SERVING FARMERS AND SAVING FARMING

FIRST REPORT

NATIONAL COMMISSION ON FARMERS
MINISTRY OF AGRICULTURE
GOVERNMENT OF INDIA, NEW DELHI
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EXECUTIVE SUMMARY

CHAPTER I - WAKE-UP CALL

The acute agricultural distress now witnessed in the country, occasionally taking the form of suicides by farmers, is the symptom of a deep seated malady arising from inadequate public investment and insufficient public action in recent years. The precise causes of the agrarian crisis are many and varied, but there are five basic factors which are central to the present crises. These are: unfinished agenda in land reform, quantity and quality of water, technology fatigue, access, adequacy and timeliness of institutional credit, and opportunities for assured and remunerative marketing. Adverse meteorological factors add to these problems. The worst affected are small and marginal farmers, tenants and share croppers, landless agricultural labour and tribal farmers, since their coping capacity is very limited. Women suffer more since they have little access to institutional credit or organised extension support.

2. The ecological foundations of sustainable agriculture such as land, water, biodiversity, forests and the atmosphere are under varying degrees of anthropogenic pressures. Water tables are going down and land degradation and soil salinisation are on the rise. Average size of farm holdings is declining and there are now nearly 115 million farmers, most of them belonging to the small and marginal farmer categories. Farmers' indebtedness is growing even in a State like the Punjab, which is the heartland of the green revolution.

3. State governments have an equal responsibility for ensuring that adequate and appropriate support is extended to the farm sector, comprising crop and animal husbandry, forestry, fisheries and agro-processing and agri-business. Even if there are good schemes which can be of real help to farm women and men, their delivery is poor. Illiterate farm women and men are also often unaware of their entitlements. An urgent need at the field level is achieving convergence and synergy among all on-going programmes. It is therefore suggested that the numerous Technology Missions currently
under implementation, such as the ones dealing with oilseeds, pulses, maize and millets, cotton, horticulture and Dairy may converge on a watershed basis, so that the water harvested and saved in the watershed is put to optimum use. To facilitate such convergence in delivery, we suggest the formation of a National Federation of Farm Technology Missions chaired by a farm woman or man, with an outstanding record of practical achievement.

4. Small farm families will have to be conferred with the power of scale at the production and post-harvest phases. Different institutional devices like the formation of self-help groups (SHGs), contract farming based on a code of conduct, group farming through small Farmers' Cotton, Horticulture and Poultry Estates, and the nurturing of watershed and command area communities, will have to be adopted according to local socio-cultural and agro-economic conditions. There is also a need for a New Deal for Women in Agriculture, in order to ensure that working women have the needed support services and have access to timely credit and extension services.

5. The two pronged strategy to resource mobilization consists of optimizing the benefits of all Government schemes and reducing their transaction costs, and optimizing the return from the resource endowments of farmers like land, livestock and water. The additional funds needed will be for filling critical gaps in current public investments and programmes.

6. Irrigation water is becoming a critical constraint in agriculture. In the Union budget of 2004-05, provision has been made to launch a massive scheme to retain, renovate and restore all the water bodies that are linked to agriculture. The following two programmes are suggested for taking this movement forward.

   i) A million well recharge programme

   ii) A programme for building, repair, recharging and rebuilding water bodies linked to agriculture.

   iii) There is need for a mandatory water harvesting regulation as is already in practice in Tamil Nadu. Government support for the Million Wells and
water bodies rehabilitation programmes could be in the form of a rebate on agricultural credit.

7. Besides the quantity and quality of irrigation water available, soil health influences output. Soils, particularly in dry farming areas, suffer from hidden hunger caused by the deficiency of micronutrients. Soil testing laboratories need to be upgraded. Hence, a National Network of Advanced Soil Testing Laboratories is recommended. Also, farmers need proactive advice on land use. Computerised databases need to be developed by multidisciplinary teams of experts. Such data can be transmitted to farming families through the Village Knowledge Centre programme.

8. In the midst of the hunger and distress “hot spots”, there are numerous agricultural “bright spots” in the country. The ‘bright spots’ covering crops, fruits trees, farm animals and fisheries indicate how we can shape our agricultural future. These bright spots are the result of the work of innovative and hard working farm women and men. It is suggested that Farm Schools may be established in the fields of such innovative farmers, in order to spread their message and methods. A cadre of grass root Master Trainers can be built up in such Farm Schools. Farm schools can also be powerful instruments for participatory research and knowledge management. Thus, starting with Farm Schools in working farmers’ fields, there will be a chain of capacity building institutions including KVKs and Agricultural Universities. Promoting 50,000 Farm Schools across the country will require an investment of Rs.150 crore.

9. The 150 districts chosen for the launch of the Food for Work and Employment Guarantee Schemes require considerable support from S & T institutions for fostering sustainable livelihoods, through integrated attention to on-farm and skilled non-farm employment. In order to facilitate multi-institutional and multi-disciplinary support for launching a job-led economic growth strategy, it is proposed that a National S&T Alliance for Rural Livelihood Security may be formed in consultation with national S&T institutions, Agricultural and Rural Universities, Civil Society and private sector industrial institutions and with counterpart structures in the States taken up for the initial Food for Work programme. An appropriate State Agricultural University may service
the State level S & T Alliance, while at the District level, the Alliance partners may work with DRDA. The aim of this partnership among public, private and academic sector S & T institutions is the technological and skill empowerment of assetless rural women and men in order to add economic value to their time and labour. If technology has been a factor in widening the rich-poor divide in the past, **the National S & T Alliance will strive to make technology an ally in the movement for gender and social equity.**

10. Our agriculture is at the crossroads economically, environmentally, socially and technologically. To reverse the present decline in farm productivity and farmers’ well being, we should go back to the advice given by Jawaharlal Nehru in 1948, “Everything else can wait but not agriculture”.

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CHAPTER II - INTEGRATED LIFE SAVING SUPPORT PROGRAMME FOR FARM FAMILIES FACING ACUTE DISTRESS

The reasons for farmers’ distress are many and varied. The low growth in agricultural per capita income is a major problem. The farmers also have to face climatic and market risks without satisfactory risk mitigation systems in position and extremely poor qualitative supply of services and inputs including credit. These constraints individually or in combination lead to poor returns and sometimes huge losses. When these take place repeatedly, the distress is acute. The cyclical nature of agriculture with occasional blessings has encouraged many small and marginal subsistence farmers to enter commercial agriculture from a position of extreme vulnerability. When their expectations are not met either due to natural or human factors, these farmers suffer a great deal. Then, there are events in the lives of the poor people like illness, accidents, large social expenditure, a major loss of asset or earning system/capacity, which drive them to the money lenders who charge high rate of interest and put harsh conditionalities to their loans. This further reduces their incomes and ultimately leads to loss of assets and finally land. With the weakening of community support as well as that of kin-networking, the farmers are driven to a state of helplessness and sorrow and in extreme cases to suicides.

2. The remedies are mainly the relief and rehabilitation measures in the event of disaster impacting a large area and their fine tuning, an effective community managed ‘Nutritional Security System’ on a life cycle basis, enhancing the productivity, profitability and stability of crop-livestock farming, creation of multiple livelihood opportunities in the farm, off-farm and non-farm sectors, improvement of the existing crop insurance system and introduction of an integrated insurance package covering accident/death/medical cover and loss to dwelling unit and other property due to fire/earthquake, etc.
3. The financial implications of taking up two immediate measures i.e., starting 10,000 community based grain banks initially in 38 out of 150 districts identified for the National `Food for Works’ Programme where the SC/ST population is more than 50% would work out to Rs.75 crore and for an integrated insurance covering accident risk, fire risk to the dwelling, natural death & medical cover for about two crore families would work out to Rs.310 crore for 2005-06.

4. The following other initiatives are suggested:

   (i) Create a National Level Steering Committee with representatives from the Govt.of India, IRDA, National Commission for Women, NABARD, IBA, NAIC, the four General Insurance Companies, SBI, the National Federation of State Cooperative Banks and one or two RRBs to oversee the development of rural insurance.

   (ii) NABARD and the Banks to broaden and deepen the Self Help Group linkages to Banks specially in the 150 identified districts and link those up with private sector/other institutions for backward & forward linkages for their products.

   (iii) Encourage establishment of private nursing homes/hospitals and Voluntary Health Services network in rural areas and block head quarters by providing tax holiday for five years and concessionality in bank credit. Such healthcare providers should agree to extend high quality but low or no cost medical facility to the poor.

   (iv) It would be useful to designate the small amount of financial help recommended for enabling the resource poor to take to insurance as life saving support and not as “subsidy, since such help is totally non-trade distorting. This will help to bring about a change in mindset with regard to saving the poor from acute distress.
PARIVAR BIMA POLICY

Based on a felt need and the IRDA decision to encourage micro insurance by allowing appointment of the Non Governmental Organisations (NGOs) and the Self Help Groups (SHGS) as agents for accepting insurance proposals upto Rs.10,000/-, an integrated family insurance policy named Parivar Bima Policy (PBP) providing floating cover for various risks other than crop and livestock has been devised. The proposed Policy could include mediclaim insurance providing reimbursement of hospitalization expenses for husband, wife and two dependent children upto Rs.10,000/- including transportation and meal charges not exceeding Rs.200/- and Rs.150/- respectively, life cover against natural death for Rs.5000/- for self (male or unmarried female taking the cover) or husband if the female is married, cover against accidental death or permanent total or permanent partial disability upto Rs.10,000/- and for insurance of dwelling unit for Rs.10,000/- to cover loss or damage to the house and contents (excluding jewellery) due to fire, lightning, riot, malicious damage, landslide, earthquake, etc. The policy thus covers the major risks which could seriously impact the life of the rural poor. The annual premium is likely to be around Rs.225/- p.a. (exact premium and the terms and conditions would, however, have to be firmed up in consultation with the Insurance Companies and IRDA). To facilitate larger coverage under the scheme, the NGO/SHG/Primary Agricultural Cooperatives (PACS) etc. could advance loan towards the premium cost to the insured and recover the same in installments. There is a potential of covering about 2 crore rural families under the PBP in the next two/three years.
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CHAPTER III – PRODUCTIVITY AND LIVELIHOOD
ENHANCEMENT IN RAINFED AREAS: TOWARDS A RAINBOW REVOLUTION

The greatest distress to farm and rural communities occurs in areas with low and uncertain rainfall, mainly in the arid and semi-arid regions of the country. The research and development work done in different parts of the country during the last 35 years has highlighted the need for the following concerted actions towards improving productivity and livelihoods in such areas:

(i) Capturing and conserving every drop of rainwater.
(ii) Enhancing the water infiltration and holding capacity and overall physical and chemical properties of the soils.
(iii) Cultivating crops which can perform optimally under conditions of water stress and scarcity.
(iv) Adopting a farming systems approach, with appropriate blends of crop-livestock integration.
(v) Improved post harvest technology and value addition to crop and animal products.

2. The principal constraints observed in reaping the full benefits from dryland farming research are the following:

(i) Lack of a watersheds approach, with all members of the watershed community working together to save and share water.
(ii) Lack of social synergy in the area of land and water use planning, with emphasis on collaborative efforts in both the production and post harvest phases of farming.
Dry lands soils are both thirsty and hungry. It is important that steps are taken to overcome these two constraints by judicious water harvesting and use, and by applying to the soil the needed micro- and macro-nutrients. The hidden hunger of the soil caused by micronutrient deficiencies needs to be addressed on a priority basis.

Major Recommendations

3. Establish a National Network of Advanced Soil Testing Laboratories capable of testing large volumes of soil samples for 16 macro and micronutrients – 1000 laboratories in all parts of the country, with 500 of them being located in dry farming areas, where there is scope for doubling average yields immediately through addressing the deficiencies of micro-nutrients in the soil, in addition to attending the needs for N, P, K.

4. Highest priority should be given to augmenting water availability by vigorously promoting rainwater harvesting, restoring water bodies and a million wells recharge programmes.

5. Convergence and synergy of all agricultural programmes around a watershed: We have recommended the formation of a National Federation of Farm Technology Missions which can assist the watershed community to access the provisions of appropriate technology missions like those relating to oilseeds, pulses, cotton, horticulture, dairy, etc. In addition, we propose the setting up at the national level a Commission for Sustainable Livelihood Security in Dry Farming Areas under the Chairmanship of an eminent farmer, who is an achiever in increasing productivity and income per every unit of water.

6. Lab to Land: Large-scale demonstrations should be organized on catalytic interventions both factor oriented, such as application of micro-nutrients for improving soil health and implements for improving soil physical properties (soil physics, chiseling
and enhancing rain water absorption) and system oriented, such as crop-livestock and crop-livestock-fish integrated systems. These would be undertaken in collaboration with CRIDA and ICRISAT.

7. Post harvest processing and value addition in collaboration with CFTRI and private sector should receive priority attention. A post harvest technology wing should be added to each Krishi Vigyan Kendra to bridge the gap between production and post harvest technologies and the KVKs may be redesignated as Krishi and Udyog Vigyan Kendras (KUVKs).

8. **Rainbow revolution** should be promoted in rainfed areas achieving substantial enhancement in the productivity of millets, pulses, oilseeds and livestock through large scale adoption of highly successful new technology packages, such as hybrid pigeonpea. Fifty thousand Farm Schools should be established in the fields of farmer-achievers.

9. Create pulses and oilseeds villages (eg. *Arhar* Villages, Sesame Villages) for specialized enhanced production (ensuring full availability of quality seeds and other specified inputs), efficient processing and remunerative producer-oriented marketing of the selected crops as well as the optimization of producing more crops and income per every drop of water by cultivating low water-requiring crops.

**Financial Provision in the Union Budget for 2005-06**

10. The following allocations are recommended:

(i) 1,000 advanced soil testing laboratories across the country, with 500 of them located in dry farming areas, each laboratory costing Rs. 50 lakhs - total allocation Rs. 500 crore.

(ii) 5,000 large-scale demonstrations on catalytic interventions in collaboration with CRIDA and ICRISAT, establishment of 1,500 seed banks and creation of 6,000 Small Holders’ Estates - Rs. 100 crore.
(iii) Establishing 50,000 Farm Schools in the fields of framer-achievers - Rs. 150 crore.

(iv) Post harvest processing and value addition in collaboration with CFTRI and private sector and strengthening of Krishi and Udyog Vigyan Kendras for post harvest management - Rs. 150 crore.

(v) Augmenting water availability by vigorously promoting water harvesting and restoring water bodies – Rs. 70 crore.

(vi) Million Wells Recharge Programme (to be promoted through interest rebate on loans)

(vii) Rainbow Revolution in rainfed areas achieving substantial enhancement in productivity of millets, pulses, oilseeds and livestock through large scale adoption of highly successful new technology packages, such as hybrid arhar - Rs. 50 crore.

(viii) Creation of pulses and oilseeds villages (Arhar Villages, Sesamum Villages) for specialized enhanced production, efficient processing and remunerative producer-oriented marketing of the selected crops - Rs. 30 crore

**Recommended total allocation: Rs. 1,050 crore**
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CHAPTER IV: A NEW DEAL FOR WOMEN IN AGRICULTURE

Under its terms of reference, NCF is “to recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership”. Women in agriculture include women farmers, share croppers and farm labourers. Though their role and contribution to agriculture is immense, it is not adequately recognized and measured and hence is not integrated into development planning and resource allocations for Plans / Budgets. This results not only in women suffering from hard work, long working hours, drudgery, poor nutrition and inadequate economic returns, but also leads to sub-optimal productivity at the national level. Women’s lack of title to land limits access to credit. Technical know-how and gender specific technologies also do not reach them. Further, their traditional wisdom and experience relating to biodiversity conservation and enhancement, seed selection and storage, water harvesting, risk-minimising agricultural practices, and sustainable use of natural resources are not adequately recognized and compensated.

2. Pro-active approaches and affirmative action strategies are needed particularly at legal, policy, strategy, programme and resource allocation levels to provide all the categories of women a level playing field in relation to their contributions in the areas of conservation, cultivation, consumption and commerce. The following priority action plan is recommended in this context.

3. Priority Action Plan:

   (i) Legal land titles including allotment of surplus land and joint pattas as well as equal returns for equal work have to be ensured through time-bound and well monitored State action. Steps should be taken to provide women access to Kisan Credit Cards and other forms of institutional credit.
(ii) The proposed Employment Guarantee Act as well as the implementation rules relating to the Protection of Plant Varieties and Farmers’ Rights Act (2001) and the Biodiversity Act (2002) should be engendered.

(iii) The on-going Food for Work programmes should provide adequate, timely and gender-specific work for women, especially to women-headed families; the concept of “work” in the case of women should include the organization of a wide variety of support services for women, such as crèches and day care centres, preparation of noon meals, etc.

(iv) In the 150 districts identified for EGS, support services and nutrition supplement, including temporary crèches, should be provided to pregnant women and mothers. Also, nutrition support should be extended to adolescent girls and infants in the 0-2 age group in 20 selected districts to begin with.

(v) Women self-help groups have to be at the core of initiatives for income generation along with close interaction with partner agencies.

(vi) Programmes covering biodiversity, Farmers’ Rights, food security at household and community levels, training, access to technology, information and credit have to promoted. The proposed Rural Knowledge Centres should promote quality, food safety, trade and legal literacy movements among women.

(vii) Engendering the Curriculum of Agricultural and Veterinary Universities, based on the Kerala Agricultural University model, should be made obligatory.
(viii) **A Gram Panchayat Mahila Fund** should be established to enable SHGs and other women’s groups to undertake community activities that help to meet essential gender specific needs.

(ix) The overall focus would have to be on the landless and land poor sections of women working in dryland farming systems, and the marginalized groups who find their access to natural resources dwindling.

(x) An institutional mechanism for policy formulation and oversight and gender audit is essential. This could be achieved through the establishment of a **National Board for New Deal for Women in Agriculture** headed by the Union Minister for Food and Agriculture, with the Union Ministers for Women and Child Development, Rural Development and Panchayati Raj serving as Co-chairs. The Board should include in its Membership representatives of various stakeholders including the National Commission for Women, State Women’s Development Corporations, Women’s Organisations, NGOs, financial institutions, academia and media.

4. **Financial Provision in the Union Budget for 2005-06:**

The following allocations are recommended:

(i) **Gram Panchayat Mahila Fund @ Rs.2 lakhs each for 10,000 panchayats** – Rs. 200 Crore

(ii) **Day Care Cum Nutrition for 0-2 years children of poor rural women** – Rs. 500 Crore

(iii) **Support to women SHGs and other women’s groups for taking up common activities for women including women’s toilets, market yards, worksheds, etc., @ Rs.1 lakh for 2500 selected groups** – Rs. 25 Crore.

(iv) **Preparation of engendered curriculum in Farm Universities, Regional consultations on the issue of land title to women, meetings of the National**
Board for New Deal for Women in Agriculture and of an Expert Group for engendering the EGS and Food for Work Programme – Rs. 1 crore.
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CHAPTER V - STRENGTHENING AND EXPANDING THE HORTICULTURE REVOLUTION

The “horticultural revolution” during the past 10-15 years, led by Maharashtra and a few other States, has resulted in considerable expansion of horticultural production and consumption. However, the overall horticultural productivity has shown little change and the productivity of fruits and plantation crops has declined during the past decade. Moreover, little is known of the benefits reaching the small and marginal farmers and landless agricultural workers. The impact has also been skewed geographically as several States did not benefit from the opportunity and the investments made. The serious mismatch between production and consumption continues due to heavy post harvest losses, poor processing, low value addition and disorganized marketing. The ongoing Horticultural Technology Mission for North Eastern Region holds good promise but its four Mini Missions are disjointed and so far not much has happened in the highest priority area of post harvest management, processing and marketing.

Major Recommendations

2. In order to provide focused attention to the high priority areas in the proposed National Horticultural Mission aiming to uplift both the rural economy and national nutritional security, we would like to suggest the following:

(i) **A National Horticulture Council** may be established with the Union Minister of Agriculture as its Chairman and the Union Ministers of the other concerned Ministries as Members, which should ensure synergy and convergence among the sectoral missions (the Mini Missions) of the National Mission.

(ii) An agro-ecologically and socio-economically differentiated approach should be adopted to cater to the needs and potential of the different agro-ecological
settings and sectors of the society viz. small farmers, tribals, landless labour and women’s groups.

(iii) Based on the studies done so far, a pilot insurance project for horticultural crops should be launched under the existing National Agriculture Insurance Scheme.

(iv) In order to ensure convergence and synergy among the four Mini Missions, a National Mission Director, who must be an eminent horticulturist with outstanding achievements in horticultural research and development, should be appointed. He/she alongwith the coordinators of the different Mini Missions should identify the priority horticultural species and areas of activities through a participatory mode, particularly taking note of the needs and potential of the small holders. Highest priority should be given to prevention of post harvest losses, processing, value addition and marketing; the NDDB model and other successful models of production–processing–marketing integration should be replicated widely.

(v) Rejuvenation of old plantations and replanting senile and unproductive orchards, production and distribution of certified planting materials, implementation of SPS measures and other regulatory mechanisms and skill development should be undertaken on priority basis.

(vi) The long standing serious diseases of major fruits viz. malformation, alternate bearing and spongy tissue of mango, should receive highest attention of researchers and technology developers.

(vii) Small farmers’ SHGs should be helped to organize themselves as Small Farmers’ Horticulture Estates (SFHE) covering an area of 200 to 500 ha. each, to capture the economies of the scale. Landless labour should be supported in specialized activities, particularly with women self help groups
for beekeeping, vermicompost, production of bio agents, tissue culture and other planting materials. Young graduates should be engaged in precision horticulture, e-trading, establishment and management of agri-clinics, and soil and pesticide testing. Low cost green houses and fertigation should be actively promoted. The KVKs and ATMAs should also perform the role of Udyog Vigyan Kendras.

(viii) The successful experience of Maharashtra and of other places should be shared widely through organizing: (i) visits to “bright” spots, (ii) linking horticulture to national Food for Work and National Rural Employment Guarantee Schemes, (iii) revitalizing the NHB on the lines of NDDB and (iv) engendering all horticultural programmes.

Financial Provisions in the Union Budget

3. Rs. 21,699 crore is already proposed under the NHM for the next seven years. The resources may be reallocated according to the priorities suggested in this Report, especially the following areas:

(i) Organization of Small Farmers’ Horticulture Estates
(ii) Post harvest management, processing and marketing
(iii) Production and distribution of quality seeds and planting materials
(iv) Imparting quality literacy.
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CHAPTER VI - ENHANCING COTTON PRODUCTIVITY, QUALITY AND GLOBAL COMPETITIVENESS

Cotton, coupled with the cotton-based textile industry, is the largest employer and income provider in India, second only to agriculture as a whole. With the coming to an end of the multi-fiber agreement on the 1st January, 2005, our cotton producers, weavers, and the textile industry will encounter both new opportunities and threats. Therefore, synergistic interaction among all the stakeholders in the country is needed to enhance the efficiency of cotton production, processing and marketing.

Major Recommendations

2. India’s cotton production is besieged with low yields, poorer fibre quality, deteriorating soil health, heavy pest infestation and excessive use of pesticides and poor supply of quality seed and other inputs. The following public policy actions are recommended for alleviating these constraints towards enhancing cotton productivity and competitiveness:

   (i) Establishment of a National Cotton Council to serve as the apex level coordinating body comprising multiple stakeholders under the Chairmanship of the Union Minister for Agriculture, with the Union Minister for Textiles serving as Co-Chairman.

   (ii) Ensuring remunerative prices to the farmers and promoting farmer-centered marketing; since the landed price of cotton this year is somewhat lower than the price prevailing in the domestic market, the import duty may be raised from 10% at present to 30%, barring that on extra long fine cottons. Appropriate levels of export tariff may be provided for maintaining the farmers’ income and the overall cotton economy.

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(iii) Appointment of a **Mission Director**, who must be an eminent cotton improvement and production expert, to integrate and coordinate the work of and to bring convergence and synergy among the four Mini Missions.

(iv) **Expanding the role of Cotton Corporation of India** in insulating the farmers from the wide price fluctuations and to advise them on the quality and varieties of cotton to be grown.

3. Priority should be accorded to the following research and technology transfer programmes.

   (i) Consistent with the bio-security requirements, promotion and development of Bt cotton and other bio-technologically designed varieties.
   (ii) Widespread adoption of new *arboreum* varieties and hybrids.
   (iii) Improvement of fiber quality to meet international standards.
   (iv) Correction of micronutrient deficiencies and carbon enrichment of soils.
   (v) Adoption of new water retention and management practices.
   (vi) Wide adoption and integration of IPM and IRM.
   (vii) Production and distribution of quality seed, biopesticides and bioagents.

4. Biomass utilization should be promoted for enhanced income and job security.

5. Establishment of **Small Farmers’ Cotton Estates**, each covering 500-1000 hectare, to increase efficiency and to provide small producers with the economies of scale, combining the advantages of production by masses with mass production technologies by fostering decentralized production supported by key centralized services at the production and post harvest phases. Each Estate can be supported by an Agri-clinic and Agri-business center operated by Farm Graduates. The Small Farmers’ Cotton Estate can each host a Rural Knowledge Centre based on modern Information and Communication Technology (ICT).
6. Credit, insurance, marketing may all be included in the Estate. The design of the Small Farmers’ Cotton Estates should be such that it represents a win-win situation for all participating farmers. Production, processing and marketing can be dealt with in an integrated manner.

Financial Provision

7. The following additional financial provisions are recommended for 2005-06:

(i) Establishment of 100 Small Farmers’ Cotton Estates, each covering 500-1000 hectare, - Rs. 175 crore
(ii) Research and technology transfer through integrated technology demonstrations - Rs. 50 crore
(iii) Promotion of biomass utilization - Rs.25 crore.

Recommended total allocation: Rs. 250 crore
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CHAPTER: VII - SUSTAINING AND EXPANDING FARM COMMODITIES TRADE: SANITARY AND PHYTOSANITARY DIMENSIONS

India’s preparedness in the field of Sanitary and Phytosanitary (SPS) measures is highly inadequate. As a result of this, several consignments of Indian farm exports were rejected in recent past. The situation is likely to get serious in the coming years since health safety standards as presented by Codex Alimentarius are getting increasingly stringent and the goal posts in developed countries have been shifting very fast. Thus, there is need for urgently launching a quality and food safety literacy movement in the villages and strengthening of SPS infrastructure.

2. We should also strengthen our quarantine facilities as several invasive weeds, pests and diseases have been introduced in the country along with grain, seed and planting material imports. About 50, important pests not yet in India, but found in the trading partner countries, could enter our country if not checked and destroyed at the border, or else these will destroy our agriculture. The Asian Flu disease of chicken in South East Asia is a case in point.

Major Recommendations

3. In view of the urgency of the steps needed both to safeguard our agricultural exports and to capture new markets, the following steps are suggested:

(i) establishing a Food Safety Council of India chaired by the Union Minister Agriculture with the Union Commerce Minister as Co-Chairman. There should be wide representation of members especially from major exporting States, both women and men covering all aspects of crops, livestock, fisheries and herbals.
(ii) augmenting and creating Survey, Surveillance and Quality Literacy Programme
(iii) strengthening SPS infrastructure and capacity
(iv) generating awareness abroad on steps taken in India to maintain high standards regarding food safety and biosecurity.

Financial Resources Required

4. To meet the above requirements and challenges of SPS Agreement, the country needs:

(i) comprehensive operation systems at all strategic points
(ii) credible diagnostic and accreditation system
(iii) science–based Pest Risk Assessment (PRA) and management
(iv) surveillance systems
(v) information, awareness and databases
(vi) audit and quality control system and enhanced quality and food safety standards.

To attain the above outputs and for spreading Codex Alimentarius standards, an additional sum of Rs 100 crore is required for the next two years, of which Rs. 60 crore is proposed during 2005-06.
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CHAPTER VIII: TOWARDS AN ERA OF KNOWLEDGE INTENSIVE AGRICULTURE MISSION 2007: EVERY VILLAGE A KNOWLEDGE CENTRE

Ecologically sound agriculture is knowledge intensive. Information empowerment of farm men and women on agriculture and allied activities, as also knowledge empowerment on a variety of issues ranging from health, education, on-farm and off-farm livelihoods, enterprise development, market linkages and quality literacy is the need of the hour. This can be effectively done through a network of Rural / Village Knowledge Centres harnessing ICT and other modern tools of communication.

These centres could operate from either the Panchayat building or village school or Study Centre of an open university and be designed on the underlying principles of social inclusion, gender equity and reaching out to remote areas and vulnerable populations. A National Alliance for MISSION 2007: Every Village a Knowledge Centre has been formed to mobilize the power of partnership among the public and private sector, academia, mass media and civil society organizations, to work together in making this vision a reality. The initiative calls for public policy support under the USO Fund and for a proactive Rural ICT policy including a community radio policy, and for public investment primarily in the areas of connectivity and setting up and operation of the Rural Knowledge Centres. There is also a felt need for Farmers’ Distress Call Centres in each State to provide timely and effective aid to farmers during periods of crises.

The four major components of Mission 2007 are Connectivity, Content, Capacity Building and Care & Management. India is in the fortunate position of being able to connect all the 600,000 villages speedily. BSNL and all the other agencies working on connectivity, including educational institutions like IIT, Chennai, should join together in fostering the rural connectivity movement. The Content has to be location specific and need based. A wide range of agencies will have to be involved for creation of relevant
content and brought under the umbrella of a National Digital Gateway for Rural Livelihood Security. A blend of non-formal training approaches, content creation in a virtual mode and its use at the Village Knowledge Centres is necessary for making a mass impact. A district level Content Consortium can be formed in each district. Again a District level Capacity Building Consortium can help to organise capacity building programmes using the pedagogic methodology of learning by doing. The care of the equipment and management of the knowledge centre can be undertaken by trained ICT-SHGs linked to Panchayats.

In this manner, an integrated self-sustaining and self-replicating system of Village Knowledge Centres can be built up. These Centres will be powerful vehicles for making the Right to Information (at the correct time and place) a reality.

It is proposed to establish 20,000 Rural Knowledge Centres covering 100,000 villages in the 150 less developed districts identified by the Planning Commission, on a priority basis in 2005. Investment support of Rs.500 crore for this is sought from the Ministry of Panchayati Raj and the USO Fund under the Ministry of Communications and Information Technology. The Ministry of Panchayati Raj is also requested to make an allocation for setting up RKCs in each Panchayat, provide for training of managers of these centres (Rural Virtual Academicians), extend incentives to rural service providers, and outsource revenue generating services to these centres (Rs.150 crore). The Farmers’ Distress Call Centres may be set up by the Ministry of Agriculture (Rs.100 crore). The creation of the National Digital Gateway for Rural Livelihood Security needs an allocation of Rs.100 crore. An Innovation Fund for rural connectivity and incentives for Rural Service Providers is called for under the USO Fund (Rs.500 crore). Banks and Financial institutions may extend low interest loans to ICT-SHGs that will manage the RKCs, to encourage ICT-based entrepreneurship (Rs.100 crore). The Ministry of Information and Broadcasting is requested to frame a community radio policy for the country and provide licenses to 4000 community radio stations in the coming year. The total financial support that will be needed from USO and the Ministries of Agriculture and Panchayati Raj during 2005-06 will be of the order of Rs.1450 crore. Such an investment will enable our villages to leapfrog in promoting knowledge intensive
agriculture and agri-business and in providing opportunities for a healthy and productive life to everyone in the village.
EXECUTIVE SUMMARY

CHAPTER IX - FOOD AND NUTRITION SECURITY

Under its terms of reference, NCF has been called upon “to work out a comprehensive medium-term strategy for food and nutrition security in order to move towards the goal of universal food security over time”. The serious hunger problems in our country relate to under-nutrition caused by inadequate purchasing power, and micro-nutrient malnutrition or hidden hunger caused by both poverty and lack of nutritional literacy. Inspite of striking progress in improving agricultural production, India is the home of the largest number of undernourished children, women and men. This unenviable reputation is unnecessary and inexcusable.

2. Nutrition Security involves economic, physical, social and environmental access to balanced diet and safe drinking water. The country has the capacity to achieve freedom from chronic hunger speedily through the introduction of an interactive and decentralized Nutrition Security programme under the supervision of Panchayats.

3. Ultimately, the country should introduce a Food Guarantee Scheme, combining the features of Employment Guarantee and Food for Work. A National Committee for a Hunger Free India may be set up under the Chairmanship of the Prime Minister, with the Union Minister for Food and Agriculture and Co-Chair, for preparing a road map for launching such a National Food Guarantee Programme. The National Committee should include in its membership Chief Ministers of States characterized by the high incidence of hunger hot spots.

There is also need to bring about a paradigm shift in the delivery of nutrition support programmes from a department-centred to a human life-cycle centred approach.

5. The following allocations are recommended during 2005-06 for moving towards the goal of achieving relative freedom from hunger by 15th August, 2007, which marks the 60th anniversary of our independence:

XXVII
i) Supplementary nutrition for adolescent girls, pregnant women and 0-2 age group children – 250,000 tons of food grains

ii) Nutrition support to HIV/AIDS/Tuberculosis affected rural women and men – 100,000 tons of food grains.

iii) Elimination of hidden hunger caused by the deficiency of iron, iodine, zinc and Vitamin A – Rs.200 crore

iv) Establishment of Community Food and Fodder Banks – Rs.75 crore for 10,000 Community Food Banks as recommended in Chapter II and Rs.25 crore for Fodder Banks.
EXECUTIVE SUMMARY

CHAPTER X – LIVESTOCK AND LIVELIHOODS

The ownership of livestock is much more egalitarian than that of land. Livestock are particularly important in arid and semi-arid areas for strengthening household livelihood and food security. The Diary and Poultry sectors, which are already playing a key role in enhancing income and nutrition, need additional attention from the point of view of the following needs.

2. **Diary:** Under and mal-nutrition of livestock cause reduced milk yield. There is need for intensifying production and distribution of fodder and feed, since most of the dairy animals are stall-fed. Fodder and Feed Banks operated by SHGs would help landless labour families to take to animal husbandry.

3. There is urgent need for a **Livestock Food Corporation** organized jointly by NDDB, SFAC and NABARD to promote and assist SHGs to undertake fodder and feed production. It is suggested that a sum of Rs.100 crore may be provided in the budget of 2005-06 to support SHGs undertaking the production of fodder and feed. Also fodder production (both perennial and annual fodder) should receive priority in the EGS and Food for Work programme.

4. **Poultry:** Resource poor farmers, particularly belonging to SC/ST rural communities can be assisted to form **Poultry Estates** based on the provision of key centralized services to support decentralized production. The help of the Egg Coordination Council and organized poultry companies in the private sector may be taken to integrate poultry farming in the **Engendered Sustainable Livelihood Security Movement**.

5. The sanitary and phytosanitary measures should be strengthened to avoid the introduction of invasive alien pests and pathogens.
EXECUTIVE SUMMARY

CHAPTER XI - BEYOND TSUNAMI: SAVING LIVES AND LIVELIHOODS

The Tsunami disaster has provided a unique opportunity for launching through public-private sector partnership an integrated psychological, ecological, agronomic and livelihood rehabilitation programme. Rehabilitation efforts in the recent tsunami affected areas have to be adopted for operation across three time dimensions: Immediate (Jan-Mar 2005), Medium term (2005-07) and Long Term (2005-10), in order to alleviate the distress of the affected fisher and farm families.

2. The immediate is in terms of i) psychological rehabilitation by way of counseling to recover from the trauma and ii) livelihood rehabilitation. It is recommended that A Special Food for Livelihood Revival and Eco-protection programme be initiated in the affected areas to create assets for the tsunami ravaged families. It is recommended that 300,000 tonnes of food grains be allotted immediately for this programme.

3. The medium and long-term strategies should cover all families along the coast and fall into three broad categories –

   a) Ecological rehabilitation through coastal bio-shields, participatory management and enhancement of coastal mangroves forests and other wetlands, promotion of community nurseries of species chosen for the bio-shield and agro-forestry programmes, regeneration of fisheries, raising of artificial coral reefs, management of marine biosphere reserves, special attention to housing through a human security driven design of coastal habitations and construction of permanent sea walls in places where there is heavy sea erosion. There should be a Code of Conduct for construction beyond 500 metres.

XXX
b) Agronomic rehabilitation through reclamation of salinised soils. This has to be done on a priority basis the help of Agricultural Universities, ICAR and CSIR. A consortium of R&D institutions set up jointly by the Department of Ocean Development, Department of Science and Technology, and Indian Meteorological Department, Government of India should map human and agricultural vulnerability to potential changes in sea level. Scientific land and water use planning will have to be done to prevent salinisation of ground water.

c) Livelihood Rehabilitation through a sustainable strategy based on the principles of social inclusion and gender equity. Aquatrain Policy should focus on conservation and sustainable use of living aquatic resources, harmony between artesenal and mechanized fishing and equitable sharing of benefits, promotion of Sea Water Farming and establishment of Coastal Biovillages. Aquaculture Estates in the Biovillages can help confer the power of scale to fisher families and lateral learning should be promoted through a coastal grid of farm schools and demonstration centers.

4. A network of Rural Knowledge Centres should be established all along the coast as soon as possible and capacity built for disaster preparedness and management
SERVING FARMERS AND SAVING FARMING

COMPOSITE FINANCIAL SUMMARY

Chapter II: Integrated Life saving support Programme for
Farm families facing acute distress

1. Community Grain Banks numbering 10,000 in the hunger
hot-spots in the 150 Districts identified for National Food
for Work Programme. Rs. 75 crore

1. Parivar Bima Policy for healthcare accidents and loss of
property. Rs. 260 crore

3. Rural Insurance Development Fund - Rs. 50 crore

Sub-total: Rs. 385 Crore

Chapter III: Productivity and Livelihood Enhancement in Rainfed
Areas: Towards a Rainbow Revolution

1. Million Wells Recharge Programme Interest rebate on
loans

2. Restoring Water Bodies and Promoting Water Harvesting Rs. 70 crore

3. Soil Health Enhancement through a National Network
of 1000 soil testing laboratories Rs. 500 crore

4. 50,000 Farm Schools in the fields of farmer-achievers Rs. 150 crore

5. Krishi Vigyan Kendras for post-harvest
processing and value addition Rs. 100 crore

6. Large-scale demonstrations of dryland farming
technologies, overcoming micronutrient deficiencies
in the soil, organisation of farmers’ groups,
establishment of seed banks and popularisation
of hybrid *arhar*

Sub-total: Rs. 1050 Crore

XXXII
Chapter IV: A New Deal for Women in Agriculture

1. Supplementary nutrition for 0-2 years age group children in 20 selected districts Rs. 500 crore

2. Gram Panchayat Mahila Fund @ Rs. 2 lakhs for 10,000 selected Panchayats Rs. 200 crore

3. Support to women Self-Help Groups for taking up common activities for women including Ladies’ toilets, market yards, worksheds etc. @ Rs. 1 lakh for 2500 selected groups Rs. 25 crore

4. Promotion of engendered curriculum in Agricultural universities, Regional Consultations on land titles, Meetings of National Boards and Expert Group etc. Rs. 1 crore

Sub-total: Rs. 726 Crore

Chapter V: Strengthening and Expanding the Horticulture Revolution

1. About Rs. 15,000 Crore is already proposed under the NHB. Provision for the measures suggested in the Report will have to be made in the National Horticulture Mission.

Chapter VI: Enhancing Cotton Productivity, Quality and Global Competitiveness

1. Integrated Technology. Demonstrations including value addition to cotton biomass. Rs. 75 crore

2. Establishment of 100 Small Farmers’ Cotton Estates, each covering 1000 hectare to increase efficiency and provide small producers with the economies of scale, credit, insurance, marketing. (in addition to Budget of the Cotton Technology Mission) Rs. 175 crore

Sub-total: Rs. 250 Crore

Chapter VII: Strengthening Sanitary and Phytosanitary Measures

1. Imparting quality and trade literacy, meeting codex alimentarius standards and preventing the introduction of invasive alien species. Rs. 60 Crore

XXXIII
Chapter VIII: Every Village a Knowledge Centre

1. Mobilizing Information Communication Technologies (ICT) for the knowledge empowerment of rural families in areas relating to weather, water, health, education, nutrition, agriculture, markets and government entitlements through Village Knowledge Centres. Rs 750 crore

2. Establishment of a National Digital Highway for Rural Livelihood Security. Rs 100 crore

3. Establishment of Farmers’ Distress Call Centres. Rs 100 crore

4. Establishment of 20,000 Rural Knowledge Centres. Rs 500 crore

Sub-total: Rs. 1450.00 Crore

Chapter IX: Hunger Free India

1. Supplementary nutrition for adolescent girls, pregnant women and 0-2 age group children 2.5 lakh tonnes of food grains

2. Nutrition support to HIV/AIDS/Tuberculosis affected rural women and men. 1.0 lakh tonnes of food grains

3. Elimination of hidden hunger caused by the deficiency of iron, iodine, zinc and Vitamin A. Rs. 200 crore

4. Establishment of Community Food and Fodder Banks. Rs. 25 crore

Sub-total: Rs. 225 Crore + 3.5 lakh tonnes of food grains

Chapter X: Livestock and Livelihoods

1. Organisation of Livestock Food Corporation of India jointly by NDB, SFAC and NABARD for Fodder; and establishment of Small Farmers Poultry Estates. Rs. 100 Crore

Sub Total: Rs 100 Crore
Chapter XI: Beyond Tsunami: Saving Lives and Livelihoods

1. Food for Livelihood Revival and Eco-protection Programme
   3.0 lakh tonnes of food grains
   Grand Total: Rs. 3496.00 Crore
   + 6.5 lakh tonnes of food grains.

Abbreviations:

1. IRDA - Insurance Regulatory Development Authority
2. NCW - National Commission on Women
3. NABARD - National Bank for Agriculture & Rural Development
4. IBA - Indian Banks Association
5. NAIC - National Agriculture Insurance Corporation
6. RRB - Regional Rural Bank
7. CRIDA - Centre for Research in Dryland Agriculture
8. ICRISAT - International Centre for Research in Semi-Arid Tropics
9. CFTRI - Central Food Technology Research Institute
10. SHG - Self Help Group
11. NGO - Non-Government Organisation
12. NHB - National Horticulture Board
13. NDDB - National Dairy Development Board
14. SPS - Sanitary and Phytosanitary
15. EGS - Employment Guarantee Scheme
16. USO - Universal Service Obligation
17. ICT - Information Communication Technology
COMPOSITE ADMINISTRATIVE INITIATIVES

Chapter I: Wake-up Call


Chapter II: Integrated Life Saving support programme for farm families facing acute distress

1. Create a National Level Steering Committee with representatives from the Govt. of India, IRDA, NCW, NABARD, IBA, NAIC, the four General Insurance Companies, SBI, the National Federation of State Cooperative Banks and one or two RRBs to oversee the development of rural insurance.

2. NABARD and the Banks to broaden and deepen the Self Help Group linkages to Banks specially in the 150 identified districts and link those up with private sector/other institutions for backward & forward linkages for their products.

3. Encourage establishment of private nursing homes/hospitals and Voluntary Health Services network in rural areas and block head quarters by providing tax holiday for five years and concessionality in bank credit.

Chapter III: Productivity and Livelihood Enhancement in Rainfed Areas: Towards a Rainbow Revolution

1. Establishment of a National Network of Advanced Soil Testing Laboratories- 1000 laboratories in all, with 500 in dry farming areas.

2. Million Wells Recharge Programme during 2005-06 by providing a rebate on interest.

3. Establishment of 50,000 Farm Schools in the farms of farmer-achievers.

4. Formation of Federation of Farm Technology Mission for assisting the water-shed community to access the appropriate technology missions.

5. Setting up a Commission for Sustainable Livelihood Security in Dry Farming Areas under the Chairmanship of an eminent farmer.
6. Demonstration on catalytic interventions in collaboration with CRIDA and ICRISAT.

7. Post harvest processing and value addition in collaboration with CFTRI and private sector. Adding a Post Harvest Wing to each Krishi Vigyan Kendra and redesignating them as Krishi and Udyog Vigyan Kendra.

8. Rainbow Revolution in rainfed areas achieving substantial enhancement in productivity of millets, pulses, oilseeds and livestock through large scale demonstrations of highly successful new technology packages, such as hybrid pigeonpea.

9. Creation of pulses and oilseeds villages (eg. Arhar Villages, Sesame Villages) for enhanced production, efficient processing and remunerative producer-oriented marketing of selected crops as well as the optimization of production of crops and income for every drop of water by cultivating low water-requiring crops.

Chapter IV: A New Deal for Women in Agriculture

1. Legal land titles including allotment of surplus land and joint pattas as well as equal rights for equal work have to be ensured through time-bound and well-monitored State Action.

2. Women self-help groups have to be at the core of initiatives along with close interaction with partner agencies.

3. Programmes covering bio-diversity, food security at household and community levels, training, access to technology, information and credit have to be ensured.

4. Support services and nutrition supplement for expectant and mothers especially through temporary crèches at work sites, particularly in 20 selected districts out of the 150 districts identified for EGS. To begin with, nutrition for children in the 0-2 age group in view of their vulnerability.

5. Margin money for Women’s SHGs for undertaking common productive activities for farming women.

6. Engendering of curriculum in Agriculture Universities based on Kerala Agricultural University model.

7. A Gram Panchayat Mahila Fund for women to enable SHGs of women to undertake community activities that help to meet essential gender specific needs.

8. Overall focus would have to be on the landless and land poor sections of women working in dryland farming systems and the marginalized groups who find their access to natural resources dwindling.
9. Establishment of a National Board for Women in Agriculture headed by Union Minister for Agriculture and co-chaired by Union Minister for Women & Child Development and Union Minister for Panchayati Raj, and consisting of various stakeholders including NGOs, financial institutions, academia, media etc. for policy oversight and gender audit.

Chapter V: Strengthening and Expanding the Horticulture Revolution

1. A National Horticulture Council may be established with the Union Minister of Agriculture as its Chairman.

2. A pilot insurance project for horticultural crops may be launched.

3. A National Mission Director may be appointed to identify the priority horticultural species and areas of activities.

4. Small farmers SHGs may be helped to organize themselves into Small Farmers’ Horticulture Estates covering an area of 200 to 500 hectares to capture the economies of scale.

5. The successful experience of Maharashtra and of other places should be shared widely through organizing (i) visits to “bright” spots, (ii) linking horticulture to National Food for Work and National Rural Employment Guarantee Schemes, (iii) revitalizing the NHB on the lines of NDDB and (iv) engendering all horticulture programmes.

Chapter VI: Enhancing Cotton Productivity, Quality and Global Competitiveness

1. Establishment of a National Cotton Council to serve as the apex level coordinating body comprising multiple stakeholders under the Chairmanship of the Union Minister for Agriculture, with the Union Minister for Textiles serving as Co-chairperson.

2. Import duty on cotton may raised from 10% to 30%, barring the extra long fine cotton. Appropriate levels of export tariff may be provided for maintaining the farmers’ income and the overall cotton economy.

3. A Mission Director may be appointed to integrate and coordinate the work of the four Mini Missions.

4. The role of Cotton Corporation of India may be expanded for insulating the farmers from wide price fluctuations and to advise farmers on the quality and variety of cotton to be grown.
5. Small Farmers Cotton Estates may be established to increase efficiency and to provide small producers with the economies of scale. Credit, insurance and marketing may all be included in the Estates and supported by an Agri-clinic and Agri-business centres.

Chapter VII: Sustaining and Expanding Farm Commodities Trade: Sanitary and Phytosanitary Dimensions

1. Establishment of Food Safety Council of India chaired by the Union Minister of Agriculture with the Union Commerce Minister as Co-Chairperson and representation from all stakeholders.

2. Survey, Surveillance and Quality Literacy Programme.


4. Generating awareness abroad on steps taken in India to maintain high standards regarding food safety and biosecurity.

Chapter VIII: Towards an Era of Knowledge Intensive Agriculture Mission 2007: Every Village a Knowledge Centre

1. Establishment of 20,000 Rural Knowledge Centres (RKC) covering 1 lakh villages in 150 districts identified by the Planning Commission for EGS.

2. Establishment of RKCs in each Panchayat, providing for training of managers of these centres, extending incentives to rural service providers, and outsourcing revenue generating services to these centres.

3. Establishment of Farmers’ Distress Call Centres.


5. Establishment of an Innovation Fund for Rural Connectivity and incentives for rural service providers under the USO Fund.

6. Access to low interest loans to ICT-SHG from banks and financial institutions.

7. Developing a new policy to encourage the spread of Community Radio(FM) and license to 4000 community Radio Stations.

XXXIX
Chapter IX: Hunger Free India

1. Setting up of a National Committee for Hunger Free India under the chairmanship of the Prime Minister, with the Union Minister for Food and Agriculture as Co-chair for preparing a Road Map for launching a National Food Guarantee Programme, combining the features of Employment Guarantee and Food for Work.

2. Establishment of a Food Safety Council of India with the Union Minister for Food and Agriculture as Chairman and the Union Minister for Health and Commerce as Co-chairs.

3. Supplementary nutrition for adolescent girls, pregnant women and 0–2 age group children.


5. Programme for elimination of hidden hunger caused by the deficiency of iron, iodine, zinc and Vitamin A.


Chapter X:-Livestock and Livelihoods

1. Organisation of Livestock Food Corporation of India jointly by NDDB, SFAC and NABARD for stimulating and supporting Fodder; and Feed Producing SHGs.

2. Formation of Poultry Estates by resource poor farmers for achieving centralized services to support decentralized production with the help of the Egg Coordination Council.

3. Strengthening of the sanitary and phytosanitary measures to avoid introduction of invasive alien pests and pathogens.

Chapter XI: Beyond Tsunami: Saving Lives and Livelihoods

1. Setting up of a Committee under the chairmanship of Union Home Minister, to monitor progress in the implementation of the integrated rehabilitation strategy suggested by NCF for Tsunami affected regions.
2. Launching of Special Food for Livelihood Revival and Eco-protection Programme in Tsunami affected areas.

3. Fostering a Coastal Bio-shield programme for minimizing the fury of cyclonic storms and tidal waves.

4. Fostering a Coastal Bio-village Movement for providing multiple livelihood opportunities.

5. Organising a network of Rural Knowledge Centres in Coastal villages.

6. Aquarian Reforms for promoting sustainable fisheries

Abbreviations:

1. IRDA - Insurance Regulatory Development Authority
2. NCW - National Commission on Women
3. NABARD - National Bank for Agriculture & Rural Development
4. IBA - Indian Banks Association
5. NAIC - National Agriculture Insurance Corporation
6. RRB - Regional Rural Bank
7. CRIDA - Centre for Research in Dryland Agriculture
8. ICRISAT - International Centre for Research in Semi-Arid Tropics
9. CFTRI - Central Food Technology Research Institute
10. SHG - Self Help Group
11. NGO - Non-Government Organisation
12. NHB - National Horticulture Board
13. NDDB - National Dairy Development Board
14. SPS - Sanitary and Phytosanitary
15. EGS - Employment Guarantee Scheme
16. USO - Universal Service Obligation
17. ICT - Information Communication Technology
CHAPTER I

WAKE-UP CALL

“Forget the past, Remember every day dawns for us from the moment we wake up. Let us all, every one, wake up now”

Mahatma Gandhi, January 1948

This report is designed to serve both as a wake-up call to the nation on the deteriorating farm conditions, as well as on the opportunities available to enhance our global agricultural competitiveness and to overcome to a great extent the scourges of endemic and hidden hunger now affecting nearly 25% of our population by 15 August, 2007, which marks the 60th anniversary of “our tryst with destiny”, to quote Jawaharlal Nehru’s historic words. Our agriculture is at the crossroad economically, ecologically, technologically, socially and nutritionally. A “business as usual approach” in the farm sector now will lead to an unprecedented human calamity, the beginnings of which we are now witnessing in the form of suicides by farmers in several parts of the country, including the Punjab which is the heartland of intensive agriculture.

2. In order to recommend policies, programmes and measures for accelerated, diversified agricultural development, that would alleviate rural poverty and raise the standard of living of the farmers’ community in the new millennium, a National Commission on Farmers was set up vide Resolution dated 10th February 2004 of the Ministry of Agriculture, Government of India, under the Chairmanship of Shri Som Pal and consisting of two Full-time Members and three Part-time Members in addition to a Member Secretary.

Following the installation of the United Progressive Alliance (UPA) Government in the Centre, it was deemed necessary to revise the Terms of Reference and Composition of the Commission in order to reflect the priorities and concerns outlined in the Common Minimum Programme. Accordingly, the Commission was reconstituted under the Chairmanship of Prof. M.S.Swaminathan. The terms of reference and the composition of NCF are in Annexure 1.
Prof M S Swaminathan joined as Chairman, NCF on 11 August 2004. Since then, the Commission has held consultations with State Governments, financial and insurance institutions, representatives of farm and tribal women and men, and civil society organizations, academia and media representatives working on problems relating to farming and farmers. In addition to several meetings in New Delhi, consultations were held at Cochin, Chennai, Hyderabad, Jeypore (Orissa), Ahmedabad, Shillong, Dehra Dun and Mumbai. Ensuring the income, work and livelihood security of farming families through enhancing the productivity, profitability and sustainability of the major farming systems, strengthening the food and nutrition security of the nation, imparting value addition to the time and labour of assetless agricultural labour families through technological and skill empowerment, ensuring gender justice and equity in all agricultural development programmes, and involving Panchayati Raj institutions in fostering environmentally sustainable agricultural progress have been the basic principles in the approach of NCF to fostering agrarian prosperity and rural livelihood and ecological security.

3. **Challenges**

Farm families in India constitute over two thirds of the population. Since farmers are also consumers, the sharp distinction often made in industrialized countries between the interests of farmers and consumers, is not valid in the Indian context. Detailed analyses of the causes of food insecurity in rural and urban areas have revealed that the major cause of under- and malnutrition among children, women and men is the lack of adequate purchasing power to permit access to balanced diets and clean drinking water. Therefore, NCF feels that a 3-pronged strategy needs to be introduced to ensure the economic well-being and nutrition security of rural families. First, families possessing assets like land, livestock or fish ponds will have to be assisted to enhance the productivity of their resource endowments in an environmentally and economically sustainable manner. The smaller the holding, the greater is the need for marketable surplus. Hence, the highest emphasis has to be placed on increasing output per units of land, water, nutrients and labour based on technologies which are ecologically and economically sound. For this, we need more research on the development of eco-technologies based on blending traditional ecological prudence with frontier technologies like information and biotechnology and space and renewable energy technologies.
Second, nearly a third of the rural population and a large proportion of women earn their livelihood through wage employment. They have no assets like land or livestock or fish ponds and are also often illiterate. The challenge in the case of landless agricultural labour is enhancing the economic value of their time and labour by bringing about a paradigm shift from unskilled to skilled work. A massive effort in the area of knowledge and skill empowerment of the women and men constituting the landless labour work force is essential if economic value is to be added to their time and labour. They will have to be enabled to take to skilled non-farm employment through market-driven micro-enterprises supported by micro-credit. Self-help Groups (SHGs) of assetless women and men will have to be made sustainable through backward linkages to credit and technology and forward linkages with markets. Common property resources will have to be developed and managed in a manner that they can provide essential support systems in areas such as fodder and feed for stall-fed animal husbandry as well as fuel wood. At the same time, the unfinished segments of land reform including the distribution of ceiling surplus land to assetless families should be attended to with speed and commitment. The interests of unregistered cultivators, tenants and tribal cultivators will have to be safeguarded.

The third group are rural artisans working in the secondary and tertiary sectors of the economy. Their skills will have to be mobilized to enhance the competitiveness of agriculture through value-addition to primary products and diversification of livelihood opportunities. The strategy for the technological upgradation of rural professions should be based on the principle of social inclusion.

Thus, the three pronged strategy consists of improving the productivity of land, water, livestock and labour in the case of asset owning farm families, converting unskilled agricultural labour into skilled entrepreneurs engaged in organizing market-driven non-farm enterprises, and enhancing the skills of families involved in the secondary and tertiary sectors of the rural economy, so that they are able to assist in improving agricultural efficiency and competitiveness and in ending the prevailing mismatch between production and post-harvest technologies.

4. **Threats:**

First, the ecological foundations essential for sustained advances in productivity, such as soil, water, biodiversity and forests are under severe anthropogenic pressures. The human and
farm animal population supporting capacity of the ecosystem has been exceeded in many parts of the country. The quantity and quality of ground water, which is now the dominant source of irrigation water, is fast deteriorating. Although India has over 20% of the world’s farm animal population, good grazing lands are practically non-existent. Compounding current problems, the possibility of adverse changes in precipitation, temperature and sea level due to global warming and climate change is no longer just a theoretical conjecture.

Second, in the area of farm economics, resource flow to the agriculture sector is declining and indebtedness of small and marginal farm families is rising. Input costs are increasing, while factor productivity is declining. Contrary to the general impression of agrarian prosperity in the Punjab, the total debt in the farm sector has been estimated to have increased from Rs.5,700 crore in 1996-97 to Rs. 11,133 crore in 2002-03. The average farm debt in the Punjab now exceeds a lakh of rupees (Rs. 1,01,210), out of which more than 40% is provided by non-institutional sources at an interest rate of nearly 24% per annum. The cost-risk-return structure of farming is becoming adverse to over 80 million farming families operating small holdings, since the resource poor families cultivating 1 to 2 ha or less are unable to benefit from the power of scale at both the production and post-harvest phases of farming.

Third, a technology fatigue has further aggravated farmers’ problems, since smaller the farm the greater is the need for sustained marketable surplus, in order to have cash income. Linkages between the laboratory and the field have weakened and extension services have often little to extend by way of location, time and farming system specific information and advice. Good quality seeds at affordable prices are in short supply and spurious pesticides and biofertilizers are being sold in the absence of effective quality control systems. Input supply is in a disarray particularly in dry farming areas. Micronutrient deficiencies in the soil as well as problems relating to soil physics are crying for attention. Farmers have no way of getting proactive advice on land use based on meteorological and marketing factors. Though it is now over ten years since the WTO regime started operating in agriculture, serious attempts are yet to be made to launch in rural areas movements for quality literacy (sanitary and phytosanitary measures and codex alimentarius standards of food safety), trade literacy (likely demand-supply and price situation) legal literacy (IPR, Farmers’ Rights) and genetic literacy (genetically
modified crops). No wonder the prevailing gap between potential and actual yields even with technologies currently on the shelf is very wide (Table 1).

<table>
<thead>
<tr>
<th>Crop</th>
<th>USA</th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>8900</td>
<td>4900</td>
<td>2100</td>
</tr>
<tr>
<td>Paddy</td>
<td>7500</td>
<td>6000</td>
<td>3000</td>
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<tr>
<td>Soybeans</td>
<td>2250</td>
<td>1740</td>
<td>1050</td>
</tr>
<tr>
<td>Seed Cotton</td>
<td>2060</td>
<td>3500</td>
<td>750</td>
</tr>
<tr>
<td>Tomato</td>
<td>6250</td>
<td>2400</td>
<td>1430</td>
</tr>
</tbody>
</table>

5. In the area of technology, there is also need to bridge the growing digital and genetic divides. Post-harvest technology is poor and there is little value addition particularly in the case of fruits, vegetables and spices including a wide range of tubers and medicinal and aromatic plants. Sustainable intensification, ecologically, economically and nutritionally desirable diversification and value addition to the entire biomass are important for raising small and marginal farm families above subsistence level. All this will call for initiating an era of knowledge intensive agriculture. Modern information communication technologies (ICT) afford an opportunity for launching a knowledge revolution in rural India. The torch bearers of this revolution should be rural women and men. **Participatory research and knowledge management involving farm women and men should be the principal pathways of research, education and extension. Farmers should be regarded as partners and innovators in bringing about agricultural transformation and not as beneficiaries of government programmes. Such a change in mindset among government functionaries is essential for progress.**

Technologies should help in promoting labour diversification and not displacement. Women farmers and labour particularly need to be assisted with implements and equipment which will help to reduce drudgery and the number of hours of work, while adding economic value to each hour of work. Women suffer from a multiple burden on their time due to home making and keeping, child rearing and income earning responsibilities. They need appropriate support services like crèches and child care centres and adequate nutrition. The feminisation of agriculture, due to male outmigration, needs specific attention with reference to gender sensitive
farm and credit policies. **All research and development programmes in agriculture must be engendered.**

Revitalisation of small farmer-friendly technologies should be based on sound principles of economics and participatory research and knowledge management. If for example, rice-wheat rotation is not desirable in the Punjab from the standpoint of ecological sustainability, the alternative farming systems proposed should be capable of yielding similar income. **Agronomic data should not only indicate yield per hectare of land, but also the likely return from every rupee invested and every liter of water used by the farmer.** Lateral learning among farm women and men should be fostered, since farmer to farmer learning is based on the principle – “one ounce of practice is worth tons of theory”. India is also the home of some of the best farm families in the world. In the midst of many hunger and agro-ecological “hot spots”, there are also numerous farming “bright spots”. In order to multiply the benefits from the experience and skills of outstanding farm men and women, **Farm Schools** should be established in their fields.

6. **Priorities:**

Based on Consultations with State Governments as well as discussions with farm and tribal women and men and media representatives, a few areas were identified for priority public policy support and financial allocation in the Union and State budgets for 2005-06. A business plan approach was adopted while developing the immediate, “save farmers and farming action plan”, since we are aware that our proposals should not merely be desirable, but **should be actionable and affordable.** We would like to stress that agriculture being a State subject, State governments also have the responsibility of providing adequate support particularly to meet the needs of location-specific agricultural problems, as well as the health, education, drinking water and other social and production infrastructure essential for farm and agricultural labour families to have an opportunity for a healthy and productive life. Public policies which are likely to result in **ecocides** (i.e. ecological suicides) should be avoided. Pandemics like HIV/AIDS and Tuberculosis need to be checked, if our agriculture is not to experience the kind of human disease-induced setback currently occurring in several countries in Africa.
Based on such considerations, the following areas have been identified for adequate support in the Union and State budgets of 2005-06:

A. **Life-saving support for farm families experiencing acute distress due to a combination of meteorological, marketing, technological, social and credit and input management factors:** The causes for the distress are diverse and there is no simple or single remedy. Our immediate suggestions relate to risk management through a basket of insurance options, and streamlining of delivery systems relating to credit and other entitlements. At the same time, a beginning can be made in the 150 districts identified for the National Food for Work programme to form consortia of public and private sector agencies for assisting resource poor farm women and men to strengthen their livelihood security through additional on-farm and off-farm income. The private sector can particularly play a vital role by helping to provide assured and remunerative marketing avenues for farm produce and for the products produced by SHGs. Outsourcing of manufacturing tasks from urban to rural areas should be fostered.

B. **Productivity and Livelihood Enhancement in rainfed areas.** The major pathway has to be productivity enhancement and the cultivation of high-value but low-water requiring crops. A catalytic intervention which will help to increase productivity immediately is attention to soil healthcare. The provision of micronutrients like sulfur, zinc and boron can help to increase yield by over 50% in dryland farming areas. Facilities for identifying and remedying micro-nutrient deficiencies in soils are urgently needed. **Soil Health Clinics** can be operated by SHGs comprising rural women and men who can issue each farm family with a **Soil Health Card.** Also, livestock and livelihoods are closely inter-related in dry farming, semi-arid and arid-areas. Hence, the establishment of fodder and feed banks should receive urgent attention. The gap between available scientific know-how and field level do how is very large in dryland farming areas. Bridging the productivity gap in an economically viable manner is the best safety net against farmers’ distress in such areas. For accelerating progress in finding lasting solutions to the economic woes of farmers and agricultural labour, it would be useful to form District-level consortia of private and public sector institutions willing to help in improving small farm income and off-farm employment opportunities.
C. **Small Farmers’ Horticulture Estates.** The cultivation of fruits, vegetables, flowers, spices, medicinal and aromatic plants is now happening in a big way in several parts of the country. Being perishable commodities, horticultural crops need effective infrastructure support in the areas of production, processing, storage, transportation and marketing. In villages adjoining large consumption centres (both for home and export markets), small farmers can be helped to organise **Small Farmers’ Horticulture Estates** in the form of SHGs covering an area of 200 to 500 hectares. In such Estates, specialized activities like seed production, tissue culture propagation, production of compost, vermiculture, biofertilizers, biopesticides and e-commerce can be promoted through technological and credit empowerment. Such Estates will confer on farmers cultivating one to two hectares the power of scale both at the production and post-harvest phases of the horticultural enterprise. Low cost green houses coupled with fertigation techniques can be promoted, in addition to high-tech horticulture which can be undertaken by farm and home science graduates. The production of good quality, disease-free planting material is important in all clonally propagated species. Also, seeds and planting materials of varieties suitable for processing will have to be provided to farmers in areas where production and processing are linked. Such symbiotic linkages between producers and processors will facilitate sourcing of good quality raw material for the processing industry.

D. **Enhancing the productivity of cotton and the global competitiveness of the cotton textile industry:**

The textile sector is a major employment and income providing sector of the national economy. With the coming to an end of the multi-fibre arrangement on 1\textsuperscript{st} January, 2005, our cotton producers, weavers and the textile industry will encounter both new opportunities and threats. Without enhanced efficiency, it will be impossible to take advantage of the emerging market opportunities. Technological upgrading of all the components of the cotton production – processing – marketing cycle, will be needed to prevent this vital sector of our economy, particularly with reference to both employment and export earning potential, from setbacks. A productivity, quality and value addition revolution is urgently needed in cotton production and processing. To provide overall
coordination and policy support it will be advisable to establish a Multi-stakeholder National Cotton Council, with the Union Ministers for Agriculture & Food and for Textiles as Chair and Co-Chair of the proposed National Cotton Council.

E. Women farmers and farm labour:

There is increasing feminisation of agriculture in families with small and marginal holdings, due to the out-migration of men. The problem is particularly severe in hill areas like Uttaranchal, Jharkhand and the N.E. States. Yet, out of nearly 44 million Kisan Credit Cards so far issued in the country, less than 10 percent seem to have been issued to women (precise data are not available). The proposed conferment of land rights to women will help to redress this distressing situation. Meanwhile, joint pattas will have to be issued to make women eligible for institutional credit. Also, women working the whole day in the field require support services like crèches and day care centres. A unique opportunity now exists for engendering the ongoing National Food for Work programme by enlarging the concept of work in the case of women by including such initial activities like running crèches and child care centres, preparing school noon meals, undertaking immunization of children, providing family planning services, etc. The curriculum of Agricultural, Veterinary, Forestry and Fisheries Colleges should be engendered without further delay.

F. Every Village a Knowledge Centre:

India’s strength in ICT provides uncommon opportunities for taking digital and knowledge connectivity to every village in the country by August 15, 2007. Reaching the unreached and voicing the voiceless will be possible through an integrated ICT strategy involving the internet, community radio, cable TV and vernacular press. The fibre optic network of Bharat Sanchar Nigam Ltd (BSNL), comprising 30,000 exchanges, covers all the 6,000 blocks of the country. If each exchange is extended to 20 nearby villages, all the 600,000 villages can be covered at minimal expenditure. It is unfortunate that out of 16 tetra bits of international connectivity available now, only 0.35 tetra bits have been lit. Less than 0.20 tetra bits are being used. We should aim to leapfrog in spreading the power of the digital age to rural India.
The Rural Knowledge Centres should be located in public spaces like Panchayat Centres or Village Schools, so that there is social inclusion in access. The National Alliance for Mission 2007: Every Village a Knowledge Centre and the Jamsetji Tata National Virtual Academy for Rural Prosperity are effective instruments for launching knowledge based agriculture and rural non-farm enterprises. Panchayat Raj institutions will have to play a leading role. NABARD, SBI and other financial institutions can support Rural ICT SHGs, who can maintain and operate the Knowledge Centres. Connectivity, content, capacity building, care and management of the Knowledge Centre will all need integrated attention to make the movement socially meaningful and economically sustainable.

G. Building a Sustainable Nutrition Security System:

Nutrition security is best defined as “physical, economic, social and environment access to balanced diet and clean drinking water for all and for ever”. The Central and State Governments have initiated from time to time a large number of nutrition safety net programmes. An accelerated advance in achieving the goal of nutrition security at the level of every child, woman and man will be possible through the following interactive steps:

- Deliver all nutrition support programmes on a whole life cycle basis and fill up gaps in ongoing programmes, such as the nutritional needs of adolescent girls, pregnant women and 0-2 infants.

- Ensure access to clean drinking water, environmental hygiene, primary healthcare and primary education.

- Take special steps to overcome hidden hunger caused by micronutrient deficiencies like iron, iodine, zinc and Vitamin A.

- Promote the cultivation and consumption of fruits and vegetables as well as of dairy products.

- Facilitate the setting up of local level community Food Banks, comprising locally grown grains like millets and legumes, thereby enlarging the
composition of the food basket. Also, promote the setting up of Fodder and Feed Banks, since livestock and livelihoods are intimately related in most parts of the country, particularly in semi-arid and arid areas.

- Generate awareness about the human and farm animal population supporting capacity of the ecosystem, in order to generate interest in population stabilization.

- Launch a massive movement in rural areas for additional employment and income generations. The on-going Self-help Group (SHG) revolution should be made sustainable through backward linkages with technology and credit and forward linkages with markets.

- Provide nutrition support to rural women and men suffering from HIV/AIDS and Tuberculosis.

Such a local level Nutrition Security Compact is best designed and managed by SHGs operating under the oversight of the Gram Panchayat and Gram Sabha. We should also plan to launch a Food Guarantee Scheme by integrating the principles of Employment Guarantee and Food for Work programmes.

H. Employment generation in Agriculture:

In the ultimate analysis, a sustainable end to hunger can be achieved only by providing opportunities for every woman and man to earn their daily bread. A detailed strategy for creating additional skilled jobs through horticulture, cotton, energy plantations, animal husbandry, biofuels and biomass utilization is being developed. India is rich in livestock resources. Nearly 20% of the farm animal population are in India. Crop-livestock integrated production systems can help to enhance both household nutrition security and cash income. Over-riding priority should go to fighting the famine of jobs / sustainable livelihood opportunities through the creation of economically rewarding and intellectually stimulating work opportunities in villages. This is the only way to attract and retain educated youth in villages.
7. **Uncommon Opportunities:**

This first report is designed to assist Central and State Governments to arrest the decline of farm income and farmers’ distress. It provides implementable and affordable suggestions for triggering an agriculture-led economic and livelihood revolution. No further time should be lost in taking advantage of the opportunities for saving farmers and farming through the opportunities highlighted in this report in the form of business plans.

There are numerous institutional structures already available to Government, like SFAC, NHB, NDDB, Agri-clinics, Agri-business Centres, Food Parks, Agro-export Zones, several Commodity Centred Technology Missions, Watershed and Wasteland Development Programmes etc. Instead of starting many new schemes, what is needed is the revitalization and restructuring of existing schemes and institutional structures and the retooling and retaining of existing staff. Also, we are suggesting ways of minimizing transaction costs and improving delivery efficiency through convergence and synergy among the numerous on-going vertically structured programmes.

The initiation of a National Rural Employment Guarantee scheme together with an expanded Food for Work Programme provides a unique opportunity for launching a multi-pronged attack on poverty and rural unemployment. Engendered work under this programme can become a catalyst of a long term sustainable livelihood security movement in the different ecological, hydrological and farmers’ distress hot spot regions of the country.

NCF feels that all the above programmes will have to be implemented in a decentralized manner with authority and accountability being linked at the field level. The 11th Schedule of the Constitution Seventy-Third Amendment Act 1992 on The Panchayats lists agriculture, including agricultural extension as the very first responsibility of Panchayats (Article 243 G). Other items including Animal husbandry, dairying and poultry, fisheries, minor irrigation, water management, watershed development, land improvement, implementation of land reforms and land consolidation and soil conservation are also the responsibilities of Panchayats. Therefore they should
be actively involved in the detailed planning and implementation of the priority action plan proposed in this Report.

8. **Malady – remedy Analysis**

The crisis in our agriculture has arisen because of lack of appropriate public policies as well as adequate public investment in rural infrastructure. Therefore, the cures for the prevailing maladies can be found only in public policies and investment. Spending by Central and State Governments in strengthening the ecological, technological and social foundations for sustained advances in farm productivity has been going down. Most of the money spent by Central and State Governments goes to the salaries of government officers and employees. Consequently, rural infrastructure including power, irrigation, market yards, rural godowns and communication, as well as vital sectors like health and education remain grossly under-funded.

Declining credit-deposit ratios in rural areas, volatility of prices, weak research and extension and neglect of women farmers and farm labour have all added to the woes of the farming community. Indebtedness of farmers is rising not only because of farming related expenditure, but also because of the need for money for healthcare. The public healthcare system in villages is in a state of collapse. Pandemics like HIV/AIDS and Tuberculosis are spreading in villages. Because of protein-energy under-nutrition as well as micro-nutrient deficiencies, a purely drug based approach to the control of diseases is not adequate. A nutrition support programme is equally important. Thus, there is need for a holistic approach in addressing the technological, financial, health, educational and marketing problems faced by farm women and men.

The crucial role of women farmers and labour in agriculture is yet to receive recognition. Women play a key role in all the four major components of farming, namely, conservation, cultivation, consumption and commerce. Until the commitment to provide land rights to women is fulfilled, it is important to ensure that joint pattas making women eligible for Kisan Credit Cards and institutional credit, are issued without further delay. 2005 marks the tenth anniversary of the Beijing Conference on Women and Development which drew attention to the growing feminisation of agriculture and of
poverty. Therefore it will be appropriate to introduce in the 2005-06 budget a **New Deal for Women in Agriculture**. The various components of such a New Deal are described in this Report. Credit, insurance, technology development and dissemination, healthcare, education, input supply, output marketing and rural employment and food for work programmes should all be engendered.

Another area which needs urgent attention is the economy of scale in farm holdings. The average size of farm holding has declined from 2.69 h.a. in 1960-61 to 1.41 h.a. in 1995-96. The process of decline in the size of an operational holding is continuing. There are now about 115.6 million farms. The use of purchased inputs by farmers has multiplied 283 times during 1950-51 to 2000-01. To meet input costs, the rural poor borrow 84% of their credit needs from non-formal sources. The quantities of marketable surplus have multiplied to the tune of 10 times of cereals, 4.6 times of oilseeds, 5.3 times of milk, 15.4 times of poultry products and 7.4 times of fish during the last 50 years. Yet, post-harvest infrastructure is weak. Even now farmers in several parts of the country dry the freshly harvested paddy on paved roads, where there is often heavy vehicular traffic. Drying yards are a luxury in a majority of villages.

Value addition in the case of horticulture products is less than 10%. The gross marketing margin in farm commodities is estimated at Rs.1009 billion, out of which nearly 70% is accounted by marketing cost. About 77% of marketing costs are estimated to be avoidable losses during handling, storage and transport. Quality, labeling, brands, taxes, subsidies, sanitary and phytosanitary (SPS) issues, price volatility, removal of quantitative restrictions on imports and the absence of a level playing field in international trade due to the very high support (nearly 1 billion dollars per day for 10 million farming families) extended to farmers in OECD countries, are all becoming significant factors in agricultural marketing.

9. **Enhancing Agricultural Competitiveness: Basket of Choices**

Raising the agricultural competitiveness of farmers with small holdings is a major challenge. Methods of conferring the power of scale to small farm families both at the production and post-harvest phases of farming is an urgent necessity. A basket of
choices should be available to farm women and men cultivating 1 or 2 h.a. or below to enhance their income earning capacity. Productivity improvement to increase the marketable surplus available to small farm families, assured and remunerative marketing opportunities, and creating opportunities for landless agricultural labour families for skilled non-farm employment should be the bottom line of public policy. The basket of choices for enhancing productivity, profitability and sustainability could include the following:-

a) Formation of Self-help groups of farm families to undertake group operations in areas like water harvesting and management, pest management and post-harvest technology. Some examples are: Small Farmers’ Horticulture, Cotton and Poultry Estates.

b) **Promotion of contract farming** to ensure assured marketing outlets on the basis of a well defined Code of Conduct; the **Code of Conduct for Contract farming** should include provision of support to small producers in the areas of technology and input supply and fair price for the produce.

c) Revitalising and restructuring various government schemes like Agri-clinics, Agri-business centres, Rural Godowns, Small Farmers Agri-Business Consortium (SFAC), National Horticulture Board, etc. so as to make them farmer centric.

d) Promoting the active involvement of Panchayati Raj institutions and local bodies to foster Water-shed/Command Area Communities and making the Water-shed or the irrigation command area the point of convergence and integration of all relevant Technology Missions like those relating to oilseeds, pulses, maize, cotton, horticulture, milk, etc. Convergence and Synergy among the numerous Technology Missions now in progress will improve their utility and impact and also help to reduce overall transaction costs. All the Missions could be integrated under an umbrella set-up which could be termed “**National Federation**
of Farm Technology Missions”. The ongoing Missions operating on parallel lines appear to have very little accountability, since in spite of their existence, imports of pulses and oilseeds are going up. Pulses and oilseeds are important nutrition and income providing crops in rainfed areas and farmers in dry farming areas will continue to suffer in poverty and deprivation unless the proposed National Federation of Farm Technology Missions extends to them the needed help at the right time and place. Such a National Federation is best Chaired by a practicing farm woman or man, who has a proven record of unleashing the power of creativity in small farm management. Its major aim should be to enhance farm productivity and agrarian and rural prosperity.

10. **Resources**

   The underlying principles governing our recommendations are affordability and implementability. Catalytic actions are needed to achieve more from the available resources. The resource use and mobilization strategy of NCF has the following four components:

   a) Maximise the benefits from the resources allotted to agriculture by the Central and State Governments by bringing about convergence and synergy among the numerous on-going programmes with the active involvement of Panchayats and local bodies. An example is the proposal to use the watershed or command area of an irrigation project as the hub of all appropriate Technology Missions and create for this purpose a National Federation of Farm Technology Missions chaired by an outstanding farmer.

   b) Make additional allocations to fill critical gaps in essential rural and agricultural infrastructure and services, including education, irrigation and post-harvest technology.

   c) Enable small farm families to maximize the benefits of their land, livestock and other assets by bridging the prevailing gap between scientific know-how and field
level do-how through mutually reinforcing packages of technology services and public policies.

d) Help rural families without assets like land, livestock or fish pond to take to skilled non-farm employment through market driven micro-enterprises supported by micro-credit.

e) Promote the effective implementation of all land reform measures, including the distribution of ceiling surplus land to antyodaya families and the security of tenure in the case of tenant and tribal farmers.

11. **Critical role of education and healthcare**

   The important steps recommended by NCF, such as value addition to primary products, turning unskilled into skilled labour and using digital technology in villages, require for effective implementation an educated population, with minimum level of Class X education. Unless all children in our villages, especially girls, dalits and rural poor get educated, the goals of social equity and agrarian and rural prosperity cannot be achieved. Until formal literacy becomes universal, the techniracy movement (i.e. learning the latest technical skills through work experience) should be spread. For this Krishi Vigyan Kendras should be developed into Krishi Aur Udyog Vigyan Kendras, with equal emphasis on production and post-harvest technologies. Farm Schools can also be established in the fields of innovative farmers.

   Along with education, healthcare facilities for the rural poor need to be strengthened. There is need to increase substantially public investment both in elementary education and healthcare in rural India.

12. **Addressing Five Basic Needs**

   Asset reform, technology, water, credit and producer-oriented market are among the five basic needs of farm women and men. Hence, these critical factors need to be taken into account in plans designed to reverse the prevailing farmers’ distress. We have accorded priority attention to them in the action plans described in this Report. Since
water is vital for agriculture, action in ensuring water security for agriculture as well as for domestic and industrial purpose needs overriding priority. A few suggestions relating to the building of a sustainable water security system are therefore given based on the initiatives outlined by the Union Finance Minister, Shri P. Chidambaram, in the budget for 2004-05.

13. **Policy for Water for Agriculture**

   The lack of availability of water has become the most critical limiting input for Indian agriculture. Farmers from across the country say that water shortage, during drought and even during non-drought years, is destroying their ability to grow food. What is often not appreciated is that groundwater irrigates a larger area than surface water; over 60 percent of the cropped area in the country. Another 20 percent of the agricultural area is irrigated using groundwater in conjunction with tanks and canals. Groundwater levels are declining sharply. This is partly because technology is allowing for deeper and deeper penetration and extraction, with little regulation over use or misuse. The Central Groundwater Board estimates that 65% of the districts in the country are over-exploited from the point of view of ground water. The electricity subsidy worsens the situation, with estimations that farmers end up using almost double the water for each unit of crop when they have access to cheap or free power as compared to pumpsets using paid diesel. But worse, electricity supply to farmers is always uncertain and unreliable, which affects their capacities to take decisions. It is imperative, therefore, that any policy for agricultural reform, must take into account the need to evolve programmes for recharge and management of the groundwater reserves of the country.

   It is also clear that farmers will remain dependent on rainfall water for agriculture. Rainfed agriculture, however, risky and vulnerable, continues to play an important role in India, contributing 60 percent of the cropped area and 45 percent of the total agricultural output. There is a need for renewed attention to programmes, which effectively address the challenge of improving productivity and reliability of rainfed agriculture.
In this context, the programme announced by the Finance Minister Shri P. Chidambaram in his budget of 2004-05 to “launch a massive scheme to repair, renovate and restore all the water bodies that are linked to agriculture” is of paramount importance. We should put in place an effective and sustained programme for implementation of this programme so that we can provide water security and hence livelihood security to our farmers.

It is also worrying that drought is no longer a question of a failure or variation in the current rainfall, but one that concerns the increased vulnerabilities of the farm sector to cope and withstand shocks. It is important to note that drought, for the rural sector, is not only about the lack of drinking water or declined agriculture productivity, it is also about non-availability of fodder for animals. The shortages of fodder results in the loss of livestock, which in turn makes them weaker and more disabled to deal with the vagaries of the next season. Drought in this way does not remain a temporary phenomenon, but one that is permanently crippling. It is therefore, essential that not only does the country have an effective system for monsoon management and drought monitoring but also places renewed emphasis on grassland development so that food reserves of the country’s animals can be built along with the food banks of its people.

It is equally clear that water use is increasing in all sectors. Therefore, the use of water in agriculture will face greater and greater competition from others – in industry and urban areas – and this will inevitably lead to conflict. It is therefore important to begin to build policies for conserving water in all sectors, including agriculture. The use of water in agriculture is consumptive – in other words, the used water is consumed and ‘virtually’ transferred via a product – to us in our food. This is different from the use of water as a process, where water is mostly discharged after use and rejoins the water cycle. For instance, cities discharge 80 percent of the water consumed as sewage back to the hydrological system.

Policies will have to be built to optimize water use in both these broad sectors. In the case of agriculture we will have to invest in improving the yield per hectare and per unit of water consumed. A recent study shows that of the 660 billion cubic metres of
total consumptive use of water by crops, roughly 55 percent is accounted for by irrigated crops. While rice accounts for a little over 20 percent of all water consumed by all crops, wheat alone uses 30 percent of the irrigated water. Interestingly, while yields per unit of irrigated area are higher than in unirrigated areas, the yield per unit of consumptive use of water is not always higher – in fact, they are normally 10 to 30 percent lower. It is important for us to invest in research, which will promote water-efficient crops and do all we can to value each drop of water.

14. **Immediate Tasks.**

a) **Million wells recharge programme.**

Research from across the world as well as India suggests that groundwater is actually more productive (producing more crops per hectare) than surface water. This is because farmers who use groundwater can get as much water as they need, when and where they want. It is not surprising therefore, while canal irrigation was the main driver of irrigated agriculture in the 1970s, by the 1990s, groundwater had become the major force. Studies also suggest that small and marginal farms, which make up 29 percent of the total agricultural area, account for 38 percent of the net area irrigated by wells and 35 percent of the tubewells fitted with electric pump sets.

But the problem is that even as the use of groundwater has increased little has been done to recharge the aquifers so that as far as possible we can ensure that abstraction is limited only to what we can annually recharge. Today, much of the recharge is natural and incidental. This recharge depends on various factors like rainfall, soil characteristics and geomorphology. The Central Groundwater Board, which has calculated the rainfall infiltration factors for different hydrogeological situations in the country, estimates that the highest infiltration is between 20-25 percent (in sandy areas). There is a need to rebuild reserves through artificial recharge using rainfall and monsoon flows in rivers.

As yet, there is no government programme, which specifically targets the individual wells of farmers. It is estimated in various studies that there are roughly 19-20 million well owners in the country. This programme needs to be targeted towards each
well owner, encouraging them, with small financial assistance, to undertake a programme to recharge their well, by channelising the rainwater to the well. The cost of the individual well recharge is between Rs.1000-5000 as this depends on the cost of the filter that is needed to ensure that mud and soil do not enter the well. As the quantum required is very small and will lead to high transaction costs, we would suggest that the million well recharge programme is linked to a rebate in the rate of interest provided under the enhanced agricultural credit programme. In this way the programme will provide farmers an incentive to invest in well recharge, which in turn will make agricultural productivity more reliable and less risky.

b) **Rebuilding water bodies.**

The Finance Minister has already announced this programme. But being linked to an annual budget, there are constraints on the programme’s sustainability. It is important to understand that water harvesting is not about an instant (annual) miracle. It will take time and investment to rebuild our rural capital. We have to think of it like a bank account, which we have overdrawn upon. Similarly, our groundwater aquifers are in deep trouble. We need to replenish these speedily. It is clear that all villages, which have practiced water conservation between 7-10 years at a stretch are able to build capacity to withstand even prolonged drought. But the challenge is to build this programme with farm families, as they alone can invest in their water security.

**We would suggest a massive programme for water bodies with the objective to secure water and food security in the country.**

The programme may be organised as follows:

a. It must draw upon the current fragmented programmes – Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP), National Watershed Development Programme for Rainfed Areas (NWDPRA), Integrated Watershed Development Projects and Programme (IWDP), the National Afforestation Programme (NAP) and the National Watershed Development Fund – for a common objective purpose to build water and livelihood security. There is
no apparent shortage of funds in this area. The task is to work towards an effective programme, which is driven by a common objective. For instance, the National Afforestation Programme alone has been allocated Rs 1,115 crore for the 10th plan. The work of this programme is to regenerate the forests, which in turn will rebuild the watersheds of agriculture.

b. The problem is that there is no enabling mechanism to effectively coordinate the delivery of the programme. The only mechanism is through the common approach guidelines evolved between the Ministries of Agriculture and Rural Development. This matter has been deliberated upon for many years, without much headway. We would therefore suggest that the best coordinating mechanism for these programmes is through the greater involvement of the Panchayati Raj department so that village communities play a direct and enabling role in the delivery of these schemes.

c. In addition, the programme must make use of the funds available in existing employment programmes – such as food for work, or the proposed employment guarantee programme as the main aim of labour in villages is to build natural assets.

d. Over and above this we would suggest enhanced allocation specifically for water bodies in the next budget, as an endowment fund. The 2004-05 budget provided for two specific programmes (restoring water bodies and water harvesting) with a financial allocation of Rs 200 crore. This allocation must be increased and provided as an endowment so that funds for this activity are available over a period of time, which will make it sustainable.

15. **National S&T Alliance for Rural Livelihood Security.**

At a consultation organized jointly by NCF and the Union Planning Commission at Delhi on 23rd December 2004, it was decided to form a National Alliance of S and T institutions in the public and private sectors to provide technical backstopping to the National Rural Employment Guarantee and National Food for Work programmes, so that the work undertaken leads to an engendered livelihood security system. The National
S&T Alliance for Rural Livelihood Security will bring together ICAR, CSIR, ICMR, ICSSR, Departments of Atomic Energy, Science and Technology, Biotechnology and Ocean Development, UGC, Ministry of Non-Conventional Energy Sources and other Central Government institutions, Agriculture, Rural and Women’s Universities, as well as private sector and civil society R&D institutions and Banks and financial institutions for the purpose of initiating in the 150 districts identified by the Planning Commission for special attention, an engendered sustainable livelihood security programme through knowledge, skill, information and market empowerment. The National S&T Alliance will be a virtual organization and will promote a multi-institutional and multi-disciplinary team effort to foster job-led economic growth in rural India. The areas of concern will include, besides the promotion of economically viable SHGs, health, education and nutrition. The S&T Alliance will aim to bring about confluence and synergy among the efforts of private, public and academic sector institutions to undertake a massive human resource development and capacity building programme, to begin with in the 150 districts chosen for the National Food for Work Programme. Sustainable SHG programmes based on poor-friendly technologies will be developed. The National S&T Alliance will be serviced by the National Academy of Agricultural Sciences.

The National S&T Alliance will promote the formation of similar alliances at the State level. The State level S&T consortium will be serviced by the appropriate State Agricultural University. At the district level, this programme will be linked to the DRDA. The District level S&T consortium will give priority to the following activities:

- Assisting local farm and landless labour families to access their entitlements
- Capacity building – building a cadre of Master Trainers
- Mentoring
- Establishing market linkages

The formation of National and State Level S&T Alliances for fostering economically sustainable and gender sensitive livelihood systems in villages will be an important step in mobilizing the power of partnership in ushering in an era of job led economic growth.
in rural India, based on a pro-poor, pro-women and pro-nature orientation to technology development and dissemination. Technology can then become an ally in the movement for gender and social equity.

16. **Soil Health Management.**

An important reason for the low return per unit of water is the lack of synergy between a genetic strain, irrigation water and soil nutrition. Hidden hunger in the soil resulting from micronutrient deficiencies results in hidden hunger in farm animals and human beings. We should strengthen our capacity to advise farmers on soil healthcare.

There is need for additional facilities for reliable soil test analysis for 13 macro and micronutrients, since this is critical for improving crop productivity. This requires sophisticated, finely-tuned equipment (atomic absorption spectrophotometer, UV spectrophotometer, etc.) that are currently unavailable in most soil testing laboratories. Implementation of the technology will require a quantum jump in the number of soil test laboratories and soil test analyses conducted throughout the country. Therefore it is advisable to establish new laboratories to supplement the existing network. Since the laboratory equipment requires frequent recalibration to maintain reliability, a national monitoring agency is also required to obtain and compare test results on standard samples on a monthly basis.

Initially it cannot be expected that farmers will fully appreciate the value of a complete soil test. Therefore, it is proposed that the Government conduct an intensive programme of free tests for the first one or two years, until the efficacy of the approach is demonstrated. Thereafter, fees can be charged to recover the cost of the tests and the cost of establishing additional laboratories. If a commercial fee structure is fixed of Rs 200 to 250 per test, then farm graduates will be attracted to supplement the government effort by establishing Agri-clinics which can undertake such tasks as soil health monitoring and management and pest proofing on an area basis. Agri-clinics can also be established in Farm Schools. A Project Design Team could be set up to work out the details on the lines indicated below.
1. Objective: To establish a national network of sophisticated soil testing laboratories capable of testing large volumes of soil samples on a full spectrum of 13 macro and micro nutrients.

2. Anticipated Benefits: To provide farmers with essential tools for doubling or tripling crop yields and farm incomes.

3. Actions Required by Government:
   - Conduct an inventory of all existing soil test labs to ascertain the type, age, condition and test volume capabilities.
   - For labs that report having the required equipment, conduct calibration tests to ensure that the equipment is working properly.
   - All labs that do possess the required equipment should be upgraded or supplemented by new labs.
   - Establish a national monitoring system to recalibrate all lab equipment on a monthly basis or as often as necessary to maintain test accuracy.

4) Programme Cost & Funding:
   - The objective should be to provide a complete soil test analysis at the commencement of each cropping season. Since accurate analysis requires limiting the sample size to three or four acres per sample, this will require approximately 25,000 to 50,000 tests per district per month. In the first phase there should be a minimum of one lab per district, each with the capacity to conduct a minimum of 10,000 complete soil analyses per month.
   - The cost of a new lab capable of processing 400 samples per day will be approximately Rs 30 lakhs for equipment.
   - Subsidies for comprehensive soil testing programme -- The materials cost for each complete soil test approximately Rs 150. The total cost of materials, labour, interest, and depreciation will come to about Rs 200 per test.

This is an investment which will yield a rich dividend.
17. **Technological upgrading of Farm Practices: Development of Computerised Farm Advisory System (CFAS)**

Soil test results will be of little value unless expert advice is available to the farmers to interpret the significance of nutrient levels and recommend appropriate steps to enhance soil nutrition. The required inputs will vary significantly from crop to crop. The most appropriate selection of inputs will also vary with fluctuations in input prices. **In order to service millions of farmers with timely and reliable interpretation, it is proposed that expert systems be developed for all major crops specifying the optimum levels of each nutrient required to compensate for soil deficiencies and produce maximum yields and net income for the farmer.**

a) Objectives:

- Create computerized expert systems for all major crops to provide recommendations based on soil tests and the steps needed for the farmer to achieve optimal yields and income.

- The expert system should cover at least 20 major crops and be customized to different agro-climatic zones.

b) Anticipated Benefits:

- Each farmer who submits soil for a soil test can receive an automated report specifying the crops most suitable for cultivation according to the soil profile and providing detailed instructions on how to enhance the soil to ensure proper plant nutrition for optimal yields and profitability.

- Quality of information can be the best in the world.

- Speed of service will be very high.

- Cost of delivering information will be very low.

c) Actions Required by Government:

- Recommending optimal cropping pattern options based on soil analysis, cost of inputs & prevailing market prices, including cost-benefit for each crop
Recommending optimal package of cultivation practices for specific crops based on field conditions & soil test results

- Generating detailed crop production instructions for the specific crop and field conditions.

d) Programme Cost & Funding:

- Major cost may be for acquisition of expert knowledge both from within the country and outside

- Cost for development of expert systems for interpretation of soil test results customized to different regions and types of soil is roughly estimated at Rs 10 to 25 lakhs per crop.

- This programme can be linked to the “Every Village a Knowledge Centre” movement.

18. **Farm Schools**

There are at present training facilities for farmers in Krishi Vigyan Kendras (KCKs) and farmers’ training centres of various kinds (Krishi Gyan Kendra, etc.) in different States. It is becoming clear that farmer to farmer learning is the most credible and effective. The numerous agricultural “bright spots” we see around the country are associated with the initiative of hard working and innovative farm men and women. Krishi Pandits, Karshaka Shris (an award in Kerala) and other outstanding farmers should be involved in participatory research and knowledge management systems in a more structured manner. For this purpose, we suggest that **Farm Schools** may be established in the fields of outstanding men and women farmers. Such Farm Schools will be based on the principles of learning by doing as well as “seeing and harvesting is believing”. The Farm Schools will help to impart a sense of grassroot realism to the capacity building programmes.
The Farm Schools can receive training and technical support on a continuing basis from a network of State level training centres, from the soil testing labs, the farm equipment hiring service and the expert computer system. The characteristics of the Farm Schools should be as follows:

a) Objectives:

- To establish a cost-effective system of on-farm training to farmers in every village of the country.

- To double agricultural productivity and farm incomes by dissemination of science-based agricultural technologies for plant nutrition, pest management and water conservation.

b) Anticipated Benefits:

- Cost-effective system for training 25 million farmers a year in advanced methods of agricultural production.

- Improved dissemination of technology by demonstrating advanced agricultural production practices on farmers’ lands in the village.

c) Strategy:

- Promote the establishment of 50,000 village-based farm schools throughout the country, on the farms of innovative farm men and women supported by Agricultural and Rural Universities / ICAR institutes.

- All agro-industries, KVKs, agricultural colleges and research institutes to assist in setting up village based farm schools on farmers’ fields.

- Agricultural graduates and lead farmers to be certified as instructors and offered incentives for establishing private farm schools to train local farmers.
- Establish central and satellite farm production training institutes in each state to train and certify farm school instructors.

- Multimedia training materials to be developed for training farm school instructors and for farmer training.

- Computerised expert systems to be developed for crop selection, soil nutrition, identification and treatment of pests.

- Farm schools to be linked to Rural Knowledge Centres to provide access to multimedia training materials, computerized expert systems, web-based technical and marketing information.

d) Programme Cost & Funding:

- Based on a model project developed for Tamil Nadu, a State-wide system for farm school training, extension, soil labs, and agro-services, including multimedia training materials and computerised experts for farm management capable of generating and supporting 50000 farm schools may require an initial investment of approximately Rs 150 crore.

The on-going Agri-clinic scheme could be restructured to include the establishment of Farm Schools. Also, special Farm Schools can be established to spread the expertise of outstanding farm families who have achieved great proficiency in water harvesting and management, wasteland development, horticulture, agro-forestry, organic farming, poultry and animal husbandry and coastal and inland aquaculture. It is suggested that Rs.150 crore may be allotted for initiating a well organized programme for accelerated agricultural progress with the help of achievers in farming.

19. We must begin the process of imparting dynamism and optimism in the farm sector, as was done in the nineteen sixties. Accelerated agricultural progress based on the enhancement of productivity, sustainability and profitability through farming systems diversification, sustainable intensification, quality upgradation and value addition, is vital
not only for food security and poverty eradication, but also for national sovereignty. Jawaharlal Nehru’s often quoted remark made in 1948 “Everything else can wait, but not agriculture” is even more relevant today. Let us therefore wake up both to the fast spreading agrarian crisis and to the opportunities available for converting the crisis into an era of restructuring and strengthening the support systems for the over 110 million farming families in the country (they constitute 25% of the global farming population).
Annexure I

The Terms of Reference of the National Commission on Farmers are as under:\footnote{Resolution dated 3rd November, 2004, Ministry of Agriculture (Department of Agriculture & Cooperation)}

- Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.

- Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

- Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

- Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

- Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth and economic progress, which can lead to opportunities for a healthy and productive life to rural families.

- Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

- Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.
❖ Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

❖ Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

❖ Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.

The Commission is to submit a mid-term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as the soon as practicable and in any case on or before 13th October, 2006. The Commission, however, is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

Composition of the NCF

1. Prof. M.S. Swaminathan … Chairman
2. Shri Atul Sinha … Member Secretary
3. Prof. R.B. Singh … Member
4. Shri Y.C. Nanda … Member
5. Shri Atul Kumar Anjan … Member (part-time)
6. Ms. Chanda Nimbkar … Member (part time) - Yet to join.
7. Shri Jagdish Pradhan … Member (part time)
8. Dr. R.L. Pitale … Member (part-time)
CHAPTER – II

AN INTEGRATED LIFE-SAVING SUPPORT PROGRAMME FOR
FARM FAMILIES FACING ACUTE DISTRESS

The causes of farmers’ distress are many and varied. The dismal growth in agricultural per capita income for decades and the increasing disparities between the agriculture and non-agricultural per capita incomes have meant greater comparative poverty in the rural areas. Inequality in land ownership and technical progress biased against labour compound the problem. The deficiencies in institutional factors, like those related to credit, insurance, supply of inputs like seeds, fertilizers and pesticides and marketing are becoming serious. Prolonged drought and the shrinking production base are other issues. The rigidities of the formal credit institutions and the exploitative attitude of the money-lenders and traders and the weakening of the cooperatives are aggravating particularly the deprivation of the small and marginal farmers and agricultural labour. Compounding the crumbling system of kin, social and institutional support are other factors such as disconnect between research, education and extension organizations, irregular and erratic power supply, land degradation, unsustainable ground water exploitation and successive droughts or other natural calamities. Market uncertainties and imports of farm commodities and economic liberalization have added fuel to the fire.

2. The fundamental cause of the collapse of rural economy is the less than satisfactory performance of the agriculture sector. The low growth in agricultural per capita income is caused by both fast growth of population in rural areas and the relatively slow growth of agricultural and rural output.

3. In the wake of commercialization of Indian agriculture, many small/marginal farmers enter the high risk commercial farming from a position of extreme vulnerability due to meagre asset base and lack of knowledge of technology and familiarity/support for handling the market forces. The cyclical nature of farming with occasional blessings encourages them to take risks much beyond their capacity. When these expectations are not met either due to natural factors or human greed (supply of spurious seeds, pesticides, etc.) or lack of institutional support, these
farmers suffer a great deal. The cycle of distress often starts with increase in borrowings, mostly from money lenders/traders at high rates of interest and with rather unfavourable conditionalities which in most cases lead to further reduction in income, culminating, finally, in loss of land. The farmers are generally in a position to manage one cycle of drought or other distress but are most likely to succumb to it if the cycle was repeated. It is the successive droughts, illness, unexpected large expenses to meet social obligations, collapse of market, a major loss of asset or earning system/capacity which causes severe unbearable distress among the rural people. Public health care systems are very weak in rural area, and expenses related to medical care add to the debt burden.

4. The decline in expenditure on infrastructure in rural areas and reduction in capital formation in agriculture in public sector has meant less wage earning opportunities in agriculturally backward areas leading to overcrowding the labour market thereby further depressing the already low wage rates in these areas. With virtually no specialized skills and limited educational background, the only jobs when and if available to them are manual jobs with low wages. Unemployment leading to out migration of assetless from the rural areas is increasing with resultant stresses and strains. It is also a fact that the income from animal husbandry and wages tend to expand and contract in response to performance of the agriculture sector. In drought years, saving the animal wealth becomes a major issue for the small, marginal farmers and the other poorer households

5. Though the line between the household shocks and the shocks impinging on all the households in an area is not always clear-cut, it is better to distinguish the two. Most of the financial shocks for the households are caused by death/illness/theft/fire, etc. and are expected to be taken care of from the past savings/investments or support from the kin and community. However, with community support system becoming weaker and the vast population existing on the verge of poverty, some financial arrangement to overcome these household shocks are essential. The shocks impinging all people in a large area call for State intervention and relief measures. Besides the short-term measures to deal with specific events leading to distress,
strategies to minimize such events and improving the capabilities of the people to combat such
distress, if they occur, are required to be put in position on a long-term basis.

6. Five sets of action points emerge from the earlier paragraphs:

(a) Immediate relief and rehabilitation measures in the event of disaster impacting a
large area.

(b) A community managed ‘Nutritional Food Security System’ for distress prone
areas.

(c) Enhancing the productivity, profitability and stability of the crop-livestock
farming systems particularly in the ‘distress hot spots’ to begin with. It is
expected that in due course the measures would spread to other areas.

(d) Creation of multiple livelihood opportunities through integrated attention to on-
farm and non-farm enterprises

(e) Introduction of an integrated rural insurance package covering accident, death,
medical expenses and loss to dwelling unit and other property due to
fire/earthquake, etc.

7. It will be appropriate to discuss these in some more detail.

The Immediate Relief and Rehabilitation Measures. In the case of events leading to
distress, the Centre/State Governments often announce special packages to mitigate the
sufferings of the farmers. Some bold and unconventional steps have been taken in the recent
past to mitigate acute distress. While these are helpful, there is need to look at the system to deal
with loss of crops due to droughts and other natural calamities which often take place.

8. While the national/state level capacity to spare and mobilize resources to mitigate the
impact of national disasters has improved, the farm level vulnerability persists particularly in dry
and other fragile regions. The physical, social, economic vulnerability to drought in marginal eco-systems of arid and semi-arid regions is a serious concern. The cyclones in coastal regions and floods particularly in certain parts of eastern India and the north-east do cause considerable distress regularly. The Famine Codes are in existence in India since the British days. After independence, attempts were initiated to change famine relief to scarcity relief. The objective of the new policy was not only to prevent starvation deaths but also the prevention of pauperization of rural population. In some States, Scarcity Relief Manuals replaced Famine Codes. Over time, the approach underwent further changes and the Scarcity Relief Manual/Codes were modified and replaced by Drought Relief Manuals or Drought Hand Books.

9. There is no doubt that the relief and rehabilitation measures have evolved and would undergo further changes as we move from ‘relief’ to ‘management’ approach, the issue will be of the speed and manner in which the relief is delivered to the distressed population. Declaration of Annawari and steps like Remission of Land Revenue which are pre-requisites for the cooperative banks to provide reschedule/conversion of short-term crop loans into medium-term loans take a long time very often defeating the very objective of relief by rescheduling/conversion of loans. The delays in completion of the crop cutting experiments also lead to a considerable delay in settlement of crop insurance claims. There is need for constant updating/revisions on the basis of learnings from field level experiences and also for efficient, transparent and speedy implementation of instructions. There are instances where declaration of drought in certain areas is influenced by political considerations rather than on the behaviour of the rains which leads to building up shades of doubts and uncertainty in the response of financial institutions in particular.

10. **Community Managed Nutritional Security System**: An important step in alleviating human sufferings and building a healthy society would be the establishment of community managed Nutritional Security System with the following components:

   i. Operation of Community Grain Banks, specially in the tribal areas and other far flung areas where Public Distribution System is not effective and efficient
ii. Food for Nutrition Programme on a life cycle basis for pregnant women, infants and old and infirm persons including ‘noon meal’ programme for the school-children.

Community Grain Bank is a tried concept which enables the community to take care of the individual family’s needs in the period of grain shortage. There is a need to cover all tribal villages with Community Grain Banks. To begin with, during 2005-2006 we may plan a target of covering at least 38 out of the 150 districts identified by the Government of India for ‘National Food for Work Programme’ where more than 50% population belongs to SC/ST communities. On the basis of about 25-30 community grain banks in each of the tribal blocks, [villages may be selected on the basis of remoteness, and the proportion of SC/ST families] we could plan about 10,000 grain banks. This should mean a grain bank for every 3-4 villages in the first year itself. The success could lead to more self-help initiatives in other villages. On the basis of 8 ton grain per community grain bank, it would require about 80,000 tons of grains [on the basis of an average price of Rs 5 per Kg the cost would work out to Rs 40 crore]. In addition, about Rs.35 crore may be provided for transportation, storage of grains and formation of grain banks, etc. during 2005-2006. In the subsequent years the coverage could be deepened and also extended to the remaining districts needing this assistance. (A note is at Annexure-I).

11. Enhancing the productivity, profitability and stability of the farming systems: Raising agriculture productivity requires increased investments in human resources, agriculture research and development of efficient and effective extension services, improved information systems, markets, roads and related infrastructure. Better input supply system including credit and power, and larger investments in irrigation systems are also important. Bridging the yield gaps between regions and between the demonstration farms and the farmers fields require no technology revolution but adoption of practices and timely availability of quality inputs. This is important and should get a high priority. For ensuring better profitability and stability, a finely tuned insurance system covering production risks, storage facilities and developed future market in agricultural commodities is needed. For small and marginal farmers in particular, the livestock sector needs better attention and so do the small mechanized tools which could reduce drudgery
and not employment as also the custom hiring facilities to avoid over capitalization. Post harvest handling needs special care and attention to reduce losses and also to improve quality through proper packaging, handling and transportation. Needless to say, an efficient marketing system is important and farmers’ organizations could play a crucial role in ensuring better share to the farmers in the prices paid by the ultimate consumers. The need for food testing laboratories, certifying agencies and a system of dissemination of information about quality standards cannot be over emphasized to build quality consciousness among the farmers to face the future market challenges. Technologies which could reduce the impact of long dry period on crops, enabling the farmers to have a diversified income flow by a mix of crop, horticulture, tree crops, animal husbandry and small micro enterprises would greatly help in stabilizing farmers income.

12. Soil health and seeds need urgent attention. The Government of Gujarat’s decision to have soil health cards for all holdings is a step in the right direction. Application of needed micro-nutrients could increase productivity with a very high cost benefit ratio. Researchers and scientists believe that applying micro-nutrients alone could double or even triple crop yields.

13. At some stage in future, land use may have to reflect the market needs more closely. There have been instances where the farmers have gone in for certain crops where the market was not deep enough to absorb increased production, leading to collapse of prices. A well organized, proactive and efficient Land Use Board could provide valuable advice to the farmers. Seed villages, agri-clinics and one window approach for availability of inputs, technical advice and information are other strategies likely to serve agriculture as well as create additional jobs in the rural areas. The scheme of agri-clinic needs special attention and review because of its potential but rather tardy progress so far. More flexibility and some capital subsidy (back ended to ensure better utilization) could help. Since farmers availing services from agri clinics would have to make payment for extension services which for long have been provided to the farmers free of cost, some government financial support at least during the remainder of the Xth Plan period could help. Once the system stabilizes and more and more farmers develop confidence in the new arrangements, the Governmental support could be withdrawn.
14. **Creation of multiple livelihood opportunities in the off-farm and non-farm areas:** The Government of India have identified 150 most backward districts for implementation of the National Food for Work Programme (NFFWP). The list is attached at Annexure II. It contains Andhra Pradesh (6 Districts), Assam (7 districts), Bihar (6 districts), Chhattisgarh (15 districts), Gujarat (8 districts), Jharkhand (19 districts) Karnataka (4 districts), Madhya Pradesh (20 districts), Maharashtra (15 districts), Orissa (27 districts), Rajasthan (7 districts), Tamilnadu (2 districts), Uttar Pradesh (7 districts) and West Bengal (7 districts). The NFFWP is a very major initiative and would not only reduce the distress of the poor people but would also add to the purchasing power in the rural areas which would stimulate demand for both farm and non-farm products. However, to get the best results the programme may have to be planned very carefully. It would be necessary to select such investments in the 150 districts as would add to productive potential of the area and lead to permanent increase in employment and incomes. The issue of the maintenance of the assets so created would also require to be looked at. Further, the work selection may have to be such as to encourage women participation and benefits. It is also important that these works are planned with due regard to the heterogeneous character of the poor and their uneven distribution in the districts. The identification of the poor, formulation of concrete programme which could lead to increase in productivity, as also provide adequate opportunities to the women and create appropriate organization systems for effective and transparent implementation would require time and effort. The strategy should be to lead to long-term benefits for the poor and not just the short-term transfer of resources.

15. **Improving access to institutional credit.** Credit is an important input. In India, the State has always shown concern and involvement in rural credit particularly agriculture credit. At the time of independence, institutional credit support for agriculture was nominal and bulk of the requirements of the farmers were met by non-institutional agencies. The Rural Debt and Investment Survey 1951 revealed that 92.7% of the rural household debts were from the money lenders (69.7%), traders (5.5%), landlords and others (3.3%) and relatives and friends (14.2%). The Cooperative Banks (3.3%), the Commercial Banks (0.9%) and the Government (3.1%) provided the institutional credit support aggregating 7.3% of the total. The Government took many measures like the nationalization of private commercial banks, liberal and concessional financing of the cooperative banks by RBI/NABARD, establishment of NABARD, fixing
priority sector/agriculture sector lending targets for commercial banks, establishment of 196 Regional Rural Banks (RRBs) and introduction of crop insurance and by 1991 the share of institutional credit had increased to nearly 66.3% of the total indebtedness.

16. During 2003-04, the banks provided nearly Rs.80,000 crore as agriculture credit. The Union Government wants the credit flow for agriculture to double i.e. reach a level of Rs.1.60 lakh crore by 2006-2007. For 2004-05, a growth of 30% has been envisaged and the credit flow during the year is targeted to reach Rs. 1.05 lakh crore. A series of measures have also been taken/are being taken to reach the above level. The UPA Government is also committed to nurse the rural credit system back to health. It is expected that measures to revitalize the cooperative credit system linked to a reform agenda is also likely to be announced. In view of the initiatives being taken by the Union Government and the recently submitted Prof. V.S.Vyas Committee Report, we could expect considerable acceleration in flow of rural credit and improvements in quality lending.

17. A notable development during the nineties has been the improvement of the outreach of the banking system through linking of the Self Help Groups (SHGs) to the bank branches. By March 2004, nearly 10.79 lakh SHGs had been linked to the banks. During 2003-04, the banks provided an aggregate of Rs.1855.53 crore as loans to the SHGs. There is no doubt that the SHG-Bank linkage programme has contributed substantially to the feminisation of ‘micro finance’ banking in India. The members of the SHGs are those people who were earlier bypassed by the banking system and are poor. Incidentally, the SHG-Bank linkage is the largest and the fastest growing micro finance outreach programme anywhere in the world.

18. This approach has enabled 1.67 crore poor families to have access to financial services including credit and has generally helped in increasing their incomes/work days.

19. Keeping in view the success of the programme, it is suggested that NABARD/Banks may make further efforts to deepen the programme particularly in the 150 identified districts for wage employment programme. The approach should be to saturate these districts with SHGs and give
a very large coverage to the rural poor under the programme and thereby improve their access to financial services. According to a NABARD publication, ten out of these 150 districts do not have SHGs linked to the banks. These districts are Jaspur, Korba, Koria (Chattisgarh State), Dangs (Gujarat), West Nimar, Umaria, Sidhi, East Nimar, Katni (Madhya Pradesh) and Phulbani (Orissa). The approach could be to make special efforts to broaden the programme to cover the above ten districts and deepen the programme in the remaining 140 districts on a priority basis. It is also worth noting that in as many as 50 out of the 140 districts, the spread of the SHGs linked to the banks is very thin in as much as the number of SHGs linked to the banks is less than 500 in each of these districts.

20. By broadening and deepening of the SHG Bank Linkage Programme in the above 150 identified districts, these groups could provide an effective mechanism for the public and private sector agencies to reach them and extend support to enable them to strengthen their livelihood security through additional on-farm, off-farm and non-farm activities. The private sector could play an important role by helping to provide assured and remunerative marketing avenues for the products of the SHG members.

21. Insurance- A financial product to mitigate the sufferings: Crises are recurrent in the lives of the poor. These crises, caused by personal, social or certain natural disasters usually need large expenditure to tide over and lead a poor family deeper into poverty. The range of crises is large. The common among them are accidents, hospitalization, death in the family, death of the bread winner, loss of crops or assets and natural calamities like droughts, floods, cyclones. Expenses to be met during these crises are met either by drawing on savings/investments, borrowings or sale of assets, etc. Institutional arrangements for meeting such expenditure is virtually not in existence and unless relatives/friends agree to help, money lender/traders provide the facilities but at terms and conditions which are generally exploitative. The household suffers an increase in debt/liabilities, increase in expenditure (debt service) and reduction in income. It leaves the poor weaker and more vulnerable, ultimately leading to loss of land.
22. Insurance is a financial product that could help the poor in the event of crop loss, cattle loss, accident, death of the insured, hospitalization charges and loss of insured asset by pooling the risks and distributing the costs among a larger number of people. So far the insurance market in India is concentrated in the urban middle and upper income groups. With a view to improving the penetration into rural areas the Insurance Regulatory and Development Authority (IRDA) has stipulated that a certain minimum fixed percentage of the total business should come from the rural sector.

23. While the need for insurance as a financial product for covering the risks is well established, the issues are the low level of awareness about insurance as a financial product for mitigating various risks which the rural people have to face, the inability of the poor to pay insurance premium upfront, low premium incomes and high service cost of the insurance companies and the absence of an effective network of insurance agents in a perceived low potential rural area. Insurance products for rural areas would have to take care of the above issues. It is obvious that small valued insurance policies could mainly be sold to groups, as individual sales would be uneconomical. Further, it would also facilitate both the insured and the insurer if the premium amount was built into a loan component which the insurer could repay in appropriate instalments either with other loans or independently. Lastly, if the banks or other people’s structures could be involved it would minimize the need for traditional agent net-work and also add a little income/incentive to those organizations. At present mainly the crop loss and loss of livestock and other assets purchased with institutional credit are largely covered by insurance in rural areas.

24. While the general insurance covering risks mentioned earlier is feasible with linkage to bank credit, the life cover which is normally a savings/investment option with risk cover may not be feasible with credit linkages which are in the nature of short-term or at best medium-term arrangements. However, efforts may have to be continued for development of suitable product with endowment after three/five years along with providing the risk cover. There is need for innovation and developing different products for meeting the requirements of the rural population keeping in view their income flows and risk perceptions. However, the product may
have to be simple and attractive. But for the present, it may be appropriate to make a beginning with general insurance of risks encountered by farmers in their daily life including the cover for death. However, that part of the premium which covers ‘life’ will have to be passed on to the specialized institutions dealing with life insurance. Other covers including accident leading to physical injury or death could be handled by the organisations permitted to deal with general insurance.

25. Insurance cover requirement of the farmers and others in the rural areas are mainly for crop loss, asset loss, loss/damage to the dwelling place, accidents causing physical loss/loss of life, medical expenses, natural death etc. These are discussed below in detail.

Crop Insurance

26. The first and foremost risk of the farmer is the crop risk. The risk of crop failure is being met under the National Agriculture Insurance Scheme (NAIS) which is being implemented through the Agriculture Insurance Company of India Ltd. The scheme is presently being implemented by 23 States and 2 Union Territories. The scheme covers food crops and oilseeds, annual commercial/horticulture crops. The premium rates for food crops and oilseeds range from 2.5%-3.5% during Kharif and 1.5% - 2% during Rabi. The rates for annual commercial crops are actuarial. The scheme operates on area approach for widespread calamities and on individual basis for specified localized calamities. However, individual assessment of losses is experimented only in a few areas.

27. The small/marginal farmers are subsidized in premium to the extent of 50% to be shared equally by the Centre and States. The subsidy is proposed to be phased out over a six year period. Accordingly, the eligible subsidy is 10% during 2004-05. The scheme covers all farmers (compulsory for loanee farmers and voluntary for non-loanee farmers). The scheme is open to all States/Union Territories on optional basis. A State opting for the scheme will have to continue for minimum three years. The States which are not covered are Punjab, Arunachal Pradesh, Manipur, Nagaland and Mizoram.
28. Till Kharif 2003, the NAIS covered 4.18 crore farmers for a premium of Rs. 1,179 crore and finalized claims of Rs. 4,473 crore. During 2002-03, 102.97 lakh farmers were covered for a sum of Rs. 9,951 crore and the premium collected was Rs. 321 crore. According to available data, claims costing Rs. 810 crore were settled benefiting nearly 26 lakh farmers.

29. In addition to the above, the Government of India is also implementing a Farm Income Insurance Scheme (FIIS) from Rabi 2003-04 in 19 districts in 12 States on a pilot basis for Rice and Wheat. The Scheme covered 1.8 lakh farmers for a sum insured of Rs. 241 crore. The FIIS is also based on an area approach and provides income guarantee based on the ‘Minimum Support Price’ (MSP). If the actual income \[\text{Current yield } \times \text{ current market price}\] is lower than the guaranteed income \[\text{Average yield of 7 years } \times \text{ the level of indemnity i.e., 80% or 90% as the case may be, } \times \text{ MSP}\] the insured farmer is compensated. The premium rates are actuarial with 75% subsidy to small/marginal farmers and 50% to others. The scheme was extended to Kharif 2004 season, and was implemented in 19 districts of four States for Rice. The scheme is rather new and is being tested on a pilot basis.

30. In addition to the above, weather insurance scheme covering anticipated shortfall in crop yield on account of adverse weather parameters has been introduced recently. All individuals who stand to lose financially on account of adverse incidence of weather could take insurance. The advantages of weather insurance are as under:

(a) The trigger events like adverse rainfall, temperature, moisture, relative humidity etc can be independently verified and measured.

(b) It allows for speedy settlement of indemnities as early as a fortnight after the indemnity period.

(c) It could be implemented for all crops with little historic yield data.

(d) Problems of adverse selection and moral hazards could be controlled to a large extent.
(e) All cultivators and other people who are dependent on agriculture, could be covered.

(f) Wide choices of payment options could be provided commensurate with premium.

(g) The scheme is easy to operate and understand.

31. The weather insurance (Varsha Bima) was launched on a pilot basis in 20 rain guage areas of Andhra Pradesh, Rajasthan and Uttar Pradesh during Kharif 2004. It is likely to be expanded to about 100 districts in Kharif 2005. There is a great potential for extending the coverage of the scheme.

32. While the crop insurance scheme, the NAIS is in operation since Rabi 1999-00, there is a lot of criticism about the delay in settlement of claims, the basis of settlement and the need to switch over to a smaller ‘defined area’ from Block or Tehsil to Panchayat etc. Further, the scheme has primarily covered the loanees of banks. Substantial number of farmers who have no access to crop loans from the banks and raise money from non-formal institutions are virtually out of the scheme. The awareness level about the crop insurance, its rationale and advantages have not been adequately disseminated. Even the loanee farmers who are covered by the crop insurance are taking the cover not because of its perceived usefulness to them but because it is compulsory. Considerable work in building awareness, getting feedback and developing appropriate products needed by the farmers was perhaps necessary. In Gujarat, a study done by the Disaster Mitigation Institute in 3 districts of Patan, Kutch and Surendranager, revealed that nearly 40% of the farmers were not aware of the Crop Insurance Scheme (the coverage of crop insurance is high in Gujarat; during Kharif 2003, out of nearly 80 lakh farmers taking crop insurance in India, nearly 10.16 lakh i.e. about 13% were from Gujarat alone). It would appear that realising the need and importance of broad basing the crop insurance programme and to make it more farmer friendly, the Government of India have recently constituted a Joint Group under the Chairmanship of Additional Secretary (Ministry of Agriculture) to review various aspects of crop insurance. The Group would consider improvements in crop insurance particularly the NAIS. The Group is likely to submit its report shortly.
33. In view of the above, we may await the report for needed improvements in the crop insurance scheme. However, it is necessary that the scheme be more farmer friendly. It may cover more crops, the farmer may have the option of seeking higher compensation, the settlement may be much quicker and the area as the basis for assessing the crop loss may have to be much smaller than what it is now.

34. **Cattle Insurance**

Cattle risk is another significant risk for the rural people. The animal husbandry sector contributes nearly 23% of the agricultural GDP. Cattle provides much needed diversification of farmers’ income as also a regular cash inflow against income from crop which is seasonal. The total value of milk group to the economy is nearly 1.5 times the total value of paddy and nearly 2.4 times the value of wheat. Further, ownership of livestock is more evenly distributed than land. However, it may not be possible to cover cattle in the integrated insurance product. There would be different breeds, age group, sex and quality and number of animals with individuals in a group which would attract different insurance premium. The general premium for cattle insurance is around 4% while milch animals financed under ‘schemes’ are covered at a subsidized rate of 2.25%. While there is no doubt about the importance of livestock, insurance for the farmers, for the time being, may have to be mainly on individual basis. However, the implementation of the cattle insurance as it obtains now, does not satisfy the farmers much. The procedure for verification of claims and their settlement is a source of constant irritation and subject of many jokes. This calls for a relook.

35. This brings us to other risks, i.e.; the accident risk, loss/damage to dwelling and property, natural death and medical cover. It is possible to cover these with an integrated product. However, considerable effort is required for building up awareness about the utility of insurance products. It appears that many in the rural areas are driven to extreme poverty and distress due to illness, loss of income due to injury by accident, etc. Risks to health are frequent and generally have a serious impact on the welfare of the family. It reduces their incomes and increases the expenses. This would mean borrowing from the moneylenders at very high interest rates leading to ultimately loss of assets and land. It is also a fact that the rural medical facilities are not
adequate and the people have also to spend money on transportation/meals, etc. The same may therefore have to be built into the insurance product. It would be ideal if an effective third party administration system could be developed for medical coverage, where the lists of hospitals could be firmed up with uniform charges for different surgical interventions as also other treatments. In this system, the insured could get the treatment and the bill to the extent of the insurance cover directly settled by the third party administrator (TPA) system. The insured would be required to make direct cash payment for only the excess amounts (over and above the ceiling of the cover) if any. However, in absence of such arrangements on an all India basis and the need to extend medical insurance urgently, it may be useful to introduce cover for hospitalization charges to start with. Incidentally, the Common Minimum Programme of the United Progressive Alliance has mentioned that a national scheme for health insurance for the poor families would be introduced. The efforts may, however, be continued to have a TPA system all over the country at the earliest. It is also expected that with the coverage of large number of people under the scheme and the involvement of the SHGs/other peoples’ structures/NGOs and Banks, there would be strong pressure on the health services and insurance companies to improve their products and become more user friendly than what they are today. The TPA/Insurance Companies would, in their own interest, make efforts to improve ‘preventive’ systems and practices and also negotiate with rural health service providers to reduce costs and improve services. Another issue is the poor spread of the rural health services. It may be useful to encourage establishment of private nursing homes/hospitals and Voluntary Health Services in the rural areas by providing tax benefits, concessionality in the credit /back ended subsidy etc. They should provide low or no cost healthcare of high quality. The large expansion in demand for ‘paid’ health services under insurance cover is expected to be seen by the private health service providers as a huge expansion of the market and incentive for them to reach the rural areas.

36. There has been a recent development in the micro insurance sector. The Insurance Regulatory and Development Authority [IRDA] has issued instructions regarding issuance of license to the NGOs/SHGs for working as agents for accepting insurance proposals upto a sum assured of Rs.10,000. The NGO/SHG would be entitled for commission on this work and the qualification/training requirements for issuance of license to them have also been kept low. In
view of the above, it may be appropriate to devise a suitable product which could be canvassed by the NGOs/SHGs to their members.

37. The cover could be floating for different insurance risks. The product could be as under:

A. The integrated Insurance Policy for the poor – through the Self Help Groups etc. could cover:

(i) Dwelling and household assets (excluding jewellery and valuables) against fire, allied perils and earthquake for Rs.10000/- and Rs.5000/- respectively. In case of ‘hut’ the sum insured would be Rs.4000 for the dwelling unit and Rs.1000 for the contents.

(ii) Personal cover against accidental death, permanent total disability and permanent partial disability, the sum insured would be Rs.10,000/-.

(iii) Mediclaim insurance in case of hospitalization – benefit upto Rs.10000/- for husband, wife and two dependant children on floater basis including sums not exceeding Rs.200/- for transportation and Rs.150/- for meals during the policy period.

(iv) Natural death of the insured male or unmarried/widowed woman and husband in the case of married woman – Rs.5000/.-.

The premium could be around Rs.225 to Rs.300/-p.a (the exact premium however have to be ascertained from the insurance companies). This product could be called ‘Parivar Bima Policy’.

B. Another product could be with higher cover [aiming mainly at the KCC holders] as under:
i) Building and household contents (excluding jewellery and valuables) against fire, allied perils and earthquake for a sum of Rs.30,000/- and Rs.10,000/- respectively.

ii) Personal cover against accidental death, permanent total disability and permanent partial disability for a sum of Rs.50,000/-. 

iii) Mediclaim insurance for Rs.30,000/- on floater basis (applicable to any of the five members) with a cap of Rs.15,000/- per illness. The premium for this coverage is Rs.548 with exemption from service charges. It is exactly the same as ‘Universal Health Insurance’ introduced by the Government of India for below the poverty line (BPL) families with a subsidy of Rs.300/-. 

The annual premium would be around Rs.575 (the exact premium however have to be ascertained from the Insurance companies).

38. The choice of policy could be left to the individual/group. However, if the policy is covered under micro insurance, it would have to be limited to Rs.10,000 only. In all the cases, loan could be included/advanced for the insurance cover and recovered along with other loan or as per instalments etc.

Need for special developmental efforts/support for integrated Insurance products.

39. Insurance is an essential financial product and together with facilities for deposits and credit constitute the major financial services required by the people. While micro finance has got lot of attention during the last decade or so the emphasis has been mainly on thrift and credit. Micro or even rural insurance (excepting crop insurance or insurance of cattle and other assets financed by the banks) has not made much progress. There is also a need for engendering the insurance system which so far has mainly covered the male population. Besides the issues of low value covers, high transaction costs, problems connected with servicing of individual clients who are scattered and lack of traditional network of agents and moral hazards, the other issues are
building up the confidence and awareness of the rural population about the insurance products, designing appropriate products and innovations in delivery system to popularize them and the ability of the poor to buy insurance cover which they need most but are unable to afford. There is a developmental role for the insurance companies, the IRDA, the banks and the Government particularly about building up awareness of the rural population and convincing them about settlement of claims without too much procedural delays and form filling.

40. As a part of providing safety net to the very poor, the Government may consider meeting part of the premium at least during the remaining years of the Xth plan period. The position could be reviewed thereafter. The crop insurance has been financially supported for quite some time for all farmers. The Government of India have also agreed to provide support to the tune of Rs.300/- (out of a premium of Rs.548/-) for ‘Universal Health Insurance’ for BPL families. Subsidy of Rs.200 out of a premium of Rs.365 if the coverage is only of one person in the family and Rs.400 against a premium of Rs.730 if besides the family of five (as in Universal Health Scheme) the parents are also covered. It would, however appear that in the absence of proper delivery arrangement and developmental efforts, the scheme has not made much headway.

41. The insurance products listed earlier have a potential of reaching about 2 crore poor families mainly through the SHG route in 2-3 years and another about 4 crore Kisan Credit Card holders in the same period. In other words, there is potential to cover upto half the rural families in the country by 31st March 2007. Incidentally, since around 90% of the SHG members are women, the coverage would also contribute towards engendering the insurance system to a certain extent.

42. If the ‘Universal Health Insurance’ cover had been extended to about one third of the BPL families (about 2 crore families) the annual support would have worked to around Rs.600 crore per annum. However, the scheme has not made much progress perhaps because of inadequate attention to the delivery system and special efforts essential to popularize a new product could not be made. It would be necessary to have a National Level Steering Committee to look into the progress on a regular basis. The Committee could have representatives from
Govt. of India (Deprt. of Banking & Insurance and also Ministry of Health), IRDA, the National Commission for Women, NABARD, IBA, National Agriculture Insurance Company, all the four general insurance companies, SBI, NASCOB (Federation of State Cooperative Banks) and one/two representatives of the RRBs. The National Agriculture Insurance Company could provide the secretarial assistance and house the Committee.

43. In order to encourage resource poor families to take up the cover, the GOI may support the scheme which is really a life saving support to the rural poor. The premium could be shared by the GOI and the insured people in the ratio of 1:1 in the case of Scheme-A of micro insurance i.e. the Parivar Bima Policy and at the present rate under the Universal Health Insurance Scheme for the BPL families covered under the Scheme-B. For non BPL families, covered under Scheme-B a token support of Rs.100 may be provided. If about 1.5 crore people take up Scheme-A (Parivar Bima Policy) through the SHGs etc during 2005-06, the life saving financial support would work out to about Rs.169 crore on the basis of 50% of the likely premium of Rs.225 and for Scheme-B, assuming about 5% of KCC holders are BPL, i.e., about 20 lakh KCC holders, the support (average taken at Rs.300) would be around Rs.60 crore and for non BPL families assuming about 30 lakh people take the cover would work out to another Rs.30 crore. The total would be Rs 259 crore or say Rs.260 crore.

45. A Rural Insurance Development Fund of Rs.50 crore may also be created at the National Agriculture Insurance Company to take up development work for spreading rural insurance. The Standing Committee referred to earlier could also be asked to frame guidelines for use of the Fund.
COMMUNITY GRAIN BANKS

Community Grain Golas (Banks) are an age old concept in the villages particularly the tribal villages. The entire community contributes grain to the ‘Gola’ from which any family could draw the grains at the time of need and return the same with an additional quantity representing ‘interest’ at the harvest time. This provided nutritional security to the poor families particularly during the ‘Monsoon’ period when there were no work opportunities in the villages and going out in search of employment outside the village or in the forests for collecting minor forest produce was not feasible. One should also bear in mind that a large number of villages, particularly the remote tribal villages, do get cut off during rains making it difficult for the villagers to go out or the supplies to reach them. This period also often coincided with depletion of the saved grains from the previous harvest making nutritional security a serious issue for below the poverty line population and more particularly the children, infants and pregnant and lactating mothers.

2. Grain Golas are a community self-help system which could go a long way to provide nutritional security to the poor tribal families. Under an on-going scheme, the Government is assisting in the formation of Grain Golas in the tribal areas. The idea is to cover all the tribal villages (about one lakh) in due course. The target for 2004-05 is however only 3500 grain banks. According to the TRIFED data, between 1996-97 to 2003-04, money has been released (Rs.20.50 crore) for establishment of 4858 Grain Banks in 11 States viz. Andhra Pradesh (905), West Bengal (152), Bihar (61), Gujarat (237), Madhya Pradesh (2461), Orissa (662), Tripura (78), Rajasthan (33), Tamil Nadu (2), Kerala (2) and Maharashtra (259). No Grain Bank could be established under the Scheme in Uttar Pradesh and Manipur which were also covered under the programme. The coverage of these grain banks is about 3.50 lakh families. Incidentally, nearly 62% of the Grain Banks were supported in 2002-03 and 2003-04 and about 83% of these were in the three States of Madhya Pradesh, Andhra Pradesh and Orissa.
3. Under the Scheme 100 qtls of grain for 100 families @ 1 qtl per family (the total quantity of 100 qtls is fixed regardless of families) is provided, along with Rs.2000 for weights/balance and Rs.2000 for storage bins, etc.

4. The cost of transport is met by the Centre and the State Government at 1:1 ratio.

5. It is understood that the scheme is under revision in the following respects:-

   (a) The scheme would be available to all BPL families

   (b) The main focus would be on endemic drought and migration prone tribal concentration areas. The non-tribal areas to be included later.

   (c) The allocation of grain would be @ 2 qtls per family and for an average Grain Bank covering 40 families, 80 qtls of grain would be supplied.

   (d) In addition the Grain Banks would also be given Rs.5000 for weights/measurements/storage bins, etc.

   (e) A training support of Rs.500 would also be provided to the NGO promoting each Grain Bank.

   (f) 50% of the transportation cost would be borne by the concerned State Government.

6. In order to encourage self-help and make the Grain Banks sustainable, it is suggested that:

   (a) The Government may consider whether it would not be better to release only 50% of the grain in the first instance and balance on a matching basis with the grain saved/increased by the Grain Bank
(b) The NGO assisting in the formation of a Grain Bank may be given at least Rs.2500 for establishment of each grain bank and another amount of Rs.1000 after one year of the establishment provided the Grain Bank is operating successfully and has collected additional grain from members by contribution/interest-charged which is not less than 50% of the grain initially given by the Government. It is felt that the proposed provision of only Rs.500 for training for each Grain Bank is far too inadequate. The remote tribal areas which would be initially selected, would pose serious problems of transport and communication and hence the NGOs taking up the responsibility of the formation of the Grain Banks need be compensated for their expenses and efforts. Payment of additional Rs.1000 if the grain bank develops would serve as an incentive to the NGO to focus on this area and develop sustainable Grain Banks.

(c) The sum of Rs.5000 for weights/measures/storage bins, etc. as proposed under the scheme appears to be inadequate. Storage bins for storing about 8-10 tons of two different types of cereals may cost more. According to the Indian Grain Storage Management and Research Institute, Hapur, the estimated cost for a 12 tons grain storage with inlet and outlet made of RCC sheets was around Rs. 22000 (2002 estimates). A storage built with reinforced bricks (RBs) with a capacity of 6.68 ton would cost around Rs.24000. It is suggested that an average estimated cost for each Community Grain Bank for storage, weights and measurements, etc. may be placed at Rs.25000.

(d) Instead of spreading the scheme thinly in a large number of States/districts, the Government may consider saturating the districts which have at least 50% of the populating belonging to the ST and SC categories. In 150 districts identified by the Government of India for employment guarantee scheme, there are 38 districts where the tribals and the Scheduled Caste constitute at least 50% of the total population. The list of these districts is attached (Appendix A). During 2004-05, the programme could be to set up 10,000 Grain Banks in the above districts i.e. about 250-275 grain banks in each district.
7. Besides, the cost of grains, the other costs for 10,000 community grain banks would be as under:

<table>
<thead>
<tr>
<th>(Rs. in crore)</th>
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<tbody>
<tr>
<td>a) Cost of formation @ Rs.2500 each &amp; incentive @ Rs.1000 each</td>
</tr>
<tr>
<td>b) Cost of Weights /Measures &amp; Storage arrangements @ Rs.28000 each</td>
</tr>
<tr>
<td>c) Transport @ Rs.90/- p. qtl. 50% i.e. Rs.3600 per grain bank</td>
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</table>

As regards the cost of grains, on the basis of an average Rs.5/- per Kg. the total cost would work out to Rs.40 crore. Thus the total outlay would be about Rs.75.1 crore or say Rs. 75 crore.
## APPENDIX – A

### Districts* with more than 50% population of SCs/STs

<table>
<thead>
<tr>
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*Out of the 150 districts identified by the Planning Commission for National Food for Work Programme*
## 150 Districts Identified for Wage Employment Programme

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CHAPTER - III

PRODUCTIVITY AND LIVELIHOOD ENHANCEMENT IN RAINFED AREAS

Towards a Rainbow Revolution:

The greatest distress to farm and rural communities occurs in areas with low and uncertain rainfall. These areas occur mainly in the arid and semi-arid regions of the country. The people living in such environmentally underprivileged areas have over centuries developed methods of coping with natural calamities. Migration with their cattle or sheep was one common method of withstanding the problem of water, food and fodder shortage. Women often stayed behind and had developed fairly effective methods of saving whatever rain water became available and shared it equitably. Anil Agarwal and Sunita Narain\(^2\) have documented such “dying wisdom”. As early as 1925, the Royal Commission on Agriculture emphasized the need for developing technologies which can help to elevate and stabilize crop and livestock production in dry farming areas. After independence, several collaborative projects were undertaken in the field of dry farming, like the Indo-French project in Anantapur district, the Indo-UK project in Indore and the Indo Canadian project all over India. National and international research efforts were strengthened and an International Centre for Research on Semi-arid Tropics (ICRISAT) was established in 1972 at Hyderabad. Inspite of the very valuable work done under these projects, the fate of farmers in rainfed areas continues to remain a gamble in the monsoon.

2. Covering 66% of the cultivated area, rainfed farming continues to be critical for meeting the livelihood needs of a vast majority of small, marginal and tribal farmers in the chronically drought prone areas of the country. Despite the development of new technologies related to crops, resource management, livestock and fisheries during the last 3-4 decades, the farm level adoption and impact on the farmers’ income and livelihood in these disadvantaged areas has not

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been as significant as in irrigated areas. This is mainly due to the low and highly fluctuating productivity and the low risk bearing capacity of the rainfed farmers, for whom risk aversion is more important than productivity enhancement. Low rainwater use efficiency and the constant threat of water scarcity and drought aggravate the situation. Land degradation and declining soil health, acute fodder shortage and poor livestock productivity are the other serious constraints. These challenges are further compounded by a large number of institutional, policy and infrastructural constraints, like lack of assured and remunerative marketing opportunities.

3. Though rainfed agriculture has remained a high priority area through all the Five Year Plans, the UPA Government has identified this area as one of the key priorities to address the problems of poverty, food insecurity and regional and gender inequity. Accordingly, 150 most backward districts in the country have been identified, a majority of which are rainfed. Any improvement in the livelihood of the farmers and landless labourers in these areas is intimately linked to the progress achieved in rainfed agriculture including horticulture, agro-forestry, livestock, poultry and all related farming systems. A Rainbow Revolution is needed for achieving congruent and synergistic improvement of all the components leading to enhanced and sustainable agricultural productivity and profitability and strengthening of livelihoods through eco-technologies, diversification, value addition, and work security.

**Strategic Paradigm Shifts for Converting Potential into Production**

4. In order to bridge the prevailing income and livelihood divides and to break the nexus of poverty, food insecurity and natural resource degradation, the following strategic paradigm shifts are suggested.

4.1 Foster and build convergence and synergy among components of development, interventions and stakeholders – public-private-corporate-NGO-CSO-farmers, and leverage the potential of small farmers and landless labourers, including women, through group actions and institutions.
4.2 Undertake area-based actions for wet, dry and semi-arid rainfed areas by involving the active participation of grass root communities through Panchayats and Gram Sabhas, engendering the transformation process, and meeting the needs and potentials of rural people – farmers, landless agricultural labour and artisans, using a disaggregated and differentiated approach.

4.3 Move from commodity to farming system approach to integrate crop, horticulture, livestock, aquaculture through development and adoption of system based eco-technologies rooted in the principles of inclusiveness, environmental sustainability and economic viability.

4.4 Build capacity through knowledge empowerment in areas relating to weather, water, pest management, post-harvest technology and home and external markets.

**Convergence through Watershed Development**

5. Integrated watershed management is the most proven approach for increasing productivity and strengthening livelihoods. Recent study jointly conducted by ICRISAT and International Water Management Institute (IWMI) involving 311 watershed programmes in India showed that the mean benefit cost ratio of watershed programme in the country is 1:2.14 with an internal rate of return of 22% which is comparable with many rural development programmes. The watershed program had generated new employment opportunities, augmented irrigated area, enhanced cropping intensity and better conserved soil and water resources (Box. 1).

6. The demonstrated success of the above mentioned watersheds and a few other watersheds in the country notwithstanding, the success has not been as pervasive as desired. In general, the following problems have been identified as major bottlenecks in implementing watershed programmes: (i) multiple funding sources and guidelines and top-down approach of priority setting, (ii) compartmentalization, lack of coordination and monitoring, (iii) diversion of funds to unrelated uses, (iv) limited community participation, specially of women, (v) unsustainability of the gains and low build up of asset and (vi) less focus on landless and non-agricultural groups.
An innovative farmer participatory watershed development model with consortium for technical backstopping

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in partnership with Central Research Institute for Dryland Agriculture (CRIDA), National Remote Sensing Agency (NRSA), State Agricultural Universities, State Government Departments, Non-Government Organizations and Farmers Associations/Organizations have developed and tested an innovative integrated watershed development model for enhancing the productivity of rainfed agriculture, minimizing land degradation and improving the livelihoods. The pilot model was developed and evaluated in Adarsha Watershed at Kothapally in Shankarpally Mandal in Ranga Reddy district of Andhra Pradesh. The main components of the participatory consortium approach for community watersheds are:

- Farmers collectively identify and prioritize the problems for possible technical interventions, participatory planning and implementation of watershed development involving all the stakeholders.
- A consortium of research and development organizations including NGOs provided technical backstopping to community watershed programs.
- Increased individuals participation is ensured by providing tangible economic benefits through in-situ water conservation of rainwater which is translated into increased productivity and incomes through integrated genetic and natural resources management (IGNRNM) approach. Holistic systems approach for watershed management for livelihood improvement in place of compartmental approach adopted earlier.
- Knowledge flow is facilitated by linking successful on-station watersheds and on-farm watersheds for strategic research.
- Islanding approach is used in which a strategic research watershed is established within the macro-watershed/district to serve as a site of learning.
- Cost effective and environment-friendly soil, water, nutrient, crop and pest management practices for wider adoption to raise the carrying capacity of the system.
- Empowerment of communities, individuals and the strengthening of the village institutions is achieved for sustainable development.
- Continuous monitoring and participatory evaluation by researchers and elimination of contractors for implementing the works increased transparencies, over all performance and sustainability of the program.

This approach resulted in substantial reduction in runoff volume (29% less than untreated area), significant reduction in soil loss (only 1/3) was found from treated compared to untreated watershed. Increased groundwater availability in the watersheds resulted in reviving of dead open wells and additional 55 new borewells were dug during the project. Due to additional groundwater recharge, 200 ha area were irrigated in post-rainy season and 100 ha in summer season growing vegetables and other high value crops. Mean average raised groundwater was 415 cm during 1999-2001. With improved technologies, farmers’ crop yields are increased by 2.2 to 2.5 times for maize, sorghum, chickpea and up to 4 times in case of pigeonpea. Income of individual households was substantially increased and the net returns on rainfed cereal crops were more than double as compared to the non-watershed village and also with the baseline incomes in 1998. Average household income from crop production activities within and outside the watershed was 15,400 and 12,700 respectively. The respective per capita income was 3,400 in the watersheds and 1,900 outside watershed. This resulted into significant impact of watershed interventions towards poverty reduction in the watershed through increased incomes for the poor from crop production activities.

ICRISAT led consortium has scaled-up this model in 200+ watersheds with the funding from Sir Dorabji Tata Trust, Andhra Pradesh Rural Livelihood Program of Government of Andhra Pradesh supported by DFID. U.K. and with Asian Development Bank in states of India (Gujarat, Madhya Pradesh, Andhra Pradesh, and Rajasthan) and parts of north-east Thailand, northern Vietnam and South China. The results during the last 2 years have clearly demonstrated that this model could be scaled-up and the productivity of rainfed agriculture along with incomes were substantially improved while minimizing the land degradation in the rainfed areas. For scaling-up the benefits from the pilot 200 villages necessary details of linkages, institutions, policies are being worked out. This holistic innovative model has changed the paradigms for watershed management in India where watersheds are used as an entry point for improving the livelihoods and protecting the environment. Main success of the model depends on implementation of participatory approach by the community, empowerment of the stakeholders, building the available institutions and community-based organizations and most importantly technical backstopping by the consortium.
Major Pathways to Productivity and Livelihood Enhancement:

A. Public Policies:

7. **Convergence and synergy:** There is a need to achieve convergence and synergy among all the dryland farming and watershed programmes in India. For this purpose, we suggest the setting up of a **Commission for Sustainable Livelihood Security in Dry Farming Areas** under the Chairmanship of an eminent farmer. Appropriate counterpart bodies at the State, district and watershed (local) levels should also be constituted.

8. **Technology:** In the watershed development projects technical backstopping is lacking and hence 15% of the developmental project budgets could be earmarked for on-farm strategic research to ensure refinement and incubation of new technologies in the developmental programmes.

9. Fortunately, we have excellent national and international research institutes like Central Research Institute for Dryland Agriculture (CRIDA) and ICRISAT in Hyderabad, which have rich technical knowledge in elevating and stabilizing the yield of dryland crops. The Commission for Sustainable Livelihood Security should take full advantage of the vast pool of unutilized knowledge available in research institutions/Agricultural Universities.

10. **Empowering the grass root institutions:** Empowerment of community based organizations (CBOs) and Panchayati Raj Institutions (PRIs) is critical and special measures to augment the technical expertise at PRI level need to be done through appropriate policies and resource allocation. The development work in the district can be taken through PRIs effectively utilizing the existing infrastructure present in various line departments associated with development of rainfed areas.

11. **Establishing R&D consortia:** All development programmes for the rainfed areas should have technical backstopping through a district level R&D consortium of organizations, which should include the relevant experts, development agencies, women’s groups, farmers, private
sector companies, financial institutions and other stakeholders. The consortium is designed to bring the best available scientific know-how and crop varieties to farm families.

12. **Flow of Funds:** Funds for development work, as shown below, can go directly from the Commission to the district and from district to the PRIs. For strategic and applied research, the total fund designated for the purpose may be passed on to the research organizations implementing the project. The development part of fund can be channeled through the project to the PRI.

13. **Enhancing investment in rainfed areas:** Several studies in India and elsewhere have shown that the economic returns to investment in rainfed areas, specially in research and technology development, is much higher than that in irrigated and congenial areas, let alone the gains in environmental health and agro ecological security. Therefore, it is heartening that the UPA Government is giving high priority to rainfed areas, which should enhance effective investments in these areas. Recognising that development of technologies like IPM, IRM, INM, biotechnological alchemy of bio-resources and other system based technology developments are much more costlier than the technologies designed for single commodities and based on single discipline, the enhanced investment in rainfed agricultural research and technology development should particularly be given high consideration. About 10 percent of the total investment in watersheds should be allocated for rainfed research and technologies.
14. **Enhancing the Social Capital and Insulating Farmers from Risks:** Investing in the social capital in the risk prone rainfed areas is equally important, if not more, than the monetary investment for creation of physical assets. The process of transforming the rainfed area must be engendered through the promotion of sustainable women SHGs. Their access to entitlement such as land, water, food for work programme and overall employment should be proactively promoted. Given the high risk, coupled with the low investment capacity of the farmers and other inhabitants of rainfed areas and the acute distresses created due to layers of indebtedness through borrowing from non-formal institutions, highest priority should be given to the access to formal credit, insurance and other institutional supports particularly to the weaker sections of the society. In order to build the human capital, nutritional security of children and women through the whole life cycle approach coupled with safety net provisions should be given top priority in the hot spots. Safety nets and input supports such as development of seed villages and establishment of seed/grain/fodder banks through the leadership of SHGs and involvement of agri-clinics will prove extremely effective in enhancing food security. The Governments should proactively support the purchase of local grains, such as millets, jowar, ragi, oilseeds and pulses for stocking the grain banks. This will empower the local people both economically and nutritionally and many of these grains are much more nutritive than rice and wheat – the commodities which presently constitute the bulk of the national food buffer stock.

15. **Strengthening Enabling Mechanisms:** Livelihood of small and resource-poor farmers are directly linked with the magnitude of their marketable surpluses and remunerative returns of their products. While through group actions (cooperatives, SHGs, farmers’ associations, etc.), economies of scale should be realized by effecting the integration of production, processing, value addition and marketing, appropriate regulatory mechanisms should be in place for protecting the rights of rainfed farmers on indigenous agricultural biodiversity, which they have conserved and evolved over generations. These resources possess extremely valuable genes and constellation of characters, such as the extremely high fat content of milk of local buffalo breeds.

16. **Effective Sanitary and Phytosanitary measures and quarantine management must be in place to protect the trade and biosecurity of rainfed people (Refer Chapter VII).** In this context, necessary institutional and awareness development programmes need to be designed particularly
for the rural people, to enhance their trade, legal quality and genetic literacy to empower them for their active participation in the development process and for capturing the new opportunities.

**B. Catalytic Interventions:**

**B1 Adopting Existing Technologies:**

17. **Narrowing yield gaps:** For the last many years, the average yields in rainfed areas have been hovering around 1 ton/hectare. However, the recent on-station and operational research on large number of farmers fields across the country clearly showed that the yield level can be at least doubled to 2 tonnes/ha. if only a “campaign mode” approach is adopted to popularize the technologies matched with appropriate policy and institutional support. Some of the key elements for the successful adoption of improved technologies are: (i) consortium approach for technical coordination and implementation, (ii) direct fund flow to the PRIs/PIAs, (iii) involvement of financial and marketing agencies at the village/district level, (iv) proper synergy with the existing schemes of the State departments of agriculture and leveraging their strengths particularly in input supply like seeds, micro nutrients, machinery and (vi) participatory involvement of the stakeholders including the PRIs, SHGs and other grass root organizations on the choice of interventions and resorting to a bottom-up priority setting based on the local needs assessed through participatory rural appraisal.

18. **Bridging the R&D disconnect:** Indian researchers, sometimes in collaboration with CGIAR and other international and developed countries’ research and technology development institutions have developed some world class research outcomes and technologies, which have substantially contributed to our agricultural production and natural resource management. These “bright” spots should be expanded and shared through traveling seminars, visits and exchange of farmers and technology transfer agents. The critical elements of success should be identified and effectively internalized in the development process. **Farmers Field Schools**, promoting farmer-farmer lateral learning, involving even the *Krishi Pandits*, should be promoted and further expanded.
19. To have a measurable impact on production, income and livelihoods at the district level, it is important that a sizeable number of the farmers in the target areas adopt technology and the institutional consortia should facilitate this through a well defined institutional and policy framework. CRIDA and ICRISAT are willing to provide this framework on a pilot basis in few districts which need to be replicated all over the country, particularly the 150 districts by involving the institutions in the National Agriculture Research System (NARS), NABARD and the private sector. For internalizing the proven technologies in the development process, Agricultural Technology Management Agency (ATMA) should strengthen its linkage with the ICAR. Private sector participation is particularly relevant in areas like input supply, soil testing and marketing. Some examples of the rainfed farming technologies that can be popularized in the backward districts are: (i) Soil test based micronutrient application for maximizing yields, (ii) Popularisation of hybrid pigeonpea, (iii) Ridge and furrow method of cotton cultivation, (iv) Popularization of high quality *arboreum* cottons (MDL-2463. PA-255 and DLSA-17), (v) Upland rice + pigeonpea intercropping system (5:2), (vi) Double cropping in rice fallows of eastern India, (vii) On-farm water harvesting in rainfed rice through dabris and (viii) Integrated rice-fish-duck farming system. Nearly 2000 large-scale farmers’ fields demonstrations are proposed.

20. Other promising technologies which have equal potential but need some more refining are: (i) Popularization of multicrop safflower harvester, (ii) Multipurpose 6 row seed drill for rainfed crops, (iii) Water harvesting through small farm ponds, (iv) Improved intercropping systems for different agro ecological regions of the rainfed crops, (v) Ridge and furrow planting method of rice + pigeon pea, (vi) Popularization of improved rabi sorghum variety CSV-216-R, (vii) Utilization of sunflower heads as a cattle feed through pulverizing machines, (viii) Pulse beetle control in stored pulses like redgram, greengram and blackgram through probe cum pitfall trapping, (ix) Improved storage of soybean seed for increased viability (vacuum storage techniques), (x) Horti-agricultural system in rainfed areas and (xi) Improved livestock nutrition. For these, 3,000 demonstrations are proposed. Micro enterprises for landless workers needing widespread adoption are: (i) Promotion of using improved machinery through custom hiring centres (for seeding/tillage/interculture/harvesting/threshing/shelling and drying), (ii) Kisan nurseries for landless women, and (iii) Village seed banks: about 1500 seed banks (10 villages in each of the 150 districts) may be set up.
B-2 Transferring New Technologies:

21. The following thematic interventions are considered the most critical towards increasing productivity and livelihoods in rainfed areas: (i) water resource development, (ii) investing in soil health, (iii) integrated crop management and production, (iv) integration of alternate land use with livestock/aquaculture/horticulture, (v) post harvest management, processing and value addition, (vi) micro-enterprises and marketing and (vii) social engineering, group dynamics, engendering the movement; expanding the knowledge base.

22. Based on the research done and the successful cases of transfer of some of the technology packages in selected pockets in different zones of the country, the following interventions have been found to be extremely effective for enhancing productivity and livelihood in rainfed areas and deserve large scale adoption.

22.1 Participatory augmentation and management of surface and groundwater.
22.2 Soil test based integrated nutrient management with focus on micro nutrients and soil carbon.
22.3 Participatory selection of crop varieties and village based seed/fodder/grain banks, based on the NERICA model (New Rices for Africa adopted successfully in west Africa).
22.4 Promoting increased fodder production and livestock health care.
22.5 Production and distribution of quality planting material of horticultural crops.
22.6 Skill enhancement of artisans and promoting micro enterprises for value addition through post harvest processing and ICT –mediated knowledge sharing.

23. Soil test based micro-nutrient amendments for increasing yields: While scaling-up, the consortium model noted that with 80-100% of the tested farmers’ fields in Andhra Pradesh, Madhya Pradesh, Rajasthan and Gujarat in 200 watersheds were severely deficient in boron, zinc and sulphur in addition to the macro-nutrients like nitrogen and phosphorus. Farmer participatory trials with micro-nutrient amendments in 200 watersheds during the last 2 years increased crop yields by 30 to 120% in case of maize, groundnut, sorghum, pigeonpea, chickpea,
soybean, greengram etc. The economic gains with the application of micro-nutrients in three districts of Andhra Pradesh is ranging from Rs.1,500 to Rs.16,500 per hectare. This technology should be adopted on large scale throughout rainfed areas of the country with due attention to the 150 districts for improving the productivity of the rainfed systems. Additional facilities for soil test analysis for all the 16 macro and micronutrients are needed to implement this programme. To begin with, each district must have one adequately equipped soil testing laboratory which could reliably test for the various nutrients, especially the micronutrients. Additional investment both in terms of equipment and human resources are required to create a national grid of advanced soil testing laboratories (ref. Chapter I).

24. **Enhanced soil health through vermicompost and *in-situ* generation of organic matter:** Indian soils are severely deficient in soil organic matter which is the main driving force for agricultural production. At the same time, there are large quantities of farm residues available in the villages and wastes in the cities which can be converted into value added compost through vermi-composting. The farm boundary bunds are successfully used for generating N-rich organic matter by growing nitrogen-fixing shrubs on the farm boundaries. These shrubs can provide 25 to 30 kg of N per hectare through loppings and also improve the soil health through building the soil carbon. Both these technologies can result in building assets in the villages which will enhance the agricultural productivity and at the same time create long-term employment in the villages while improving the soil health and improving the productivity. **Small Holders’ Estates**, landless labour and non-agricultural groups must all actively promote this green technology.

25. **Availability of high quality improved variety seeds through village-based seed banks:** Timely availability of good quality seeds of high-yielding improved varieties of crops is one of the major constraints farmers face in the rainfed areas. The consortium model has demonstrated that with the support from the consortium to the farmers for producing high quality seeds using the breeders seed material, grading, storage and distribution could result in increased productivity and employment opportunities in the village. The SHGs managed the village-based seed banks and through value addition more income was generated in the village and at the same time, productivity of large rainfed areas were substantially increased. Successful examples of
village-based seed banks in Madhya Pradesh and Rajasthan supported by Sir Dorabji Tata Trust project and in Andhra Pradesh supported by APRLP-DFID projects have been in operation for the last 2 to 3 years. The villagers are empowered and are managing the village-based seed banks effectively for crops such as groundnut, chickpea, sorghum and soybean. Other governments, private sector, NGOs and SHGs should also adopt this programme.

26. **Rainwater harvesting through farm ponds for supplemental irrigation and recharging the dead open wells:** In most of the rainfed areas, the seasonal rainfall which comes as downpour, substantial part of that goes waste through runoff causing soil erosion as well as impoverishing the soil through soil erosion. It has been demonstrated throughout India that harvesting of excess runoff and storage into farm ponds as well as restoring water bodies and recharging the dead open wells is a very feasible and successful option for improving the groundwater recharge as well as enhancing the productivity of rainfed agriculture through supplemental irrigation. In the areas with rainfall above 400 mm these technologies could be widely adopted which will enhance the cropping intensity, diversify the system into high value crops, increase the productivity and incomes from rainfed agriculture and at the same time, create assets in the villages. These technologies have shown remarkable increase in the groundwater as well as productivity and incomes for the farmers. The watershed programmes should adopt a **million well recharge programme** to be linked to a rebate in the rate of interest provided under the enhanced agricultural credit programme, on priority basis. All the Technology Missions should also contribute to the national scheme to retain, renovate and restore the water bodies that are linked to agriculture.

27. **Popularization of improved high yield varieties/hybrids:** Large number of high yielding varieties/hybrids of number of rainfed crops are released by research organizations and private entrepreneurs in the country. However, availability of these seeds to the farmers is lacking in remote areas. By popularizing these improved varieties and establishing linkages with private entrepreneurs, the benefits of increased productivity can be harnessed. This technology can be widely adopted by conducting front line demonstrations on the farmers’ fields through farmer participatory approach. At the same time, linking villagers with the private entrepreneurs will increase the employment opportunities in the villages and serve the purpose of increasing
productivity and incomes of rainfed agriculture. NABARD Agriclinics, contract farming and Small Holder Estates, with active involvement of corporate sector should be the main drivers of this technology.

28. **In-situ moisture conservation through land farm treatments:** Based on the type of soil and rainfall different land forms such as ridges and furrows, broad bed and furrows (BBF), raised beds and sunken furrows, contour planting and bunding and conservation furrows at specified intervals can substantially enhance the infiltration of rainfall resulting in increased soil moisture for growing the rainfed crops. These technologies are well proven and can be widely adopted in the specific areas based on the type of soil and rainfall in the region. Through these interventions, rainwater use efficiency can substantially lower the runoff, soil loss can be decreased and productivity of rainfed systems and incomes from rainfed agriculture can be substantially increased.

29. **Integrated livestock and horticulture with crops:** Livestock are important source of livelihood for the rainfed farmers and landless people. In order to improve the livelihoods of landless people in the watersheds, enhancing the incomes through improved animal production (for milk, meat and other products), the intervention will be through improved forage production, seed quality improvement, improved animal health and breed improvement. At the same time, agricultural systems with improved water availability can be diversified using high value crops (fruits and vegetables), the incomes of the small holders can be substantially enhanced. It is proposed to target weaker sections and landless people for the livestock and small holders with irrigation facilities for diversification with high value crops.

30. **Post harvest management, processing and marketing:** Recognising that huge post harvest losses especially in horticultural and livestock and dairy products, cause significant depression in productivity, quality and income, highest emphasis should be placed on investment in infrastructure for post harvest management, transportation of agricultural goods (the production centres are generally placed distantly from the processing and marketing centers in rainfed areas), agri export zones, processing and modernized retail outlets, Growers’ cooperatives and SGHs should play an active role. The highly successful NDDB model of
linking production – processing – value addition – marketing of milk and dairy products should be replicated for other commodities. Appropriate harvesting and processing machines, shellers, threshers, dal mills, oil expellers etc. should be promoted and supported both by the public and private sectors. The involvement of women SHGs closely linked with the home science activities promoted by the agricultural universities and ICAR Institutes should be duly supported. Low cost storage structures for fresh fruits and vegetables, pulses, grain banks and hand tools to reduce drudgery among women should be actively promoted. A post-harvest technology wing may be added to the existing Krishi Vigyan Kendras (KVKs), in order to bridge the huge gap between production and post-harvest technologies, particularly in horticulture resulting in considerable post-harvest losses as well as loss in opportunities for value addition. As such, Krishi Vigyan Kendras may suitably be redesignated as Krishi and Udyog Vigyan Kendras (KUVKs).

31. The following micro enterprises and marketing approaches are strongly recommended to be adopted towards the goal of enhanced productivity and livelihood security, especially by landless and non-agricultural people:

31.1 Intensification and spread of household income generating activities like mushroom cultivation, sericulture, backyard poultry, apiculture, vermicomposting and pisciculture.

31.2. Promotion of custom hiring of farm machinery, irrigation and plant protection equipment etc.

31.3. Establishing and fostering linkages with market committees by e-networking

31.4. Linking SHGs and other farmers organizations/groups with credit, insurance, private & corporate sector to promote Small Holder Estates to benefit from the power of scale.

31.5. Establishing ICT based knowledge centre/internet kiosks for market information and virtual extension service (Refer Chapter VIII).

C. Leveraging Group Dynamics:
32. In order to take advantage of the scale of economies, small and resource poor farmers should be helped to organize themselves as **Small Holders’ Groups**, on the lines of SHGs, each covering an area of about 500 ha. About 6000 such groups could be created in the 150 districts identified by the Planning Commission. Through appropriate skill development and based on agro-ecological capacity, and strategic locations, such groups may further form themselves into clusters of groups to undertake mass production by masses of specified commodities. The smaller groups may concentrate on seeds, planting materials, biofertilizers, marketing and e-commerce. These groups should be duly empowered to enhance their access to modern technologies, formal credit and marketing. The group action will dispel the risk aversion attitude of otherwise individual resource poor farmers and other workers and will provide the necessary confidence to adopt new technologies, investments and avenues of employment and income generations. Since their access to appropriate insurance packages and life saving supports from the Government will enhance considerably, the adoption rate of new technologies and intensification processes will grow fast. Further the group action will insulate the small farmers from the gambles both in monsoon and the market place by scaling up their power both in production and distribution. The proposed **National Commission for Sustainable Livelihood in Dry Farming Areas**, through the watershed management programmes, should make special efforts to create such groups throughout the country. The role of Panchayat Raj in creation and management of such groups can hardly be over emphasized and PRIs should suitably be strengthened by providing necessary financial and human resources support.

**D. Socio-economically and Agro-ecologically Differentiated Approach:**

33. In rainfed areas, natural resources endowment and development potential vary greatly from location to location. Therefore, location specificity must be emphasized in micro planning, in allocation of resources and in setting socio-economic targets. Area-based development duly internalized in the integrated watershed management approach, should be the hall mark of development and growth of rainfed areas (Fig.1). Therefore, we propose that the agro ecological sub-regions of the 150 districts should be delineated and the various programmes should be designed to match their capacities, as illustrated in Fig.2. This will particularly be important for creating assets to ensure sustainability of the watersheds.
E. Capacity Building and Knowledge Sharing for Improved Livelihood Security in Rainfed Areas:

34. The new approach to productivity improvement and employment generation in the rainfed areas is more information and knowledge-intensive. The majority of the individuals covered require support to meet a range of information needs that arise with the deployment of new technologies and services. There is also a need to build and strengthen new local capacities in aspects of resource management and in responding to credit or market movements. Both these dimensions require a functional and affordable arrangement that brings knowledge and information sources and the rural families together for improved livelihood security of the families. Capacity building and knowledge sharing approach that integrates the bottom-up with the top-down approach is also needed.

35. Through a system of ICT based rural knowledge centres (Refer Chapter VIII), the families in the dryland areas can access information and knowledge resources with facilitation by a district-level consortium, and can raise their queries. The following figure describes this arrangement, which is itself derived from the significant national experience in rural IT kiosks in recent times.
Focus on *in situ* moisture conservation, intercropping, livestock

Land use diversification and rainwater harvesting, livestock

Scope for intensification of double cropping, rainwater harvesting

Immense scope for rainwater harvesting, horticulture

Intensification of upland rice, paddy-fish-pig integrated farming, oilseeds and pulses
Financial Resources

36. A National Network of Advanced Soil Testing Laboratories will be required towards addressing the soil fertility imbalances, particularly the deficiencies of micronutrients in the soil. Factor oriented (eg. micro-nutrient deficiencies, implements etc.) and system oriented (eg. crop-livestock-fish integration) demonstrations need to be organized in resource poor farmers’ fields by the R&D Consortium to be set up by the Commission on Sustainable Livelihood in Dry Farming Areas. Farm Schools will have to be established using the services of outstanding farmers. Additional financial resources will be required also for strengthening processing and post-harvest management, rainwater harvesting and restoring water bodies as well as for the creation of pulses and oilseeds villages. ICAR should provide part of the funds needed through re-ordering of priorities and redeployment of personnel. **An additional sum of Rs.1,050 crore, as detailed below, may be provided in the budget for 2005-06 to cater to the above mentioned requirements.**

36.1 **A National Network of Advanced Soil Testing Laboratories** – 1,000 laboratories across the country, with 500 of them located in dry farming areas, each laboratory costing Rs. 50 lakhs - total allocation Rs. 500 crore.

36.2 Five thousand large-scale demonstrations on catalytic interventions in collaboration with CRIDA and ICRISAT, establishment of 1,500 seed banks and creation of 6,000 Small Holders’ Estates - Rs. 100 crore.

36.3 Establishing 50,000 **Farm Schools** in the fields of framer-achievers - Rs. 150 crore.

36.4 Post harvest processing and value addition in collaboration with CFTRI and private sector and strengthening of **Krishi and Udyog Vigyan Kendras** for post harvest management - Rs. 150 crore.

36.5 Augmenting water availability by vigorously promoting water harvesting and restoring water bodies – Rs. 70 crore.

36.6 **A Million Wells Recharge Programme** ( to be promoted through interest rebate on loans)
36.7 Rainbow Revolution in rainfed areas achieving substantial enhancement in productivity of millets, pulses, oilseeds and livestock through large scale adoption of highly successful new technology packages, such as hybrid *arhar* - Rs. 50 crore.

36.8 Creation of pulses and oilseeds villages (*Arhar Villages, Sesamum Villages*) for specialized enhanced production, efficient processing and remunerative producer-oriented marketing of the selected crops - Rs. 30 crore.
CHAPTER IV
A NEW DEAL FOR WOMEN IN AGRICULTURE

The Sixth Five-Year Plan (1980-95) should be remembered as a watershed in the history of post-independence Indian planning. For the first time, the Plan document presented a separate chapter titled Women in Development. Government of India had finally accepted that women were vital actors, contributors and agents of development planning. Since then, each Five Year plan introduced development schemes for women. An illustrative list of the important and significant programmes presently being implemented in the Ministry of Agriculture (MOA) is provided below:

- The Central Sector Scheme of Women in Agriculture (launched in the Eighth Plan) (now covers 15 States in the country)

- Externally aided projects on Women in Agriculture: (the earliest of these began in 1982, now running in 4 States)

- Externally aided GOI-UNDP Food Security Programme (began in 1998, running in 4 States)

- Projects to promote women’s involvement in the cooperative movement (as part of the general education programmes of the National Cooperative Union of India; formation of self-help groups of women is one of the activities)

- Gender-friendly agricultural Implements and Machinery: (as part of the MOA general programmes on implements and machinery)

- General programmes of Integrated Pest Management, National Perspective Development Plan, etc. also specifically focus on women in training programmes, access to subsidized equipment and earmarking of benefits at the field level.
• Organic Farming: A National Project on Organic Farming has been formulated in the Tenth Plan, and a National Institute of Organic Farming has been set up as a Central body. The links between women, biodiversity and organic farming make it one of the potential programme areas for women farmers.

• The MOA has mandated 30% of benefits from all development programmes to reach women, the target date for which is proposed by MOA as 2006-07.

2. These programmes are a mix of a) those specially designed for women, b) those that form components or have special focus on women as part of larger programmes, c) those that bear critical importance and potential for women.

**The Path Ahead:**

3. The Common Minimum Programme (CMP) provides that -

“The UPA government should ensure that at least one-third of all funds flowing into panchayats should be earmarked for programmes for the development of women and children. Village women and their associations should be encouraged to assume responsibility for all development schemes relating to drinking water, sanitation, primary education, health and nutrition.”

“Complete legal equality for women in all spheres should be made a practical reality, especially by removing discriminatory legislation and by enacting new legislation that gives women, for instance, equal rights of ownership of assets like houses and land.”

4. In the current context of the increasing feminization of agriculture, planning for women in this sector needs to keep their critical role in view in –

1. Conservation
2. Cultivation
3. Consumption
4. Commerce
5. Keeping in view the above perspective, a three-pronged approach for engendering the Tenth Plan for Agriculture is required:

- New special programmes for women with specific focus on the most marginalized families of the farming and rural labouring population and their gendered situational needs

- Affirmative action for women farmers in the programmes being currently implemented by providing 30% of benefits (including selection of numbers of women in participation in programmes as well as programme benefits) with specific reference to training, extension, provision of inputs, subsidies and support services etc. with effect from 1/4/05.

- Creation of institutional mechanisms for a) integrating women farmers’ concerns in ‘mainstream’ agriculture at policy, strategy and programme levels and, b) incorporating gender analysis, gender-sensitive monitoring and evaluation and stronger affirmative action for women

6. Agriculture for the purpose of this Chapter, from the women’s context, is envisaged in the broadest dimension. It is not restricted to cultivation only. It includes not only crop production and horticulture, but also dairying, small animal husbandry, fisheries, poultry, natural resource management in its widest sense (including forestry, tree crops, minor forest produce) as well as subsistence production. It requires creative and combined approach in order that women workers belonging to small and marginal farmer households can use a small piece of land optimally to generate year round employment. It calls for promoting a farming systems approach based on crop-livestock-fish integration, but goes even further.

7. Given this comprehensive operational framework, the suggestions made in this chapter cut across conventional sectoral lines of subject-matter demarcation; inter-sectoral collaboration and coordination is therefore of prime importance to the success of these ventures. The
mechanisms that are needed for ensuring such collaboration and coordination have, however, not been gone into in detail in the chapter.

8. **New Programme Initiatives:**

8.1 **Rights, entitlements and better access to land, water and other physical resource base:**

8.1.1. Effective access to land is perhaps the single most significant determinant of economic and social status and power in rural India and “women’s unequal access to it is one of the most important forms of persistent gender inequalities in India today” (Bina Agarwal, 2004) (mimeo). Land is a productive resource and placed in women’s hands means well-being of the family, as evidenced in better access to education, health and nutrition of its members, especially the children. In the interest of social justice as well as well-being of families, enhancement of women’s rights and entitlements to land deserves to be the first priority on the agricultural agenda. “In other words, enhancing women’s direct access to land in the rural economy could prove critical for meeting the national goals of improving food and livelihood security, children’s welfare, agricultural productivity and women’s empowerment”. (Bina Agarwal 2004)(ibid).

8.1.2 Women have been agitating for better access to credit and credit instruments. It is the absence of land titles that prevents women farmers from being granted kisan credit cards.

8.1.3 For the purpose of this section of the chapter, accelerated programme activities based on the following are recommended to be taken up –
i. Existing policy pronouncements and directives of direct transfer of government land to women,

ii. Improving inheritance rights of women to land by bringing changes in laws and working towards better implementation,

iii. Enabling women to buy land from the market

a) Transfer of Government land, including wasteland, ceiling surplus land, etc. to women

Government has issued policy directives from time to time to all States on allotment of land on joint pattas in the names of husband and wife. In addition, Government has also issued directives on allotment of such land in the names of women only. The Sixth Plan recommended allotment of at least 40% of land pattas to women and the remaining pattas in joint names of husband and wife. This was further taken up in the Seventh Plan as well as in the National Perspective Plan for Women (1988-2000). Allotment of land under various welfare and anti-poverty schemes on the basis of joint pattas to husband and wife is a part of Government policy of strengthening women’s legal entitlements.

Since the subject of land is within the competence of the State governments, the implementation of these directives is not uniform. Nor is there an effective monitoring system in place at either State or central level. While some States have gone far ahead and have issued orders for enforcing land transfers to women or in the joint names of husband and wife, some others have not been proactive.

Joint pattas give a measure of protection to wives against indiscriminate sale by husbands without consulting them. In case of marriages breaking up, joint pattas ensure a share in the property to the wives. However, joint pattas have several flaws, as women are not able to have legal rights of disposal of the land. Women also find it difficult to access the produce of the land and enjoy it. Joint pattas also
obstruct women from joining with other women to take up agricultural activities as a group.

The Center of Rural Studies, Lal Bahadur Shastri National Academy of Administration, Mussoorie has brought out a number of publications on gender discrimination in land ownership. These studies bring out that the majority of women, especially those who belong to the target group of welfare and anti-poverty programmes, under which these allotments are made, are themselves not aware of these Government directives and of their entitlements to land. In the Uttar Pradesh study, (covering two districts), none of the rural households interviewed reported the case of any such land allotment, either on individual or joint patta basis under the land reform programme. They did not understand the phrase “joint patta” and expressed their ignorance of the government directives on land allotment. In Orissa, the study found that land compensation for development projects was paid to the male heads of families only. In case of landowners who were female-heads of households, widows, or destitute women, etc. the compensation was diverted to middlemen or others who cheated the women of the money. Government of Orissa had issued its first directive on grant of joint land pattas to husband and wife in 1989. In October 2002, the Government further directed that 40% of the Government wasteland allotted for agriculture, ceiling land, bhoadan land etc. may be allotted to widows, unmarried women, victimized women and women living under the poverty line as far as is practicable. No consolidated information was made available to the research team on the progress of implementation of these directives. There was some evidence of title transfers
on joint patta basis in a few places where the administration had started the same on “experimental basis”.

Programme activities for 2005-06 should focus on –

i) Setting targets State-wise, for allotting at least 40% of government land distributed (including water bodies, wasteland, surplus land, etc.) to women’s groups for taking up agriculture and allied activities.

ii) Setting targets State-wise, for allotment of remaining government land transfers on the basis of joint pattas to husband and wife

iii) Setting targets State-wise for at least 40% of government land distributed to SC/ST to go to the women of these communities.

iv) Allocation of land in State Farms (both Central and State) to women SHGs engaged in the production of seeds and planting material for horticultural crops including medicinal plants.

Though ‘land’ is a State subject, the Central Government should oversee this programme and monitor its implementation. Most of these directives on providing titles to land for women emanated from Central Plans, based on the recommendations of planning groups and other high level policy making bodies.

The Central Government and State Governments can earmark land on government-owned farms to be given to Self Help Groups (SHGs) of women for agricultural purposes.

Monitoring of the implementation of grant land titles on exclusive or joint patta basis to women should be taken up as a new programme and should form a part of
the Ministry’s activities during 2005-06. Such a pro-active step by the MOA should establish that programmes and policies for women in agriculture cannot be designed and carried out without reference to legal rights as well as access to land. It is not enough to provide women with access to knowledge, skills and productive resources such as credit and technology, marketing, quality control, etc. without legal entitlements. It is necessary for MOA and its various agencies to be seen as supporting affirmative action to raise women farmers’ status by facilitating their ownership and access to land and other physical assets.

MOA should carry out 4 regional consultations on issues of land rights and women during the FY 2005-2006 in collaboration with State departments of agriculture and rural development (among others). In addition, a special consultation should be held in the North-East region where issues of land rights and women need special attention.

b) **Private land**

In the short term, overcoming existing legal obstacles to equal access to land and property for women pose grave challenges. However, the need to provide equal rights to land through amendments to existing laws cannot be put on the backburner. Follow up of earlier initiatives should be accorded top priority. Union Cabinet has recently approved amendments to the Hindu Succession Act 1956, providing that daughters would get equal rights in ancestral property.

While ownership of private land is skewed by both class and gender in India, it is ironical that the largest numbers of women farmers and workers in agriculture belong to the tenant category, who work on the lands belonging to others. Share cropping and other similar systems provide livelihoods to the largest numbers of families in the country and in the background of increasing male out-migration, women have become effective share croppers in large parts of the country. Though it is a loss making activity, it generates foodgrains and provides a modicum of food security. These women have no better
alternatives and stand marginalized by banking institutions, agricultural and scientific establishments and governments. With increasing feminization of agriculture, these women are taking up more and more of agricultural tasks hitherto carried out by males. They have no security of tenure and are seldom allowed to cultivate the same piece of land continuously. They have no access to credit and therefore buy the agricultural inputs, often of poor quality, at exorbitant prices, some safety nets are required for this very large category of women workers, for which NABARD can set up a working group or a committee.

c) **Purchase of land from the market**

There is also the successful initiative where a Scheduled Caste Development Corporation (SCDC) (Andhra Pradesh) has enabled dalit women’s groups (by giving subsidized credit) to purchase/lease private land from the market for cultivation of crops. The ownership rests with the group, which manages and controls the land and its cultivation. The SCDC has sought partnership in this endeavor from NGO’s working in the State. This initiative can be recommended to the other States, especially where the problems of landless dalit women are in large numbers, either as an alternative or in conjunction with the grant of leases/pattas of government-owned land.

### 8.2 Improvement of land records to strengthen women’s land security

*Special problems arising from lack of proof of community-owned land: the case of the North East*

Women in certain areas or belonging to certain communities of the country, especially the North-Eastern region, are often handicapped in the absence of legal proof of entitlements to their customary and traditional rights to agricultural lands as well as the accompanying responsibilities that they are required to carry out. The All India Federation of Women in Agriculture has demanded a cadastral survey to be conducted in the North Eastern region, which should enable the women as well as the men to have proof of the ownership of land. Though land is
not a problem in this area traditionally, as it was considered ‘non-tribal’ not to own land, with increase in land grabbing, problems are arising. The privatization of community land is increasing and land is being leased to private groups.

The North East region is known for its customary land systems adhering to tribal and other ethnic norms of property ownership and use in which the community ownership is predominant. However, in most areas of this region, the land system has not been codified nor cadastral surveys conducted. This has led to a situation where there is no record of land rights. With the increasing socio-economic changes and trends towards modernization, community and communally owned land resources are in danger of being encroached upon by individuals. Pattas are being issued indiscriminately by local authorities that do not have the sanction of customary laws. Women stand to lose a great deal in these transactions that are taking place. Their control over natural resources is getting more and more endangered with the conversion of community-owned lands to private property. The conventional images of women of the north east region having property rights is not always borne out by actual field realities. Even if women have proprietary rights over land, it is the males who may more often control its use. The decline of jhum cultivation and its replacement by conventional individual farming is an example.

The urgent necessity of undertaking a comprehensive survey of the land and preparation of a statute book or a compilation of record of rights based on cadastral maps has been emphasized by many authorities, including some of the high courts and land reforms commissions in the region. Even when some of the States have passed enabling legislation to provide for surveys, the same have not so far been enforced for all the States of the region as a whole.

A comprehensive survey of land ownership in the North East should be taken up during 2005-06, using the latest technology so as to ensure accuracy of mapping as well as saving of time. Ensuring a participatory and transparent process to the
planning as well as the conduct of the survey is vital to its success. Unrecorded rights traditionally enjoyed by individuals or groups, such as women (but not confined to women only) run the risk of being excluded when a formal exercise of surveying ownership rights and then recording them, collects oral evidence and uses it as an important input. Very often members of marginal groups fail to turn up for the hearings. It is essential that all women of the region and the areas being surveyed are consciously involved in the process. In order to give wide publicity to the process, public hearings can be made an integral part of the process. Disputes and jurisdictional complexities can be dealt with better by using such open forums.

Clear village-scale maps, using informal and formal mapping methods including GIS and GPS, and a database of the updated land records should be prepared. Records of land rights can be computerized and made available in hard copies to local agencies for public use and perusal. Capacity of local women and men to upgrade the records from time to time should be built.

Apart from the special issues relating to land records of the North East region, there are other problem areas in the rest of the country that obstruct the enjoyment of women’s rights over land in the possession of the family.

8.1.4 There are two other problem areas needing interventions at various levels –

a) Absence of women’s names in general in the land records of land-owning families: Generally, only men’s names are shown as owners of land. Women’s names are often not recorded as claimants. This is more so in the case of daughters. Improving the maintenance of land records is in the interest of increasing women’s ability to obtain land from their families and ensuring that their claims are properly recorded in the village registers. Women’s names go by default in the ownership or possession columns. Since 86% of arable land is privately owned, the absence of revenue record showing women’s claims to
land severely affects women’s capacity to take up productive land-based activities on ownership basis. The example set by the Government of Assam is worth emulating. In 1989, it took a policy decision to include the name of the wife in settlement pattas. It was part of the Government Land Policy of 1989, which marked a complete departure from the earlier State land policies, which did not mention women by name. The Policy stipulates that all allotments and settlements of land, both in rural and town areas, should be in the names of the spouse, conferring joint title to the husband and wife of a family. The State Government followed this up by issuing patta passbook with specific columns to show shareholders of the property. Even though the policy of inclusion of wife’s name in the settlement pattas has remained on paper in the State, the initiative taken by the State to include this provision in the Land Policy is worthy of emulation by other States. It protects the inheritance rights of women, especially of widows. This can be recommended to other States in the country. On the analogy of the Assam initiative, MOA should ask all State governments to include the names of women family members in the revenue records as claimants of landed property.

b) **Problems arising from lack of recorded rights of certain exclusive communities:** Rights of women of the traditional farming communities, pastoral, artisan and fishing communities, women’s share of common property rights over pastures, forests, wetlands, and other lands are seldom recorded. The same situation exists for individual rights of women and men over agricultural fields. Most nomadic communities have no written record of the rights enjoyed by them. They exist in a State of uncertainty, because they do not have a title deed to the lands and waters that they have traditionally or customarily used for their livelihoods. This situation often creates indifference and a lack of stake in maintaining and enhancing biologically diverse, sustainable farming, pastoral, and fishing practices.
Improvement of the preparation and maintenance of land records is to ensure women secure and clear tenure, especially women of communities who traditionally enjoyed common property rights in the absence of any record or document of these rights. Women holding individual rights over agricultural land are also benefited by the proper upkeep of land records.

A similar exercise should be carried out for customary/traditional right-holders such as tribals, nomadic groups, pastoral communities, traditional farmers, artisans, fishing communities, etc. with special focus on women in these communities. What is needed is to compile and collate existing records at village level, so that it is possible to look at issues of conflict, areas of dispute and at competing claims and try to arrive at solutions amongst the different parties involved including the government departments. Women of these communities should be involved in these village level discussions and public hearings.

A large number of line agencies should be involved in these exercises. The objective should be to move towards a secure and clear tenure by way of both individual and common property rights that can be recorded and made into a document that is easily accessible to every one at the village level.

8.3 Partnership programmes in promoting women’s productivity (Supporting women’s groups in enhancing productivity with the help of established women’s organizations working at grassroots level)

8.3.1 In the short and medium term, poor women’s groups should be provided programme support (technical, financial, management, etc.) for agriculture, horticulture, fisheries, wasteland development, rejuvenation of grasslands, natural resource management, village pond development etc. through the agriculture and allied extension machinery backed by NGO support. Instead of following the
conventional top-down approach whereby government ‘motivates’ the ‘beneficiaries’ to avail of new government schemes and projects, the MOA should make efforts to identify groups of women where a latent demand for such opportunities already exists (the term “beneficiary” denotes a patronage approach; there is need for a shift in mindset from patronage to partnership).

8.3.2 Those grassroot organizations in different parts of the country who have successfully spearheaded poor women’s groups to demand land from the government should be involved by the MOA in these efforts. Organizations that have achieved many successes in these fields should receive formal recognition as resource agencies to help the MOA for designing and running these programmes, according to the needs of the local context and situation.

8.3.3 Organizing and mobilizing poor women who are in search for new alternative livelihoods is an essential ingredient for the success of these programmes at the local level. This enables women to create their own organizations, whether in the form of self-help groups, cooperatives, societies or other forms. It is only as members of their own organizations that the women can aim to increase productivity, income and bargaining power. Such a partnership should enable MOA to avoid the pitfalls of a ‘targeted’ approach where quantitative aspects are deemed to be a measure of success.

8.3.4 The group approach is essential to strengthen women’s capacity to retain control over the land as well as to access production resources of better quality with greater ease and convenience. The entity of a group also enhances the status of women as compared to individual leases or pattas. This should be therefore a non-negotiable feature of this scheme.

8.3.5 This programme initiative should take the following elements into account:
a) The State authority enabling ownership of/access to land by hitherto landless or land-poor women organized into groups through its rules and procedures.

b) The presence of intermediary organization(s),

c) Fostering a collective ethos amongst the women through mobilization of a broadly homogenous set of asset-poor women, which is essential to the sustainability of the programme;

d) Mobilization, specifically in the context of building an organization of women workers.

e) Mobilization around issues that are local-specific, differing from area to area on the basis of agro-climatic or other factors; relating to challenges that the women have to battle with for survival and subsistence, such as water, soil, natural calamities, displacement etc.

f) Involvement of women not only in crop production but in any of a sweep of activities based on land and water, bio-diversity, natural resource management, etc. with an open-ended approach.

g) The importance given to removal of food insecurity at both the household and community levels as one of the main objectives of the programmes.

h) The asset-poor women’s collective entity cannot be restricted to the self-help group model alone (which is what most of the MOA programmes are based on) as the funding norms may not suffice. There is a need to look at other models such as the cooperative, the mahila mandals, village groups, or others. Different organizational models could be combined, as for example, a women’s cooperative at the district or sub-district level could mobilize women into self-help groups/credit and savings groups or other informal groups or sanghas at the village level. These formations of women should be legally eligible and authorized in terms of policy mandates to lease or purchase land for agriculture. Self-help groups of women, for example, should be given the
same status as farmers’ groups in accessing resources for land-based activities.

i) Self-help groups are generally understood in a narrow and instrumental sense, as a conduit for delivery of services. They should not be merely instrumental entities, or used for their instrumental value, but should be strong collectives of women. They should be sustainable SHGs, ensuring backward linkages with technology and credit and forward linkages with markets so as to generate both farm and non-farm livelihood opportunities. In order to upscale their activities (such as marketing or quality control), they could join to create federations at higher cluster levels. Management of sustainable SHGs should be improved and made more transparent by introduction of relevant accounting software.

8.3.6 Programme components should broadly cover food and nutrition security at community and household levels, conservation of bio-diversity, organic farming, information dissemination and documentation of best practices, community-based production, storage and distribution systems, popularization of traditional health foods, etc. Specifically, they should focus on the women of the poorest and most vulnerable communities (such as dalits, marginal and landless families and agricultural labour) and could include the following illustrative activities:

A. Food Security of communities and Households Agricultural Biodiversity Documentation

(a) Encouragement of alternative public distribution systems based on locally produced food items, especially organic food and coarse grains;

(b) Support women in the communities to launch and participate in movements to save and preserve several varieties of indigenous seeds of crops such as rice,
rajma, millets, vegetables, spices, herbs, etc. (on the analogy of Beej Bachao Andolan of Tehri Garhwal);

(c) Initial support in the form of wheat, rice, or jowar to local SHGs and groups to establish food, feed, fodder and water banks can be thought of. Such banks can be operated by SHGs on revolving funds basis

(d) Integration of locally produced foodgrains and food items within the State sponsored programmes such as Integrated Child Development Scheme (ICDS), Mid day Meals, etc. Gram Sabhas and village panchayats can monitor the extent of use of locally produced food grains and food items in these programmes;

(e) Creation of community grain banks and seed banks by women’s groups/NGOs for retrieving and conserving local varieties of grains, millets, pulses, oilseeds, etc. for ensuring regular supply and distribution of seeds to farmers (on return basis as well as outside sale) aimed at conservation and food security;

(f) Promotion of organic fertilizer, especially for homestead vegetable production

(g) Support to women’s groups in villages for retrieving varieties of traditional grains such as millets, pulses and oilseeds and for conserving them in community banks at the cluster level;

(h) Encouraging cultivation of bio-diverse crops and augmenting the seeds that are vanishing or are becoming scarce at the local level;

(i) Retrieval and conservation of seeds at the village level by women farmers;

(j) Encouraging women’s groups to grow organic spices under the scheme launched by the Spices Board;
(k) Support training of local women’s groups to produce compost manure and vermi-compost;

(l) Bio-diversity festivals and contests, kitchen garden contests;

(m) Documentation of women’s oral knowledge of traditional systems of cultivation, including those based on agro-biodiversity, which are still evolving in dynamic modes and innovations; methods of seed selection, preservation, storage, crop planning, conservation of germplasm, management of yield and production vis-à-vis diversity of land types; recipes, nutritional, dietary and recuperative value of traditional crops; collection of data on domesticated diversity from villages, information on livestock diversity; local knowledge and practices of women on the nutritive and medicinal qualities of both cultivated and uncultivated foods; women’s contribution to local subsistence economy and use of local natural resources, women’s experiences of seed selection and storage practices

(n) Better access to credit, technology, collaboration with technical, financial and management institutions;

(o) Promotion of legal literacy relating to Protection of Plant Varieties and Farmers’ Rights Act, 2001 as well as on Biodiversity Act, 2002; and the urgent need for making the implementation rules for these Acts gender sensitive.

B Women’s Rights to Common Property Resources and Role of Village Panchayats

The one million elected women representatives of the panchayati raj institutions can play a major role in conserving common property resources for sustainable use in the following ways:
Support to poor women’s groups dependent on village common lands for grazing their livestock by not diverting them to other uses;

Legally enabling women to manage part of the common lands by handing them over to women’s groups for meeting their needs of fuel, fodder and pasture;

Support to women’s groups to access village water bodies to promote fish farming; one third of village ponds and water bodies to be leased by panchayats to self help groups or other formations of landless and poor women for fish rearing;

Support to training in skill development and training programmes targeted at women involved in fisheries;

Panchayats to respect and pay due consideration to women’s priorities in the management of common lands; village common lands used for grazing of livestock;

Technologies for wasteland development such as agro forestry, planting of bio-fuel trees, fertilizer trees, arjun trees for tassar rearing, could be supported on leased common lands over a viable time period;

Support to programmes aimed at increasing women’s ownership of livestock by improving their skills of management and increasing their income by better marketing through cooperatives and other channels;

Support the designing of training programmes for women as para veterinarians with focus on women’s traditional knowledge of animal healthcare remedies.

The list of the possible activities to be taken up by women’s groups given above is largely based on actual grassroots initiatives and experiments. A study of these initiatives of action groups outside the government, which have recorded success reveals a process-oriented approach rather than a target-oriented one. It is suggested that MOA
launches this programme in the FY 2005-06. The ground should be prepared by holding formal but intensive discussions with the State governments and the partner organizations with the full involvement of the National Board for a New Deal for Women in Agriculture (proposed in para 8.8), which could form a sub-group for this purpose. A few projects can be initiated during 2005-06 where enabling conditions on the ground are present. The launch of the programme, however, needs the legal and procedural conditions of lease and patta to be put in place by the State Governments and adequate land (revenue, forest-degraded, common property) to be identified well in time. MOA should therefore monitor the progress of the State governments and agencies, especially in those States where food insecurity is a major problem.

8.4 Engendering the Agriculture Curriculum

Both proactive efforts and consistent follow up are needed to remove gender stereotypes and build awareness about women workers of whom, in developing countries more are concerned with land and agriculture. This is specially vital for educational institutions.

Kerala University, in collaboration with M S Swaminathan Research Foundation (MSSRF), has pioneered a course for undergraduates in agricultural colleges / universities since these students are the potential future professional leaders in areas such as research, extension work, policy, teaching and activism.

The course has the following specific objectives: -

1. To build a perspective by providing an overview of the social construction of gender and gender inequality.

2. To create skills by identifying gender roles, rights and responsibilities and their bearing on gender relations.
3. To bring about attitudinal change, creating gender sensitivity and helping students to internalize equity concerns as fundamental human rights.

The course consists of two modules, one on gender relations and rural livelihoods and the other on gender issues in different agrarian sectors. Teachers can use it as it is or adapt it to suit local-specific learning objectives in any University. It can be adopted for use with undergraduates of any discipline.

Other Agricultural Universities as well as those belonging to the Veterinary, Fisheries and Forestry disciplines should be asked to take up similar programmes. The process should be completed by 2005, the tenth anniversary of the Beijing Conference since its outcome document, the Platform for Action, has been ratified by the Government of India. In the Platform For Action, under the thematic area Women and the Economy, member-countries of the UN have pledged to promote women’s economic rights, including access to employment, appropriate working conditions and control over economic resources and to eliminate occupational segregation and all forms of employment discrimination.

8.5 Gram Panchayat Mahila Fund for Women

Under the provisions of the 73rd Constitutional amendment and the revised State Panchayat Acts, responsibility for agricultural development now lies with the panchayats. The village panchayat has one-third representation of women. Most State Acts have a provision for special committees, standing committees or sub-committees to be constituted by the village panchayats from amongst its elected members (including its women members) to look after broad categories of production, finance and social justice. These committees interact with a whole range of representatives of line departments depending on their mandated areas of jurisdiction. There are very few States that have specific policy or legal requirements that elected women panchas should be members of any of these committees. In some States, there is a requirement that a women member should be part of the Social justice committees.
The presence of one third elected women in the village panchayats or approximately one million elected women members is crucial and opens a door to possibilities of greater collaboration and coordination between them and the women farmers in the area. This is a potential that has not yet been tapped fully for the purpose of engendering of the Gram Panchayat budget. The CMP has indicated that 30% of the Gram Panchayat funds would be allocated for women’s programmes.

Part of these specially allocated funds could be used as an incentive for initiating the participatory decision making process in which the elected women representatives (EWRs) and the farmwomen could be partners.

A Gram Panchayat Mahila Fund (GPMF) should be created for this purpose. In the initial stage of this new programme, the Fund could be started in selected 10,000 Gram Panchayats in the States. The GPMF should accord priority to building technological skills, providing information and empowering women in agriculture. This fund could be used for the purpose of establishing a facility, like women’s toilets, or for purchasing an item of equipment that should serve the needs of farmwomen in their role as farmers. It should meet the common need of the women farmers and not of an individual woman farmer only. A small fee or rental can be charged from the users by the Fund managers/Gram Panchayats.

Members of Parliament are allocated financial resources for their constituencies which they can use with a great degree of flexibility for public good. GPMF should enjoy a similar flexibility for taking up community activities that help to meet essential gender specific needs.

Some illustrative examples of its use are:

Tools that can benefit women in their farm work such as seed drills, levellers, winnowers etc. or in post harvest processing work, such as dal splitters, etc. can be included.
The GPMF can establish a common facility that can be used by groups of women farmers for drying of crops, or for seed banks, nurseries, compost making, water ponds, cattle troughs, etc.

The Fund can be used to procure services from external sources to meet women farmers’ needs such as veterinary and poultry services, information on specific crops and technologies, etc.

The Fund can be used to provide training for building women farmers’ technical skills, build an information database that can be used by the women in the village and empower the women through better access to information.

To the maximum extent, the suggestions given in this chapter on starting new ventures by women’s groups could be tied up/converged with the funds from this source to be managed by the Panchayat. However, the following should be ensured:

1. The Fund should not be used for distributing money to selected beneficiaries for any agricultural or allied purpose. It should be used only for spending on common facilities.

2. Training programmes should not be covered, but equipment and sheds for training can be included.

3. The scope of ‘agriculture’ for the purpose of using the Fund would conform to the suggestions made in this paper (“integrating” approach that would enable optimal use of land, water, livestock, commons, forests and allied resources). It would not include income generation activities unconnected with the primary sector, (such as sewing machines, repair of schools, literacy, etc.). However, infrastructure and facilities for essential child support services for women farmers could be included as a special case on strategic priority depending on the context and in consultation with all partners.
4. The Fund should remain a dedicated Fund and should not become a part of the GP general fund. It should be administered under the leadership of the EWRs with the consent of the GP as a whole.

Selection of the Gram Panchayats could be attuned to the following factors:

1. Number of active EWRs in the GP
2. EWR holding the position of Pradhan or Up-Pradhan
3. An active Standing Committee on Agriculture/Production set up in the panchayat, preferably with an EWR as a member.
4. Presence of resource organizations (very widely defined) in the vicinity for technical advice, back up and hand-holding, whose interest in land-related gender issues is well-known.

5. Presence of any type of extension machinery for farm women.

The elected women could initiate a participatory decision making process with the women farmers of the panchayat belonging to small and marginal/subsistence farmer families. The farmwomen of the Gram Panchayat supported by the EWR’s of the Panchayat could take decisions on how the fund shall be used and this should then be discussed in the Gram Sabha in which the village women should take part. This should be preceded by a series of participatory and consultative dialogue amongst the elected women, the farm women and the gram panchayat on how the fund should be used.

The quantum of funds to be placed in the GPMF depend on many factors. However, it may be of the order of Rs. 2 lakhs in order to be effective and meaningful. The administration of the Fund by the Panchayat should also be overseen by the EWRs and it is essential that the Gram Panchayat, by a resolution, delegates the maximum power of administering the Fund, to the EWRs.
One of the likely and desirable outcomes of the Fund use should be an enhanced status to the Standing Committee on Production/Agriculture and the nomination of more EWR’s to it.

8.6  
Child Care as an essential Support Service to Poor and Needy Rural Working Women

Target group

The term “rural poor women” includes women small and marginal farmers, women farm labourers, including temporary and seasonal labourers, women in fisheries, forest-based activities, fuel and fodder gathering, livestock rearing, agro-based activities, and home-based work. Such women require child care services because of their “triple roles”-they are engaged in productive economic work, household chores as well as having exclusive responsibility for child care, and are often unable because of poverty, lack of time and resources to effectively attend to all three.

The age-group for which child care services are required is 0-5 +, with special emphasis on the age-group 0-2, that is, children below three. This age-group is important for the following reasons:

- Criticality of the period not only for brain growth, of which 80% is completed by the age of two, but also for overall development—physical, mental, emotional and social, and as preparation for education

- Evidence of continuing malnutrition (0-2), high infant and child mortality, maternal anaemia, and other indicators of human development.

Basic components of the services
Child care for this age-group, to be effective, that is, to combat malnutrition and provide an environment for healthy and all-round development, must include the following components:

- Food, adequate in quantity and quality. The word quality implies not only its nutritious value, but also that there is a proper combination of semi-solid and solid foods, adapted to age, hygienically prepared, and offered at frequent intervals throughout the day (about five times a day for children below eighteen months) and with attention, affection and concern).

- Reasonably safe and healthy environment, and some stimulation, attention and interaction

- The above two conditions can only be met by the continued and regular presence of an adult care provider with some skills and a warm and caring relationship with the child.

- This implies that for the youngest children the ratio of adults to children has to be high enough to allow for care, attention and interaction.

To meet these conditions, especially the first, day care is a must for large numbers of poor rural working women. Mere distribution of food supplements at a feeding center is not enough. However, child care, especially of the youngest, is a highly context and situation specific activity. For example, some women may need child care for eight to ten hours a day, others for only four or five hours, and the actual duration and timings for which it is needed may vary. Again, women working as temporary or seasonal workers may need it only for specified months. Effective day care may be one way of attacking multiple problems.

Basic principles for implementation
Experience has shown the desirability of some of the following principles of implementation

1. Plurality of models - a single monolithic model for all situations in a diverse country is not appropriate. In practice, four models may be sufficient at present.

2. Context-specificity - making services/programmes very specific to local needs and demands, locally determined.

3. Flexible norms and ratios -- ratios such as population-centre ratio and worker-child ratio should be worked out for different situations.

4. Per child per day cost norms. If diverse and flexible norms have to be adopted, then it is more practical to provide a per child per day norm as the basis for funding and leave it to the programme authorities in each case to work out the nature of the programmes and activities.

5. Decentralisation. The responsibility, as well as the funding and powers for management of child care support services for women may be handed over to local Bodies (PRIs). This would enable them to fulfil the responsibility of catering to all children, especially the most vulnerable ones, in their jurisdiction, and break the stranglehold of the norms relating to size of the “habitation” which is entitled to have a center.

Advantages of decentralisation

Local procurement of food for the programme from local sources, cutting down the wastage, delay, leakage and other problems connected with centralized storage
• Linking up centralised sources with local grain banks for food supply and promoting the grain bank movement for food security in rural areas.

• Local cooking and serving of food with the help of local women, either through SHGs or other organizations. Successful examples of SHGs supplying food to anganwadis already exist.

• Monitoring and supervision of the crèche and child care services with the help of women members of the PRIs, local grassroots organizations, womens’ groups, and where available NGOs.

• Monitoring by the women users on a day to day basis, and responsiveness to their needs.

• User fee. Experience shows that where there are quality services, women are not only prepared to leave their children there but even the poorest users are willing to pay a small user fee. Confidence in the service has to be established first.

Models

A four-model scheme of child care services (including day-care) for the 0-2 years is recommended to be launched during 2005-06 in rural areas of the country, incorporating the basic principles and strictly following the implementation strategies laid down. Specifically, the scheme is intended to provide support services for women who have to leave their homes for work in the fields during the working season. During the off-seasons, the women may look for intermittent and miscellaneous work opportunities, which again may be located far away from their homes.

The four models need to be used flexibly, keeping in mind local requirements, context, resources and women’s own needs and preferences. There may also be changes from season to season, depending on intensity of work, climate, and other factors. Of the four
models, three are existing schemes, incorporating positive modifications and improvements within the existing format. The fourth model, that of seasonal or temporary crèches, is being suggested in the context of the Rural Employment Guarantee Programme (REGP) being launched in 150 districts of the country. The four models are

1. ICDS—additional services for 0-2 years children
2. Mini-ICDS centres or outreach services for 0-2 years children
3. Creches run with grant-in-aid and
4. REGP - Seasonal or temporary crèches for short duration are required not only by seasonal agricultural labourers such as sugarcane workers, but also by women working on roads and public works, construction sites, quarries, brick kilns and by all the various works undertaken by Government departments as part of employment programmes. The new REGP would also come under this purview.

Here the number and age composition of the children cannot be predicted in advance. However, wherever there are children below three, it is likely that there should also be a certain number of children above three (up to the age of eight or ten) as the older children are usually engaged in looking after the younger ones and/or helping in the women’s work. Hence, no minimum number should be specified.

The model has to include at least two workers, one with exclusive responsibility for the below threes. The actual number needed at each place should have to be decided by the situation. If the child care workers are employed by a local authority with jurisdiction over a specified area, (for example, Panchayat or ICDS) then they can be shifted from place to place within that local area without much inconvenience.

The Departments of Agriculture in the States are expected to prepare a shelf of projects aimed at increasing productivity of land and labour, diversifying agriculture and thereby creating more work opportunities in the medium and long run by taking up water and soil conservation works, land development and other rural infrastructure
works. Other line Departments should also take similar action on horticulture, forestry, animal husbandry and allied subjects. These work sites are bound to attract large numbers of women, especially in the off-season, when the guarantee schemes are expected to be in full swing. The women generally bring young children to the work sites, thus offering both opportunity and need for effective and focused child care services. If this is not done, the children may be left in the care of slightly older siblings, either on-site or off-site, thus depriving the latter of their education.

Resource Allocation

Here it is attempted to indicate the likely order of resource allocation that may be needed for the enlarged programme of child care services, with special reference to children in the 0-2 age group. Details and cost of each model can only be worked out later.

The chosen criterion for costing is the cost per child per day, and the approximate number of children in need of the services.

At current prices, it is estimated that the cost per child per day would be a maximum of Rs.10.00 (or Rs.4,000 per child per year). This includes the following items - food, salaries, equipment, materials for cleanliness, hygiene, medical care, immunization and healthcare, developmental activities, training, supervision and guidance.

The total number of number of children 0-2 years who need such services, calculated on the Census (2001) data on number of children aged 0-4, and the likely number of mothers of young children in the work force, would be a maximum of 4 crore.

The total resources needed to provide every child in need in this each group would be of the order of Rs.16,000 crore.
It is suggested that the programme could be started in 20 most disadvantaged districts from the 150 districts selected for the REGP. The funds needed for this would be about Rs. 500 crore, including preparatory activities, during 2005-06.

8.7 Engendering Acts in areas of concern to women in Agriculture:

The proposed Act relating to Employment Guarantee should be gender-sensitive, with a definition of work which includes work in the areas of human development and keeping in mind working women’s needs in relation to child care and nutrition. The implementation rules relating to the Protection of Plant Varieties and Farmers’ Rights Act and the Biodiversity Act should also be engendered.

8.8 Institutional Mechanisms for Policy Oversight and Gender Audit

Though women continue to figure in the plans and programmes of the MOA, their presence is very thin in term of actual numbers and resource allocation. Women still are not fully recognized as productive agents in agriculture or as farmers. In order to ensure that women’s issues are not crowded out or marginalized in the sector, it is important to devise high level institutional mechanisms that would advise the Government on issues of policy, strategies, programmes etc. keeping the women’s interest in mind.

In order to provide effective support and monitoring of programmes for women in agriculture, it is necessary to constitute a high-level body combining political commitment to gender justice with expertise and committed advocacy. A National Board for a New Deal for Women in Agriculture, headed by the Union Minister of Agriculture should be set up. It should be co-chaired by Union Minister for Women & Child Development, Union Minister for Rural Development and Union Minister for Panchayati Raj. It should provide policy over sight and enable gender audit. Besides the concerned
Central Ministers/Ministries and State Government representatives, the Board should include -

a) Women farmers’ representative bodies

b) Representatives of panchayati raj institutions, academicians, experts from different disciplines and backgrounds, but with a common background of having worked with or a demonstrated interest in advancing the cause of poor women in land-based livelihoods in agriculture. These could include agricultural and extension specialists, representatives and leaders of women’s organizations, trade unions, banks and credit institutions like NABARD, women’s advocacy groups, etc.

c) Representatives of agricultural universities and other educational/technical institutions involved in extension, teaching and research on issues of women in agriculture.

d) Non-governmental bodies working at grass root level with farming women

e) Policy makers and analysts,

f) Media,

g) Rights-based and other groups working on issues of sustainable livelihoods and environment, bio-diversity.

h) National and State Commissions for Women

i) Women’s Universities.

j) Women’s Development Corporations

The Board could consider giving a certain direction to the broad band of programmes dealing with land and livelihoods (including anti-poverty, employment generation, safety nets etc.) by linking them up with gender and social equity and equality. Since such programmes are spread over many sectoral agencies and ministries, the Board should enable effective coordination amongst all these agencies.
While it should not be too large so as to become unwieldy and should meet at least once a quarter, it should represent all the stakeholders. Every State Government may be advised to set up a Gender Resource Unit or Cell in the Departments of Agriculture and Rural Development, linked with line Departments including Panchayati Raj, Women, Tribals, Forestry, Fisheries etc. These could be networked by a similar Gender Resource Cell recently set up by MOA.
CHAPTER – V
STRENGTHENING AND EXPANDING THE HORTICULTURE
REVOLUTION

Mobilising Untapped Opportunities

1. Horticulture is now widely recognized as one of the major components of the strategy for uplifting both the rural economy and national nutritional security. Diversification of Indian agriculture in the area of horticulture will enhance returns to the farmers, generate rural employment, increase farm exports and expand agro-industrial base, thereby contributing to higher economic growth. Recognising this, the Plan outlay for Horticulture in the VIII Plan was raised to Rs.1,000 crore (excluding the outlay for research to ICAR) as against Rs. 27 crore in the VII Plan (40 times more). The support continued in the IX and X Plans with allocations of Rs. 1,400 and Rs. 2,100 crore, respectively, including the Horticulture Technology Mission for the North East Region and three hill States of Western Himalayas and the Coconut Mission.

2. The above mentioned schemes of the GOI provided liberal assistance as subsidy for the development of horticulture crops such as fruits, vegetables, ornamental crops, plantation crops, spices, medicinal and aromatic crops, mushrooms, beekeeping etc. for improving productivity and overall production, reducing post harvest losses and also for enhancing exports. Assistance was provided for major activities such as area expansion under individual crops, multiplication of seed and planting material, improvement of productivity of the area already under these crops, use of plastics (drip / sprinkler irrigation, green/poly houses, plastic mulches), infrastructure for post harvest management (PHM) of the crops, training and demonstrations in new technologies etc. Some State governments also made special efforts to promote horticulture.

3. The above efforts had led to the expansion in exports of horticulture products, faster promotion and use of drip irrigation, establishment of green houses, promotion of cut flower production, exploitation of hybrids in vegetable production, adoption of beekeeping as an essential input also for fruit and vegetable seed production, development of infrastructure and adoption of improved techniques for PHM and processing in some pockets. Further, horticultural consumption by the middle and upper class population increased tremendously.

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4. The UPA Government has accorded high priority to this sub-sector by announcing the launching of the National Horticulture Mission (NHM). Through this initiative, the Government has affirmed its faith in horticulture development for improving rural economy through diversification of land use and improving productivity and marketing. In compliance with the above, the Department of Agriculture and Cooperation has now submitted a detailed proposal on the NHM for a total outlay of Rs. 21,699 crore to be used during the coming 7 years to achieve the Stated goal of raising the total production of horticultural commodities to 300 million tonnes.

A “Business as Usual” Approach will not Help to Realize the Goal

5. As seen from table 1, during the past decade, while overall production of horticultural crops improved by 27.1% and the area expanded by 27.7%, the overall productivity showed little change. As a matter of fact, the productivity of fruits and plantation crops declined during the 10-year period. However, vegetables showed a marginal increase, while it was comparatively higher only in spices. It is, therefore, clear that huge investments made in the two Plan (VIII & IX) periods did not help to make a major dent in the productivity (except in spices).

Table 1: Area, production and yield of horticultural crops during 1993 to 2002

<table>
<thead>
<tr>
<th>Commodity</th>
<th>1993-94 Area (mha)</th>
<th>2001-02 Area (mha)</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Total</td>
<td>13.0</td>
<td>16.6</td>
<td>27.7</td>
</tr>
<tr>
<td>Production</td>
<td>114.7</td>
<td>145.8</td>
<td>27.1</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>8.8</td>
<td>8.8</td>
<td>Nil</td>
</tr>
<tr>
<td>B. Fruits</td>
<td>3.18</td>
<td>4.01</td>
<td>26.1</td>
</tr>
<tr>
<td>Production</td>
<td>37.25</td>
<td>43.00</td>
<td>15.4</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>11.7</td>
<td>10.7</td>
<td>(-) 8.5</td>
</tr>
<tr>
<td>C. Vegetables</td>
<td>4.88</td>
<td>6.15</td>
<td>26.0</td>
</tr>
<tr>
<td>Production</td>
<td>65.78</td>
<td>88.62</td>
<td>34.7</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>13.5</td>
<td>14.4</td>
<td>6.7</td>
</tr>
<tr>
<td>D. Plantation</td>
<td>2.45</td>
<td>2.98</td>
<td>21.6</td>
</tr>
<tr>
<td>Production</td>
<td>8.87</td>
<td>9.70</td>
<td>9.4</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>3.6</td>
<td>3.3</td>
<td>(-) 8.3</td>
</tr>
<tr>
<td>E. Spices</td>
<td>2.47</td>
<td>3.22</td>
<td>30.4</td>
</tr>
<tr>
<td>Production</td>
<td>2.51</td>
<td>3.76</td>
<td>49.8</td>
</tr>
<tr>
<td>Yield (t/ha)</td>
<td>1.0</td>
<td>1.2</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Source: National Horticulture Board
6. Little is known of the benefits reaching the small and marginal farmers and landless agricultural workers. The old and senile plantations continue to remain neglected, bringing down the national averages of productivity but occupying prime fertile land area all over the country.

7. Only a few States, such as Maharashtra, Karnataka, Andhra Pradesh, and Tamil Nadu have registered excellent progress, especially in the production of fruits. The regional disparity in horticultural development has become much more pronounced now, despite the strong potential all the regions possess. Several States have not benefited from the opportunity and the investment made.

8. One of the major reasons for low and skewed impact can be attributed to the absence of prioritization of developmental activities in each State based on location, potential, needs, aspirations and capabilities for fund utilisation. This may be attributed to the non-participatory mode of identifying the priorities and resource deployment. Consequently, support was provided for all crops and for all components, thus spreading the support too thin to make any tangible impact.

9. Serious mismatch between production and consumption continues although there is no reliable data available to estimate the success achieved during the last 10 years in reducing post harvest losses. The estimates of monetary losses being incurred in the country keep rising at regular intervals, as evident from the four reports brought out during the past decade: 1993-94 = Rs 8,000 crore (Min. of Food Proc.); 1996-97 = Rs. 25,000 crore (Mckinsey Report); 1999-00 = Rs. 50,000 crore (Anon.) and 2004-05 = Rs. 85,000 crore (Directorate of Marketing, Maharashtra). The huge investments made not only by the Department of Agriculture and Cooperation, but also by the APEDA, NCDC, NAFED, Ministry of Food Processing etc. have thus not succeeded much in reducing the staggering post harvest losses. No authentic data are available on the reduction in losses, if any, achieved due to the infrastructure created, improved PHM technologies promoted and several policy initiatives taken for streamlining the systems involved.
10. All investments and efforts made for improving PHM have ended at the storage level of bulk quantities of a few commodities, with no care taken at the retail level. Consequently, the fresh produce continues to be sold in open stalls, roadside kiosks, carts, footpaths etc. causing serious loss in quality of the produce besides adding to the PH losses. A recent FAO study on handling of apple in HP State showed that the fruits record a pressure of 18 - 20 lb/ sq.in at harvest which gets reduced to 5-6 lb/ sq.in when sold in retail, as a result of the time the fruit takes to reach the retail market. Both producers and consumers suffer due to deterioration in quality between the farm gate and the consumer.

11. The above trends of stagnant or declining national productivity and high post harvest losses point to two main things: either the NHB data are not based on methodologies which can capture the real situation or the investments have failed to produce the intended outcomes (outputs counted in terms of subsidies distributed and additional hectares planted to horticultural crops may not reflect the real impact).

Lessons Learnt from the Technology Mission for the North East Region

12. The TM for the North East Region (NER) is now in its 4th year of implementation. The Mission consists of four Mini Missions (MM) viz. MM I for improved seed and planting material, technology refinement and adoption, handled by the ICAR; MM II for improving crop production and productivity covering support for area expansion, creation of water resources and on-farm water management, multiplication of seed and planting material, promotion of organic farming, use of bio-fertilizers, IPM, INM, tissue culture, plant health clinics, disease diagnostic and plant tissue analysis labs., training of farmers etc. handled by the DAC; MM III for post harvest management, marketing including export by Directorate of Marketing and APEDA; and MM IV for processing and product development under the control of MOFPI.

13. Review of the Mission activities shows a large gap between the original concept and actual implementation in the field. Linkages among the four MMs are weak. Each MM is working independent of the other under the control of their respective administrative agencies.

14. Other gaps and weaknesses awaiting redressal are as below:
14.1 Targets for annual area expansion under different crops and the varieties to be promoted are fixed arbitrarily without any long term planning of the total area to be put under individual crops and without consultation with the research units located in the States.

14.2 Every State has been allotted financial support for all crops and all the components, irrespective of the commercial potential and need suggesting the lack of an agro-ecological and comparative advantage approach in priority setting.

14.3 Production of planting material is yet to take off within the States and hence procurement is done from outside the State from untested sources; a permanent damage thus being inflicted because of the perennial nature of the fruit species.

14.4 Procurement procedures for seed and planting material adopted leave considerable doubt about the quality of the planting material being used.

14.5 Varieties / hybrids promoted are chosen arbitrarily mostly those available in the market, irrespective of the adaptability and superiority.

14.6 Implementation of several cost-intensive components are contracted out on turn-key basis, a few of them being taken up on joint venture basis in partnership with private sector.

14.7 Assistance for highly technical units such as plant tissue analysis lab, disease forecasting lab, tissue culture units, plant health clinic etc has been provided to all States irrespective of the needs, competence of the staff and availability of appropriate technology for using the facilities for the farmers.

14.8 The R&D activities taken up under MM I are not need-based to provide technological support for the crops and activities identified for development by the States.

14.9 Infrastructure for PHM including marketing and processing is planned without any relation to the total production targeted at a given point of time.
14.10 The PHM units created so far are better handled under SHGs or the private sector,

14.11 Subsidy for inputs for newly planted area is not used effectively nor verified; the States are seeking subsidy hike from the current level of Rs 13,000 to Rs 30,000 per hectare (and this has already apparently been agreed to as judged by the rate used in the NHM project document), and

14.12 Absence of field monitoring, inadequate trained staff in the departments and urgent need for training of farmers.

RECOMMENDATIONS: THE PATH AHEAD

15. In order to achieve the goals of the horticulture-led agrarian prosperity and to realize the objectives of the National Horticulture Mission, the following recommendations related to policy, institutions, infrastructures, organizations and implementation are made:

A. Public Policy

16. **National Horticulture Council:** Given the goal, interdisciplinary nature, size and high pervasiveness of the horticulture-led nutritional, agro-ecological and livelihood security, an apex level national body (National Horticulture Council) may be established with the Union Minister of Agriculture as its Chairman and Union Ministers of the other concerned Ministries, such as Ministries of Rural Development, Commerce, Environment and Forests and Science and Technology as members. A Steering Committee of the National Horticulture Council, headed by Agriculture Secretary with counterparts of the concerned Ministries and eminent representatives of professionals and technical experts, private sector, industry, NGOs and farmers may be constituted to ensure effective, timely and synergistic implementation of the programmes and activities. Counterpart bodies may be established at the State and district levels. At the grassroot level, panchayats, other grassroot institutions and SHGs should be suitably empowered and interlinked. Farm Schools may be established in the fields of outstanding horticultural farmers.
17. **Socially differentiated approach**: The wide variety of horticultural species have been exploited differently by different sections of the society. For instance, organized commercial fruit production and plantation has been pursued mostly by larger scale and resource-rich farmers. Small farmers are generally more involved with intensified vegetable and flower production, whereas tribals have greater affinity with medicinal plants and indigenous fruits and vegetables abounding in forest areas. However, national and international experiences show that, if organized in groups, the small farmers could effectively adopt and prosper from commercialization of fruits as well as other such horticultural commodities. Given that 80 percent of the Indian farmers are small (possessing less than two ha.) and marginal, explicit policy provisions must be made for resource poor farming families, who have generally been excluded from the past horticultural development process. Programmes and institutional support should be designed with focus on the small and tribal farmers.

18. Horticulture has the potential of engaging rural women, both skilled and unskilled, in gainful employment and consequently for their emancipation through resultant economic independence. Women are best suited to handle activities like vegetable and flower seed production, production of hybrids, floriculture, tissue culture, grading, sorting of fresh produce, preparation of processed products etc. Assistance for such activities should therefore be made subject to the engagement of women. Training of women in different operations should receive priority and be supported under the NHM. The Mission should also help the States to promote setting up of women SHGs for strengthening institutional base at the village level on the pattern in place in Assam and Kerala. Engendering the Horticulture Mission is a priority task.

19. Consumption of horticulture products (fruits and vegetables) is acknowledged globally as a sustainable source of nutritional security to the masses, particularly the children and women. The country’s economic prosperity would not make it an advanced nation unless the masses are healthy and free of the effects of malnutrition. The revolution should, therefore, pay appropriate attention to promoting consumption, particularly in the rural areas through promotion of backyard / kitchen gardens and development of easy to use household products, backed by a strong awareness campaign. Enhancing consumption in the urban areas would be possible
through price rationalization and better retailing to reduce losses and preventing decline in the quality. Social marketing techniques should be promoted.

20. Lately, the corporate sector is showing interest in horticultural farming – production, processing and marketing and is undertaking contract farming arrangements, including tie-up with small farmers’ groups. Explicit codes of conduct for all the partners involved in contract farming arrangements should be developed. The government should enact necessary regulations on contract farming, keeping in view the interest of the weaker partner – the farmer. It should ultimately be a win-win situation for all stakeholders.

21. **Risk Coverage:** The National Agriculture Insurance Scheme (NAIS) which has the coverage of all food crops, oilseeds and annual horticultural/commercial crops – sugarcane, cotton, potato, onion, chilly, turmeric, ginger, jute, tapioca, annual banana and annual pineapple is in operation since 1999-2000. The Scheme does not cover perennial horticulture crops which suffer from the wide fluctuation in yield, proving to be a major source of distress to the farmers.

22. In the year 2000, a Committee was constituted under the Chairmanship of the Economic and Statistical Adviser, Govt. of India comprising Joint Secretary (CR), Director (IASRI), GM (GIC) as members to examine the scope of coverage of perennial horticultural crops under the NAIS. The Committee deliberated upon the range of issues concerning insurance scheme of perennial horticultural crops and recommended for insurance of horticultural crops on pilot basis in selected districts of some States. Accordingly, the operational modalities of pilot projects were worked out and a pilot project was put in operation since 2002-03 season. As the production of perennial horticultural crops is cyclical in nature, it suffers from low yield once in 3-4 years. This fluctuation in yield needs a high rate of premium. The actuarial premium rates are given in the following table:
<table>
<thead>
<tr>
<th>Crop</th>
<th>State</th>
<th>District</th>
<th>APR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mango</td>
<td>Andhra Pradesh</td>
<td>Chittoor</td>
<td>20.40%</td>
</tr>
<tr>
<td>Mango</td>
<td>Uttar Pradesh</td>
<td>Lucknow</td>
<td>15.90%</td>
</tr>
<tr>
<td>Apple</td>
<td>Himachal Pradesh</td>
<td>Shimla</td>
<td>14.65%</td>
</tr>
<tr>
<td>Banana</td>
<td>Tamil Nadu</td>
<td>Kanyakumari</td>
<td>2.40%</td>
</tr>
<tr>
<td>Orange</td>
<td>Maharashtra</td>
<td>Amrawati</td>
<td>13.75%</td>
</tr>
</tbody>
</table>

23. As per the Scheme, it was voluntary for all farmers with subsidy of 50% to small and marginal farmers. Despite 50% subsidy, the premium rates payable by farmers are high and the pilot project remained virtually a nonstarter. Experiences of other countries should be analyzed and the pilot programme needs to be carried out more systematically to reach satisfactory conclusion and action plan.

B. Public Action

24. Ensuring Convergence, Synergy and Effectiveness of the National Horticulture Mission: The sectoral Missions of the NHM, proposed to be executed by different ministries/departments should be designed and implemented in an integrated and synergistic manner, headed and coordinated by one National Director. The pitfalls of the NER Horticulture Technology Mission must be avoided. There should be a greater sense of accountability at all levels.

25. The Mission’s success is not to be judged by the amount of the budget spent but should be measured in terms of verifiable outputs such as technologies, services, human skill and resources, infrastructure, institutions, networks, linkages, knowledge and awareness geared towards achieving the goal of enhanced productivity, quality, income, profitability, competitiveness and inclusiveness consistent with ecological and livelihood security of the poor. Using a set of powerful socio-economic and agro-ecological indicators, the Mission should regularly monitor the outcomes and progress and undertake mid-course corrections, if needed. The NHM document should be redesigned in a participatory mode with built-in strong mechanisms of monitoring, evaluation, outcome assessment and mid-course corrections.
26. Horticulture enterprise covers a large number of commodities and encompasses an equally large number of problems / constraints of diverse nature and magnitude. Hence, putting all these into one Mission would be too much to handle, given the type of management set up we have in the States. The Mission should either cover a few major and commercially important commodities, or separate Missions should be launched for (i) Fruits & Vegetables, (ii) Floriculture, (iii) Medicinal and Aromatic Plants, (iv) Plantation Crops, and (v) Spices with well defined mandates. Each of these Missions should be highly selective and cover selected crops and specific activities.

27. **Focus On Post Harvest Management (PHM), Processing And Marketing — Bridging The Disconnect Between Production And Profit**: Emphasis under each commodity should start with investments in infrastructure for PHM, regulated markets, Agri-export zones, processing and modernized retail outlets to be owned by growers’ cooperatives or associations, SHGs, Farm Management Committees, private sector etc in a participatory approach, with government interventions directed mainly to streamlining the policy framework including food safety regulations and monitoring roles. Experience has shown that NDDB’s model of fruit and vegetable retailing with backward and forward linkages has been quite effective in Delhi. This could be expanded to cover all metros to begin with and extended to other urban areas subsequently. In order to promote social marketing, cost effective modes of storage and distribution of horticultural products, such as making fruit juices available through dispenser units may be adopted. Mother Dairy Units can also add the sale of fruit juices. Successful models of group and producer centred marketing such as Mahagrapes, Apni Mandi, Hopcom and others should be actively promoted by the NHB. Processing and marketing of India’s unique horticultural blessings, such as seabuckthorn from Ladakh (popularly known as Leh berry) should receive special attention.

28. Planning for infrastructure for PHM should be done for each production zone, adopting the well known concept of ‘Packing House’ successfully adopted by the Grape Growers’ Association, NDDB etc. It would mean setting up of a chain of Packing Houses in each production zone, equipped with facilities for collection, cleaning, grading, packing, pre-cooling,
storage and transportation to the modernised wholesale markets such as the one coming up in Bangalore through NDDB. Adoption of this strategy would call for immediate amendment to the APMC Act by each State to decentralize the system and permit marketing by other players for achieving the ultimate goal of ensuring better returns to the growers and reasonably good quality products to the consumers.

29. Appropriate regulatory mechanisms, including SPS, would be required for trade and export promotion, multiplication and distribution of quality seed/planting material, quality control of inputs being used, operation of ‘contract farming’, packing houses, exports, etc. With free trade there are chances of the introduction of invasive alien species of insect pests, pathogens and weeds which may threaten the livelihood security of the people. Therefore, States should initiate steps along with the Ministries of Agriculture and Commerce and ICAR to create necessary infrastructure for preventing the unintended introduction of serious threats to our crops. The Mission should promote human resource development in horticulture for generating skilled manpower trained in different horticultural enterprises, enrolling educated rural youth for gainful employment and for promoting precision and knowledge-based horticulture. Farm Schools can play a valuable role in skill empowerment.

30. Training and skill development in processing of fruits and vegetables and organizing cooperatives for production and marketing of processed products need to be undertaken on a large scale. Similarly, organized high-tech processing industries should be set up both in cooperative and private sectors for domestic and export markets. To achieve this, the emphasis should be on strengthening of existing processing facilities, development of cultivars suitable for processing, promotion of private/cooperative processing units and demonstration of processing techniques for cottage level industries.

31. **Creating Reliable Databases:** The Mission must address on priority basis the issue of strengthening databases for all horticulture crops and their products, market arrivals, price trends, etc. This would call for a multi-agency approach for standardizing methodology, including use of satellite imagery and other innovative methods for data collection, compilation and interpretation including yield forecasting, and devising a viable system at block, district and State levels. A reliable database becomes essential for efficient trading, including exports.
32. **Regionally Differentiated Approach:** Agro-ecological and socio-economic specifications and endowments of different regions should be matched with the most appropriate crop and farming systems leading to enhanced productivity and sustainability. For regulating support for production related activities, demarcating “Production Zones” for each commodity covering contiguous areas already under these crops and that targeted for expansion through diversification of the land use should form the basis for planning in each State. The arid, semi-arid and temperate zones apart from the NER should receive priority attention due to large concentration of small holdings, low per capita income from agricultural enterprises and large untapped potential for horticulture development. For example, the cold desert region of Ladakh offers great potential for the production of apricot, sea buckthorn, etc. Each zone should have a long term plan for the crops and their varieties to be promoted so as to back it up with appropriate PHM infrastructure and systems.

33. **Research and Technology Development Thrusts Including Flow of Quality Planting Material:** The R&D efforts did not keep pace with the rise in demand for improved technology which rose phenomenally since the VIII Plan. The National Agricultural Research System (NARS) was neither ready for it nor fully equipped in the initial stages, forcing entrepreneurs to depend on imported technologies. Further, the research in horticulture has to be reoriented to make it need-based or demand-driven to provide immediate relief to the farmers / stakeholders, reduce the cost of production and make Indian horticulture globally competitive. The ICAR / SAUs would need to undertake major reforms in research planning, prioritize the needs for new technologies, overhaul the research agenda in horticulture accordingly, actively involving other research institutions both in public and private sectors. The need-based technologies would be in the areas of improved varieties / hybrids resistant to biotic and abiotic stresses, faster and cheaper propagation techniques, IPM, INM, organic farming, resolution of chronic plant health problems, soil fertility and water management, rejuvenation of old plantations, high density plantings, PHM for domestic and export markets, new products etc. The Mission should trigger such a change and provide substantial support to technology generation, refinement and adoption.

34. The fruit industry is plagued with some perennial disease problems viz. malformation, alternate bearing, spongy tissue of mango, decline in citrus, wilt in pomegranate, sapota seed borer, coconut wilt and sigatoka in banana. Need-based evaluation of genetic resources, use of
indigenous nutrition-rich fruit species, conservation and use of rich indigenous knowledge are priority areas. Rejuvenation of old and senile orchards and establishment of an effective system to ensure timely flow of quality planting material of desired varieties in desired quantity should be among the top development priorities.

C. Small Farmers’ Horticulture EStates: Integrated Institutional Structure for Production, Processing and Marketing

35. Generally, small and marginal farmers have not benefited particularly from the fruit revolution in the country. This is primarily due to their poor competitiveness both at the production and post harvest phases. However, it is now well established that small and marginal horticulture farmers in particular will excel in improving productivity once they are assured of quick and easy disposal of their produce at reasonable returns. In clusters, specially in villages adjoining large consumption centres, small farmers should be helped to organize themselves as Small Farmers’ Horticulture EStates in the form of SHGs covering an area of 200-500 hectares. SHGs may undertake specialized activities like seed production, tissue culture propagation, vermiculture, biofertiliser, biopesticides and e-commerce. These should be duly empowered through enhanced access to modern technologies, formal credit and marketing. Since horticultural commodities are mostly perishable, these need effective infrastructure support in the areas not only of production, but much more for processing, storage, transportation and marketing. The group action will confer on the small farmers the power of scale both at the production and post harvest phases of the horticultural enterprises.

36. The National Horticulture Board (NHB) and the proposed National Horticulture Mission should give high priority to the establishment and effective functioning of the eStates. Horticulture is a proven technology for empowering even resource poor farmers who could produce high value crops at low cost. The Mission should actively promote this technology for enhancing rural livelihoods. In order to ensure right quality and yield, fertigation techniques should be promoted along with the low cost green houses. The Small Farmers Horticultural EStates should be assisted by the Mission in creating common facilities for post harvest handling, storage and marketing assistance. The market yards could also house agri clinics and agri business centres, including ICT based Knowledge Centres to enhance awareness for
increased consumption of fruits and vegetables as well as to have access to reliable inputs and
distribution channels. Effective local SHGs should be promoted to ensure supply of genuine and
healthy planting material. Also seeds and planting materials of such varieties which are suitable
for processing will have to be provided to farmers in areas where production and processing are
linked. The expertise of CFTRI should be fully mobilized in PHM.

37. The Small Farmers’ Horticulture Estates should receive special assistance for
rejuvenation of old plantations on high priority. In addition, development of water resources, on
farm water management, drip irrigation, training and demonstration of improved technology
should be emphasized. Wherever possible, the public sector extension services should be
supplemented or join hands with private sector extension services to improve the overhaul access
on the part of the small and marginal farmers to modern technologies and appropriate
knowledge. The Krishi Vigyan Kendras of the ICAR may suitably be transformed into Krishi
and Udyog Vigyan Kendras and likewise the ATMAs should also give due emphasis to the
promotion of group processing and marketing in their extension activities. Since the role of
precision horticulture will increase in the globalized world, the role of value added information
(knowledge) to all the stakeholders in the production-processing-marketing-utilization chain
can hardly be overemphasized. A quality literacy movement should be launched to sensitise
farm women and men on issues relating to pesticide residues and Codex Aalimentarius standards
of food safety.

38. Use of IT for horticulture development is yet to receive due support. Its usefulnes for
creating databases cannot be overemphasized. Besides, its scope should be exploited for assisting
in the implementation and monitoring of the progress in each district. Major use should be for
faster transfer of information on improved technologies, sources of supply and market outlets.
Pest and disease diagnosis for which the technologies are already available in hard copies would
need to be digitized and transmitted to the Community Information Centres being or to be set up
in each block and these should be linked with Village Knowledge Centres.

39. Spreading the successful experience of Maharashtra: Horticultural progress in the
State of Maharashtra has been truly revolutionary. The area under fruit crops in the State
increased from 2.42 lakhs in 1990 to nearby 13 lakh ha. in 2002 and the yield has almost doubled to about 15 tons per ha. This was essentially due to the steps taken by the then Chief Minister of the State (Shri Sharad Pawar) to link horticultural development with the Employment Guarantee Scheme. Creation of various infrastructure facilities like horticulture nurseries, micro irrigation, cooperative institutions and strengthening of research and institutional support were instrumental in achieving the success. In particular, the experience of Baramati in Pune District is worthy of emulation. In this area, end-to-end connections have been established in improving productivity and quality through technology transfer, post harvest management, prevention of losses, processing facilities, market information and finally export.

40. Learning from successes will help to purchase time. Therefore, we recommend the following steps:

40.1 Organise visits by women and men taking to horticulture to other horticultural “bright spots” like Baramati. **Farm Schools** may be established in the fields of horticultural pioneers. Farmer to farmer learning is the most effective method of confidence and competence building.

40.2 Link horticulture with the National Food for Work and National Rural Employment Guarantee Schemes.

40.3 Revitalise the National Horticulture Board in order to enable it to function like the National Dairy Development Board, providing critical support to small growers, empowering them in relation to the economies of scale through the Small Farmers’ Horticulture EStates movement as well as in access to good seeds and planting material and in post harvest processing and marketing.

40.4 The proposed National Horticulture Council (NHC) may monitor progress not merely in terms of money spent, but more importantly in terms of progress made in enhancing productivity, quality, value addition and prevention of post harvest
losses. The NHC should also ensure that all the research and development programmes in horticulture are engendered.

Financial Resources

41. Rs. 21,699 crore is already proposed under the NHM for the next seven years. The resources may be reallocated according to the priorities suggested in this Report, especially the following areas:

41.1 Organization of Small Farmers’ Horticulture Estates
41.2 Post harvest management, processing and marketing
41.3 Production and distribution of quality seeds and planting materials
41.4 Imparting quality literacy.
CHAPTER-VI

ENHANCING COTTON PRODUCTIVITY, QUALITY AND GLOBAL COMPETITIVENESS

Uncommon Opportunities and Challenges for Cotton-Based Livelihood and Income Security

1. Over four million farmers in India grow cotton as the main source of their income and livelihood. The textiles sector, which is primarily based on cotton fibre, is the largest employer and income provider in India, second only to agriculture. It employs close to 82 million people - 35 million in textiles and 47 million in allied sector. The total employment by 2010 is expected to reach 94 million people.

2. With the coming to an end of the multi-fibre arrangement on 1st January, 2005, our cotton producers, weavers and the textile industry will encounter both new opportunities and threats. The Vision Statement of the Indian Cotton Mills Federation (ICMF) for the textiles sector released in August, 2004, States that by the year 2006, the Indian textiles and apparel industry, can achieve a potential size of US$ 85 billion from the current size of US$36 billion, of which the domestic market potential would be US$ 45 billion and the exports would comprise the remaining US $ 40 billion. Consequently, over 35 percent of India's exports would be from textiles. This leap will thus be fuelled both by rise in domestic consumption and almost quadrupling of exports primarily due to discontinuing of the quota system.

3. Value-addition along the entire chain, starting from the production of quality cotton to ginning, spinning, weaving, knitting, processing and garmenting must be the key strategy for achieving the Vision. Production of cotton fibre would need to be increased by 75 percent, from the current level of about 200 lakh bales to 350 lakh bales in 2010. Productivity, quality, value addition and marketing revolution through synergistic interaction among all stakeholders is thus urgently needed to enhance efficiency of cotton production, processing and marketing to benefit from the opportunity and to obviate the threat.
4. Oscillating around 300 kg/ha (lint yield), India's average yield of cotton has remained one of the lowest in the world, being less than half of the world's average and less than one-third of China's average. Moreover, our lint quality is poor and often, due to one or the other reason, including those due to SPS concerns, it fails to meet the international standards. Thus, India’s cotton productivity and cotton-based textiles competitiveness is low. With a “business as usual” approach, our competitiveness will further decline in the liberalized cotton market, thus threatening the collapse of this vital sector of our economy and employment.

The Problems Needing Urgent Attention

5. **Low Cotton Yields and Wide Yield Gaps:** As mentioned earlier, India’s cotton yield has remained stubbornly low. Moreover, primarily due to the monsoon and market (prices) uncertainties, the yield has fluctuated widely from year to year. Even in the predominantly irrigated tracts, such as the North Zone, the yield hovers around only 400 kg/ha, resulting in one of the lowest water productivity. Consequently, even though the country accounts for about 25 percent of the world's area, its share in the world production is only 13 percent. On the other hand, China, with half the area under cotton cultivation produces 1.5 times the amount of cotton and has 1.5 times the world market share. Moreover, the gaps between farmers' average yields and realizable yields and between the realizable and potential yield in the three major cotton-growing zones of the country are rather large.

6. **Deteriorating soil health, poor productivity, declining factor productivity and profitability:** Due to increasing mismatch between the agro-ecological capacity and intensification of cotton production, increasing soil fertility imbalance, especially micronutrient deficiencies and decreasing efficiency of water and nutrient use, the productivity and growth rates of total and partial factor productivities have been declining. Methods of cultivation and irrigation presently employed also result in a very high consumption of water in cotton cultivation, which can be reduced by more than 50 percent by adopting appropriate technologies. Being a rainfed and highly sensitive crop to biotic and abiotic stresses, coupled with the gamble in the market place, the risk factor is extremely high, at times causing extreme distress to the
cotton farmers, especially in Andhra Pradesh and Karnataka (cotton farmers constitute the majority of the suicide-committing farmers).

7. **High biotic stresses and excessive use of pesticides:** Cotton is an attractive host for several pests. Although the pest scenario changes from year to year, depending on weather conditions, bollworms remain the most important yield limiting factors and American bollworm takes the prime position. If not protected, yield losses may be as high as 40 to 100 percent, depending on the pest intensity. In order to minimize the losses caused due to insect pests, the farmers resort to calendar sprayings of highly toxic insecticides, accounting for about 50 percent of the total cost of production. Cotton consumes over 40% of the total quantity of pesticides used in the country. More importantly, the practice has resulted in the emergence of resistance to the frequently used pesticides, besides causing serious environmental pollution and creating health hazards.

8. **Uncertainty about cotton production and trade:** India's cotton production fluctuates widely from year to year. Until the last year (2003-04), the all time high was at 178 lakh bales in 1996-97, rising from 139 lakh bales in 1994-95 and again dipping to 136 lakh bales in 2002-03. On the other hand, the country's cotton consumption has been increasing annually by 4%. In most years, the consumption has outstripped the production, necessitating an annual average import of about 20 lakh bales, costing over Rs 2000 crore, during the past few years.

9. However, fortunately, during the last year and this year, primarily due to yield increase, from around 300 kg/ha for several years to 384 kg/ha in 2003-04 and to 402 kg/ha in 2004-05, the domestic production correspondingly increased to 177 lakh bales and 213 lakh bales (estimated) respectively in the two years. Consequently, the imports in 2003-04 declined to 8 lakh bales and, more importantly during the same period, India exported 8 lakh bales of cotton, whereas our exports had not reached even one lakh bales for several years in the past.

10. In the context of the abolition of quotas by the end of this month (December, 2004), various segments of the textile industry in India and abroad are reported to be undertaking expansion and modernization of their production facilities. This is bound to expand the domestic
consumption as well as exports. A substantial proportion of the expanded cotton production will be used domestically to meet this encouraging trend. During this year, 2004-05, the domestic consumption is expected to reach 190 lakh bales and the production is likely to reach 213 lakh bales, necessitating a vigorous push for achieving remunerative net export of about 20 lakh bales, a quantity which India has never exported in the past. Unfortunately, international prices are falling.

11. **Low availability of quality seeds and other inputs:** Non-availability of adequate quantity of quality seeds and other inputs at the appropriate time is the foremost constraint. Nearly 50% of the total cotton area is under hybrid varieties and the remaining 50% under "open" pollinated varieties. While the private sector is able to meet the requirement of the hybrid varieties, the availability of seed of cotton varieties is limited to about 80,000 to 90,000 quintals only against the total requirement of 4.2 lakh quintals. Moreover, often the purchased seeds, fertilizers, biofertilizers, pesticides, biopesticides and bioagents are spurious, uncertified and nonstandard, thus creating economic, social and environmental crisis. In irrigated areas, the farmers invariably complain of the untimeliness of canal and electricity dependent water availability causing uncertainties.

12. **Poor lint quality and high contamination:** Poor fibre attributes, rapid deterioration of fibre quality of hybrids with successive pickings, high trash content (4 to 7%) and contamination have seriously been depressing the lint and yarn quality. India is capable of eliminating these bottlenecks and must ensure supply of quality cotton to its mills. Unnecessarily high multiplicity of varieties comprising nearly 300 varieties of highly variable fibre qualities predisposes the cotton system to contamination and non uniform yarn quality from the field to the ginning and pressing factory levels. The rapidly modernizing textile industry, such as increase in the speed of spindles, demands significant changes in the qualitative requirements of raw cotton. Today in addition to fibre length, the industry needs fibres with higher strength and better micronaire to withstand the high RPM.

13. **Unsatisfactory extension services and linkages:** The persisting and widening yield gaps point to the poor extension services for transfer of proven technologies and knowledge. High
cotton yield countries, such as Brazil, China, Turkey, etc. have dedicated cotton extension staff with clearly defined coverage of area and activities. In China, contract extension services are extremely effective and a close interaction and contact is maintained between the farmer and the extension agent. None of these arrangements exist in India. The extension workers are not adequately trained in the practices, approaches and strategies for their transfer and adoption of new technologies such as Integrated Pest Management (IPM), International Nutrient Management (INM), Insecticide Resistance Management (IRM) and Genetically Modified Organisms (GMOs). Specifically tailored training programmes are missing. Proven successful experiences such as Farmers’ Field Schools are operational only in patches.

14. Besides the poor quality, the points of distribution of the inputs are rather scattered. The role of cooperatives, SHGs, agriclinics and information centers have been negligible in promoting efficient production and distribution of cotton. Barring a few recent initiatives, the public-private (including NGO) - farmer linkage in technology transfer, information sharing and overall extension activities has been unsatisfactory. The monitoring, evaluation and mid-course corrections need to be improved.

15. **Highly inadequate credit and other institutional support:** Most cotton farmers are small and marginal and generally resource-poor. On the other hand, cost of production of cotton, especially the costs of hybrid and Bt. Cotton seeds and of pesticides, are very high and beyond the capacity of majority of the farmers. The formal credit availability is highly inadequate and the arrangements to access it are quite cumbersome and time-consuming. Therefore, most farmers turn to easily accessible non-formal sources of credit, but at high rates of interest and with other associated unfriendly agreements. As over 70% of the crop is grown under rainfed and monsoonal uncertainties, cotton production is highly risk-prone. In the absence of satisfactory crop insurance mechanisms, the growers' vulnerability is exacerbated and they generally land into traps of layers of debts. So much so that sometimes the economic and social burdens become unbearable and the farmers resort to the extreme step of committing suicide.

16. **Unsatisfactory Pricing and Marketing:** The current slump in cotton prices both in the domestic and international markets has caused serious concern and distress in the minds of
Indian cotton farmers as their increased production holds little promise for their income and profitability. The situation is tricky also for the cotton mills as with globalisation and with the abolition of the quota restriction from January 1, 2005, they would be free to procure their raw materials at competitive prices from anywhere in the world, which is already happening and is further depressing the domestic prices. However, realizing that the farmers and the industry are interdependent and neither can prosper at the expense of the other, short and long term mutually supportive interventions and measures are required for the mutual benefit of farmers, industry and the consumers.

The Way Ahead: Critical Interventions

A. Public Policy:

17. **Establishing a National Cotton Council: an apex coordinating mechanism:** The Centrally Sponsored Scheme of Technology Mission on Cotton (TMC), comprising four Mini Missions (MM) and operational since 2000-2001 in all the 13 cotton growing States seeks to address the various issues by integrating different aspects of cotton, namely research, extension and development for production; development of market infrastructure/yards; and modernization of ginning/pressing factories respectively through MM-I, II, III and IV. Mini Mission I is implemented by ICAR, MM-II by the Department of Agriculture and Cooperation and MM-III and MM-IV by the Ministry of Textiles.

18. The performance of the TMC has been a mixed one. Mini Missions III and IV, seem to be on track to achieve their physical targets of renovation and modernization. The outcomes and impacts of MM-I and MM-II are not quite discernible, although during 2003-04 and 2004-05 yield and production had increased, it is attributed mainly to good prices, good weather, increased area under Bt. Hybrids and increasing involvement of cotton mills and the private sector in technology transfer. There was little perceptible increase in the supply of quality seeds of open-pollinated varieties and in the adoption of the INM, IRM and IPM technologies beyond the "project areas."

19. Unfortunately, the four Mini Missions are tending to operate in isolation of each other, with no integration of efforts and approaches. As a result, the expected positive interaction
effects are being missed out. Some of the participating State Governments have neither allocated the apportioned 25% of the budget nor have they spent any Central Government Fund, especially under MM-II which accounts for about 75 percent of the TMC funds. Yet, the production in these States has moved up. The "Mission spirit" of partnership and leveraging interactions is missing and the programme is generally running in the longstanding Intensive Cotton Development Programme (ICDP) mode.

20. The TMC at the Central level is supposed to receive its direction, control and integration from its National Steering Committee constituted for the purpose. At State level, a counterpart State Steering Committee is to be in place. Although well intended, the committees have not been effective in providing the necessary integration of Mini Missions and drive to the TMC, as a whole. In order to overcome this problem, on the lines of the International Cotton Council, a National Cotton Council comprising representatives of farmers, textile industry, NGOs, public sector and other major stakeholders, should be set up under the Chairmanship of the Union Minister for Agriculture, with the Union Ministers of Textiles and Commerce serving as Co-chairs. The Council will guide the Mission in taking the right steps at the right time and place. Among other things, the Council should suggest as to how productivity and quality can be improved and the cost of production brought down through enhancing the pace of progress in factor productivity and guide the nation's cotton economy to remain buoyant in the globalised world, with special consideration of the needs and aspirations of millions of small cotton farmers, weavers and their families.

21. Remunerative prices to the farmers and farmer-centred marketing: The cotton production during 2004-05 is estimated to be 213 lakh bales. The carry forward stock from 2003-04 is 24.5 lakh bales. Thus, total availability of cotton is placed at 237.5 lakh bales during 2004-05. As against this, the total demand including both mill and non-mill consumption even if placed at about 200 lakh bales will leave a stock of 37 lakh bales. Maintaining a cushion of about 17 lakh bales, the exportable surplus stands at 20 lakh bales. This domestic glut is further aggravated by the glut in the international cotton market. As per the International Cotton Advisory Council, the world cotton production is estimated at 24.14 million tonnes during 2004-05 against demand of around 21.97 million tonnes leaving a stock of 9.87 million tonnes. The resultant effect is the fall
in cotton prices in world (Cotlook Index) from 70 cents per pound (454 gms) in 2003-04 to 45 cents per pound in December, 2004. The price of cotton in India also decreased from about Rs 2500 per quintal at the beginning of the season to less than the MSP of Rs 1760 - Rs 1960.

22. The landed price of cotton (lint) is somewhat lower than the price prevailing in the domestic market. In order to protect the cotton farmers throughout the country, Import Duty, which is 10% at present, needs to be enhanced to at least 30% to restrict the cheap import, particularly of the category most produced and used domestically. The import duty for the extra long fine cotton may be maintained at the current level of 10% so that India's competitiveness in yarn export may not be jeopardized. The mills in collaboration with CCI and APEDA need to assess the count-wise requirement and consumption to facilitate national policies and action required in cotton sector and should proactively buy domestic cottons. In this context, the Intensive Cotton Cultivation initiatives steered by cotton mills and ginning factories will help stabilize prices and ensure availability of desired quality required by our spinning mills. But, all this should be geared to urgently reduce the cost of production and increase India’s competitiveness.

23. In order to promote exports at prices which may provide remunerative returns to the farmers, export tariff, consistent with WTO provisions, may have to be provided to maintain the farmers' income and the overall cotton economy. Based on external demand and market situation, suitable level of export tariff may be fixed which may at least obviate the income depression due to low prices. The national system should, therefore, vigorously move to ensure export of the entire surplus produce. In order to circumvent the unrealistic non-tariff barriers imposed by the importing countries, mostly on SPS grounds, India should establish a credible SPS capacity to promote unhindered trade (Ref. Chapter VII of the Report).

B. Public Action:

B.1 Convergence and Synergy among Mini Missions:

24. It is strongly recommended that in order to revitalize the Cotton Technology Mission and to operate it in a true "Mission" mode, an eminent cotton professional be appointed as the overall full-time Mission Director. He/She will together with the four Mini Mission
Coordinators function as an apex management team with appropriate responsibility, authority and accountability to fully synergise the activities towards achieving the goal within the stipulated timeframe. The programme should be suitably redesigned involving a participatory approach and all the stakeholders, particularly the State Governments, internalizing the social engineering aspects with built-in mechanisms of monitoring, evaluation and dynamic adjustments.

B.2  **Enlarging the Role of Cotton Corporation of India (CCI):**
25. With the abolition of the quota system, CCI should play a greater role in insulating the farmers from the international price dips and in maximizing their profits when the prices go up. For this, it should be fully equipped to undertake market research and intelligence and position itself in time to meet the fluctuations. As the country’s cotton production increases, its capacity to procure, store and export cotton should be strengthened. In collaboration with APEDA and other concerned agencies, it should proactively advise the farmers on the quality and varieties of cotton to be grown.

B.3  **Reorienting Research Priorities and Technology Transfer Strategies:**

26. Notwithstanding the research priorities already identified under Mini Mission I, greater focus should be given to:

26.1 quality aspects, namely, fibre strength, better micronaire, length, high maturity, high extensibility, uniformity, low strength of attachment and short fibre content

26.2 development of broad-based Bt Cotton hybrids with desired fibre quality; use of MAS for pyramiding yield, quality and resistance genes, especially against abiotic stresses such as drought and creation of wide gene pools through inter specific hybridization; the undue delay in release of the transgenics should be avoided without compromising with transparency and biosecurity requirements

26.3 development of effective and stable bio-pesticides and biocontrol agents and to develop new IPM, IRM and INM techniques around the fast expanding Bt Hybrid system to
ensure greater sustainability, productivity and profitability.

27. The ongoing effort of the ICAR, Universities and private sector research systems should be assessed in terms of their degree of involvement both in terms of the human and financial resources deployed for the purpose and the intensity and the quality of the work. Additional resources and directed focus should be provided to the identified critical gaps through reallocation from the existing resources. Prima facie, no additional funds will be required but the need could be kept under continuing review. The Director, Central Cotton Research Institute, in close collaboration with Director, CIRCOT and other participating institutions, should be made responsible to follow up the work and regularly report the progress to the Mission Director.

28. Large-scale adoption of high yielding and superior quality arboreum varieties: Several high promising arboreum varieties, such as, PA-255, PA-402, DLSA-17, MDL-2463 have outperformed commonly grown hirsutum varieties by margins ranging from 35 to 50%, specially under water stress conditions. Besides yield, these varieties, particularly PA-255, possess excellent fibre quality which are comparable in all respects (length, fineness and micronaire, etc.) to LRA-5166, a leading hirsutum variety. By growing these excellent arboreum varieties, farmers had saved considerably on cost of cultivation (Rs.4900/ha. as against Rs.10,000 for hirsutum hybrids). The arboreum varieties were particularly outstanding under water stress conditions and in upper toposquence. Further, these arboreums have performed extremely well when intercropped with cereals, pulses, and oilseeds. Inspite of outstanding performance of new arboreum varieties, their commercial popularization has been extremely poor, depriving the farmers as well as the nation of a new opportunity of income growth as well as of environmental friendliness. It is strongly recommended that a focused extension and technology transfer programme involving all the stakeholders, particularly mills and the corporate sector, be vigorously pursued to saturate the cotton areas where the newly developed arboreum varieties hold distinct advantage over the hirsutum varieties or hybrids.

29. **Investing in the Soil Health:** Quantum jump in cotton yield can be obtained by addressing issues relating to the micronutrients status of the soils. Through pricing and policy instruments (input support) the nutrient balance should be corrected in the deficient soils. Zinc,
Boron and Sulphur deficiencies, in that order, were most common and the deficiency was greater in Maharashtra, Tamil Nadu, Haryana and Andhra Pradesh. Based on soil test, the imbalances should be corrected not only for recovering the potential yields but also for arresting further deterioration. Fertilizer industry should be encouraged to produce new and cost-effective fertilizer formulations (customized fertilizers) and participate in technology transfer. Any subsidy given on fertilizers must not ignore the vital role of and the urgency of promotion of the adequate use of critical micronutrients and a suitable measure should be put in place. The Ministry of Agriculture and the Fertiliser Industries should critically examine the suggestions and come up with a mutually acceptable action plan to restore and enhance the fertility and productivity of cotton fields to help promote INM. The TMC Director and Coordinator of MM-II should jointly chalk out detailed action plan with their counterparts in the deficient cotton-growing States and organize about 30,000 large scale demonstrations (atleast 1 ha. each) for mass impact and adoption.

30. Each farmer should be issued soil health card and trained to use the technology. Agriclinic and agro-business centers should be established strategically and rendered functional to undertake the necessary soil test. Despite all efforts and the declared policy and instructions to the banks, especially NABARD, to help establish agriclinics and agribusiness centers, so far hardly 200 units have been established during the past three years and these are operating with varying degrees of success. Serious mismatches exist in the attitude, mode of support and priorities of different partners, namely the entrepreneur, the bank, the farmer and the public sector. Thus, the move has so far not been as successful as initially conjectured. The situation has been analysed sporadically, but a more comprehensive analysis involving the different partners is called for which should come up with a new road map for improving the prospects of agriclinics and agro-business centers. There is a tendency to emphasise the business component and profit to the owner of the center at the cost of extension and knowledge services to the farmers.

31. **Enhancing Water Productivity and Saving Water and Soil Erosion:** Large tracts of cotton soils, particularly in the Central Zone, are shallow with hard pan at about 8 to 10" depth causing several interdependent soil, water and plant nutrition problems. Breaking the hard pan
will obviate the problems in many ways. Rain water is stored deep, down wherefrom it will not easily evaporate and is available to plants for a prolonged period and a much healthier and larger crop is produced. These reduce the need for irrigation particularly to deep rooted crops like cotton to as low as 20% of that normally required, and thus the water productivity will increase manifold. But, despite this knowledge and knowhow this water conservation technology has generally not been adapted in India. Chiseling (1 m interval) in rainfed areas would need high power prime movers such as 50 hp tractors because of larger draft requirements. Such tractors were not available until few years ago. Presently, both high power tractors and chisel plough are available to do the job. Traditionally, lack of high power tractors, research efforts, and extension efforts did not permit large-scale adoption of the chiseling operation. The cost of chiseling is estimated to be Rs 1000/ha. However, large scale demonstrations of about 100 ha. each in about 200 watersheds in 40 districts should be undertaken to assess the efficacy of the approach in terms of energy, economics and environment. Based on the results, a national plan should be prepared to benefit from the technology.

32. Other water harvesting, conservation and use techniques such as zero tillage, ridge-furrow planting, micro irrigation and plastic sheet mulching are used singly or conjointly. But these are restricted to limited sites and have not impacted cotton productivity in India. Toposequence based rain water management, rainwater harvesting and use, should be adopted by all rainfed cotton farmers as the technique is extremely useful in stabilizing and increasing the yield (on an average by 20%) on farmers’ field. Awareness campaign and initial financial support will prove stimulatory in popularizing the approach. Likewise, ridges and furrow system not only saves soil and water erosion but gives about 30% higher yield across all the toposequences and different cotton-based cropping systems. It also enhances nutrient use efficiency. An extensive drive and service support to promote these technologies should constitute a priority activity in all the rainfed cotton areas.

33. The high subsidy on micro irrigation equipments had encouraged the widespread sale of poor quality equipment and brought bad name to this highly effective technology. Transparency and good governance thus should underpin the popularization of such techniques. Strict monitoring and quality control of the supply of the subsidized hardwares of the micro irrigation
(drip and sprinkler) system should be ensured.

34. **Ensuring timely flow of adequate quantity of quality seed:** Despite the active involvement of the private sector and several seed production schemes of the public sector, both at national and provincial levels, the supply of quality certified seeds of the approved varieties is rather low and uncertain. Moreover, the multiplicity of the varieties grown further aggravates the situation. Therefore, first of all, the Government should urgently denotify the degraded varieties. The new Seed Act should be enacted and implemented at the earliest so that all the seed available in the market is certified and is distributed only through registered dealers and producers by authenticated systems so that, if needed, the defective link in the flow chain could be traced and corrected. The seed laws must be strictly adhered to and earnestly implemented. The defaulters should be punished to curb the distribution of spurious seeds.

35. The public and private sector together, specially the Cotton Corporation of India and Cotton Mills Federations together should identify the quantity of seed needed of the different varieties recommended for specific zones. The Basu Committee report on the retention of desirable verities and their zonal delineation should be urgently implemented. The Agri-clinic and Agri-business centers should be suitably strengthened to store and distribute quality seeds as a high priority. There should be a suitable arrangement also for either carrying over or disposing off the left over indented seed to protect the agribusiness centers from loss.

36. The National and State Seed Corporations should play a leading role in producing and distributing the quality seeds of open pollinated varieties. For this purpose, central and State seed farms, university farms and corporate sector farms should also be used. Keeping in view the excellent role played by women in the production of hybrid cotton seed, appropriate mechanisms of engendering cotton seed production by leasing out Government lands to women Self Help Groups (SHGs), such as SEWA, should be encouraged. Specialised women SHGs could be created for this purpose with adequate provision of training, skill development and access to financial resources. These specialised SHGs may also be charged with the responsibility of establishing and operating cotton seed banks (a separate note is being prepared on this aspect).
37. **National Movement to Adopt IPM:** A landmark in cotton IPM has been the validation of the cropping system based holistic community approach of IPM at village Ashta (1998-2001), a village in Nanded district, representative of over 2 million ha rainfed cotton in Central India. Large scale pilot demonstrations covering hundreds of villages in all the cotton-growing States have established the fact that the IPM approaches suiting to the regional requirement can drastically reduce the cost of production of this fibre in the country and it is possible to reduce the dependence on chemical pesticides to the tune of 60 percent and increase seed cotton yield by 24 percent. Yet, the technology is not being widely adopted. A national movement for cotton in IPM is called for. A three-year programme covering 5,400 villages, 540,000 ha, and costing Rs.600 crores (Rs 200 crores for one year) deserves priority implementation.

38. IPM approach also includes need-based and efficacious use of selected pesticides, while maintaining the emphasis on effective biopesticides and bioagents. Addition of eco-toxicological perspectives for the management of insect resistance to pesticides and insecticides would help obviate some of the shortcomings of the IPM approach. Further, the IPM and IRM strategies must be dynamically and synergistically evolved in light of the increasing introduction of Bt. Cotton and new insecticides.

39. Like the IPM approach, the results of the farmer participatory approaches in the IRM have been very encouraging and apparently farmer awareness is undergoing massive sweep as evident through the enormous reduction in the usage of pesticides in all the districts implementing the programme. Thus far 26 insecticide resistant monitoring centers have been established under the project and are expected to serve as insecticide resistance information centers to farmers throughout the season, so as to enable farmers take up properly guided decisions on the appropriate choice of insecticides. Currently, the per hectare operational cost (manpower, consumables, travel, etc) comes to about Rs.200. The programme focuses immensely on farmer education and does not provide any material inputs.

40. The IPM and IRM strategies and their proven efficacies and appeal notwithstanding, are unfortunately being pursued in parallel manner with no operational connect in the two separate
Mini-missions, MM-I and MM-II. Given the commonality of the two approaches, the disconnect between the two strategic programmes should be removed and the two programmes must be integrated under one and the same IPM umbrella, and there should be only one line of management and control for preparing, implementing and monitoring village level detailed microplans and their backward and forward linkages. All concerned stakeholders, the Department of Agriculture, ICAR, State Governments, SAUs, private sector, NGOs and farmers must forge the linkage and unify the efforts towards realizing quick and widespread impact.

41. The Report of the Joint Committee on Pesticide Residues in and Safety Standards for Soft Drinks, Fruit Juices and Beverages of the 13th Lok Sabha, under the Chairmanship of Shri Sharad Pawar, presently the Hon’ble Minister of Agriculture, contains some extremely valuable recommendations pertaining to IPM and IRM (paras 3.53 to 3.58), in addition to other important recommendations including those related to implementation of regulations and the punishment for non-compliance. The Report should be implemented soonest in our effort to save the farmers from mounting distresses from the use of spurious pesticides and ill-informed excessive use of prohibited insecticides.

**B.4. Byproduct Utilization:**

42. Byproducts of cotton cultivation and processing wastes should be subjected to value addition to enhance growers income and to develop rural employment and entrepreneurship. Technologies already developed such as utilization of cotton stalk for the manufacture of particle boards, for paper etc. need popularization, demonstration and adoption. Agro residues and byproducts need to be promoted as raw materials for industrial activity to fetch additional income to growers.

43. Scientific processing of cotton seed viz., delinting, dehulling and then crushing for oil to be promoted rather than seed to be directly crushed to oil as is being done right now. Value addition to each of these byproducts of cotton seed viz. linter, hulls, deoiled cake should be encouraged. Strategic linkages among private sector companies, Small Farmers’ Cotton Estates and NABARD should be promoted by the National Cotton Council.
C. Organising Small Farmers' Cotton Estates and Participatory Extension and Technology Transfer

44. Realising that the public sector extension and the service-providing machinery is almost defunct, and recognizing the successful experiences of certain public-private-farmer or private-farmer or farmer-farmer (SHGs) partnerships in transfer of technologies leading to the benefits of all the partners, new models of extension and service-providing mechanisms should be actively promoted and institutionalized. Some of the partnership initiatives such as the ICMF – CDRA project, the Appachi Foundation 60 SHGs, CCI-initiated Intensive Cotton Cultivation and the Vardhman Group’s participatory extension programme are bright spots deserving large-scale adoption.

45. Small Farmers' Cotton Estates through “Group Farming”, linking production and consumption through effective partnership of farmers, service and knowledge providers, formal credit providers viz. NABARD, input providers and marketing and product distribution agencies both in public and private sectors should be established. The approach aims to (i) make available cotton of desired quantity and quality to the user industry and an assured market to the producer, (ii) improve productivity and quality of cotton by providing the farmer with authentic inputs such as seed, fertilizers, pesticides and know how, and (iii) bring change from subsistence agriculture to commercial agriculture and thereby increase the profitability of the farmer.

46. Active participation of the cotton mills, NGOs and related sectors can further be promoted and institutionalized by providing incentives to them. Keeping in mind the high impact of the Scheme on the livelihood security of the cotton growers and the competitive advantage to the industry under the post-WTO environment, the Government should provide the needed support. To begin with, the State Governments should waive the market cess and sales tax. Failing that, the Central Government should provide subsidy to the extent of 50% of the cost of market cess and sales tax for a period of five years. Further, the Government of India may bear the cost of supervision of the programme by agricultural experts and also provide cost of
scouts for monitoring the crop under the MM-III. Detailed financial implications of these provisions should be worked out.

47. Recognising the importance of MM-II in enhancing the productivity and competitiveness through efficient transfer of technologies, and appreciating the role that the private enterprises and NGOs can play in supplementing the public sector effort in rapid diffusion and adoption of appropriate technologies, the funds for extension work under MM-II should flow also to the proven nongovernmental partners under analogous terms and conditions. Such efforts should first be intensified in the high yield-gap and low-yield cotton districts, selected preferably from the list of districts identified by the Planning Commission. This decision should be made widely known and private enterprises, especially those related with cotton industry, and NGOs should be invited to participate in the programme.

48. To begin with, 100 Small Farmers' Cotton Estates, each covering about 1000 ha., may be launched by the National Cotton Council in close collaboration with the TMC, ICMF, NABARD and CCI. These Cotton Estates will function on the principle of decentralized production by small farmers and supported by key centralized services at the production and post-harvest phases. Each EState can be supported by an Agri-clinic and Agri-business Centre operated by Farm Graduates. The Small Farmers’ Cotton Estates can each host a Rural Knowledge Centre based on modern information communication technology (ICT).

49. Credit, insurance, marketing may all be included in the EState. The design of the Small Farmers’ Cotton Estates should be such that it represents a win-win situation for all participatory farmers. Production – processing – marketing can be dealt with in an integrated manner.

50. Based on the initial experience and the response of the partners, it is proposed to cover within the next three years about 5000 villages throughout the cotton growing States in the country, but with greater concentration in Maharashtra, Gujarat, Andhra Pradesh and Madhya Pradesh, covering an area of about 1 million hectares with an yield advantage of about 50 percent above the present level. This yield gain is estimated to provide additional net income of Rs 5,000 per ha. to nearly 500,000 farmers, valued at Rs 500 crore.
51. **Credit, insurance and institutional support:** As mentioned earlier, since cotton production is highly risk prone and is largely in the domain of small and resource-poor farmers whose risk taking capacity is extremely low, the importance of smooth and timely access to formal credit and insurance can hardly be over-emphasised. The recommendations made in Chapter-II to address this issue is equally applicable to the cotton farmers and cotton productivity.

**Financial Resources**

52. Factor oriented interventions such as micro-nutrients, quality seeds, bioagents, biopesticides, integrating with system oriented demonstrations, namely, IPM, IRM and INM need to be provided for intensifying these demonstrations in resource poor farmers’ fields in the low-yield cotton districts. Development of Bt. and other biosafe new seeds, new biocontrol agents, popularization of new arboresum seeds especially in drought prone areas and establishment of Small Cotton Holder Estates are other priority critical interventions for increasing productivity and competitiveness. The TMC and ICAR should provide part of the funds needed through reordering of priorities. An additional sum of Rs 250 crore may be provided in the budget for 2005-06 to launch an integrated technology transfer and development programme geared especially to meet the needs of the small farmers and to capture the opportunity arising from the ending of the multifibre agreement.
Towards a Biosecure Trade: Urgent Steps Needed

1. Producer-centred assured and remunerative marketing holds the key to ensuring sustained agricultural progress. Enhanced trade in farm commodities is essential for promoting agrarian and rural prosperity. Trade also generates downstream non-farm employment opportunities. In its next report, the National Commission on Farmers will be presenting recommendations for developing a dynamic farmer-centric Indian Common Market. A few suggestions for safeguarding and expanding international trade in agricultural products are given here.

2. Our facilities for sanitary and phytosanitary measures (SPS) are inadequate. According to Financial Express (India) 16 Feb, 2004, several consignments of Indian farm exports were rejected on grounds of mycotoxin, salmonella, pesticide residues etc. during last two years (Annexure I). The situation is likely to get serious in the coming years since health safety standards as presented by Codex Alimentarius are getting increasingly stringent and the goal posts in developed countries have been shifting fast. Food safety standards will become the most important non-tariff barrier. Therefore, we must not lose any further time in launching a quality and food safety literacy movement in villages. At the same time, our SPS infrastructure should be vastly strengthened. Suggestions are given in this Chapter on urgent steps and investment needed.

3. We should also strengthen our quarantine facilities, since according to National Bureau of Plant Genetic Resources (NBPGR), several invasive alien species have been introduced into the country along with grain seed and planting material imports. These introduced pests include bunchy top of banana, potato wart, sunflower downy mildew, coffee pod borer, apple San. Jose scale, Biotype B of white fly and invasive weeds like Lantana camara and Phalaris minor. Such
invasive alien species will further threaten our agriculture, including poultry and dairying. The Asian Flu disease of chicken in southeast Asia is a case in point.

4. In the wake of implementation of WTO-SPS Agreement we are faced with the following challenges:

4.1 Designate a single Central Government authority as responsible for implementation of SPS measures.
4.2 Review and updating of legislation and regulations related to SPS to give effect to international agreement and establishing a nodal point for enquiries and information exchange
4.3 Establishment of national standards on SPS measures in line with international standards
4.4 Establishing a notification procedure
4.5 Undertake pest risk analysis and identify and maintain pest-free areas for plants and animals as per international standards and safety assessment for food
4.6 Scientific justification of high level protection in the absence of pest risk assessment
4.7 Recognition of equivalence of specific measures through bilateral or multilateral agreements
4.8 Identifying researchable issues and strengthening back-up research
4.9 Capacity building in terms of infrastructure and expertise
4.10 Awareness building and catalyzing attitude change
4.11 Develop functional public-private-NGO partnerships

The Road Ahead:

5. In view of the urgency of the steps needed both to safeguard our agricultural exports and to capture new markets, the following steps are suggested.
A. Policy Actions:

6. **Food Safety Council of India:** It is suggested to establish a Food Safety Council of India chaired by the Union Minister for Food and Agriculture with the Union Commerce Minister as co-Chairman. The Food Safety Council of India should have as members, representatives of farm and fisher women and men, particularly from States with a large volume of agricultural exports. The producers’ representatives should cover all aspects of crops and animal husbandry and fisheries.

B. Public Actions:

7. **Upgrading the Quarantine Stations:** The five major quarantine stations at New Delhi, Mumbai, Kolkata, Chennai and Amritsar have been modernized with sophisticated equipments and Post Entry Quarantine facilities under a UNDP project. However, there are other 24 plant quarantine stations for the upgrading of which an initial effort has been made for need assessment in terms of laboratory and green house facilities required under an FAO-TCP project recently. The 24 stations were classified into three broad categories in the said project based on nature and volume of material received in each of the stations. The output of the project can be a starting point to initiate upgrading of these stations. It may however be noted that apart from equipping these stations with modern instruments and facilities, the means of communication (telephone, fax, email, vehicle) need special attention for efficient functioning of these stations.

8. **Development of National Standards on Sanitary and Phytosanitary Measures:** The establishment of national standards on phytosanitary measures in line with international standards is of critical concern to meet the stiff challenges under the international agreements. There are 21 such international standards developed as on today. For this purpose, the Food Safety Council may constitute a National Committee on SPS Standards and suitable standard setting procedure need to be developed. The National Committee may assist in developing the standards and the draft standards may be circulated among the functionaries for their comments and the finalized standards may be duly approved and signed for issue to concerned Central/State level functionaries for adaptation.
9. **Survey and Surveillance Programmes:** So far no systematic efforts are being made for survey and surveillance of endemic pests, of new and emerging pests and of the exotic pests which have been introduced and are being spread. An effective integrated pest surveillance system and organization devoted to performing field inspection and pest survey activities for the detection, delimitation or monitoring of established pests as well as system and organization devoted to the detection of new pests needs be introduced. Specific systems may be required for identification, establishment and maintenance of pest-free areas as per the international standards. Similarly, systematically designed survey, surveillance and monitoring studies for the toxin incidence in food and agricultural commodities are required to identify less risk-prone areas for export and domestic use. For this, need-based additional support is needed to strengthen containment facilities, pest risk analysis capacity, pest diagnostic laboratories, residue and toxic laboratory, referral laboratories, emergency control and treatment facilities and accreditation laboratories.

10. **Generating Awareness abroad and Linkages with National and International Programmes:** In order to have complete understanding of the SPS measures of our target markets, there is a need to have direct technical contact with the concerned authorities in those countries. This could be achieved if the country posts a technically qualified Agricultural Attache at our diplomatic offices in the countries of interest. ICT must be effectively used to enhance awareness abroad on the steps taken in India to ensure the highest standard regarding food safety and biosecurity.

11. At present the staff of Directorate of Plant Protection, Quarantine and Storage (DPPQS) works largely in isolation and are not taking benefit of the various research organizations of ICAR and State Agricultural Universities for detection and identification of pests and for the control strategies. There is a need for an active linkage between All India Coordinated Research Projects (AICRPs) and the activities of the DPPQS in order to have comprehensive survey and surveillance programmes. There is an urgent need to develop a network system of information through the following means: (i) linkage with WTO, Cotton Advisory Council (CAC), IOE, International Plant Protection Convention (IPPC), FAO, WHO, International Standards
Organization (ISO) and related organizations, (ii) coordination mechanism involving planning and network system, (iii) dissemination of information on standards and code of practices and (iv) forging networks to implement contract farming.

12. **Researchable Issues**: The diverse areas requiring research input for preparing an authentic and accurate Pest Risk Analysis (PRA) such as pest status information to establish phytosanitary regulations, risk identification through development of more sophisticated bioassay, chemical or genetic analysis based on molecular or serological tests apart from morphological characteristics, evaluation of introduction/establishment and spread potential on the basis of risk of entry and establishment of the target pests and epidemiological data on a potential pest correlated with meteorological data, economic impact data in the form of national and global pest database depending upon the information on pathogenicity, etiology and control. For identifying PFAs authentic, extensive survey and surveillance is a must for authentic mapping of endemic pests present in localized pockets. Also, research is needed on suitable pest risk management practices to increase export potential of commodities/material in areas where the pest is within tolerance limits.

13. Research needs to be carried out to develop detection techniques for diagnosis of destructive pests especially to test samples of bulk consignments in batches. Alternative salvaging techniques to reduce the dependence on chemicals for control of pests and use of physical treatments like heat/cold, physico-chemical or ionizing radiations as alternatives to fumigation needs to be worked out.

14. Research on toxins with special reference to mycotoxins such as tolerance limits for the aflatoxins based on the regional diets and mean daily estimated intake of aflatoxins and its role as a immunosuppressant and carcinogen is needed.

15. **Human Resource Development - Launching a Trade Literacy Movement**: To meet requirements and challenges of SPS Agreement, the country needs specially trained manpower
as under the Agreement, PRA, a mandatory requirement to be carried out by all importing countries requires input from a team of scientists of all plant and animal protection scientists, database managers, weather forecasters, environment experts and agricultural economists. Research scientists who could strengthen pest identification through modern molecular techniques and make the imports pest free through efficient salvaging treatments/ techniques need to be internationally trained.

16. The database on prevailing pests in the country needs to be updated through not only literature survey but also survey and surveillance of land under agriculture, forests and wild fauna. This being a huge task requires networking and suitably training of plant and animal protection scientists of ICAR and SAU within the country. Such accumulated data on pest distribution can also be exploited to meet the requirement under the Agreement and to boost up our exports of agricultural commodities from certified and notified pest free areas. Trained manpower is also required for maintaining pest free areas as pest free through suitable phytosanitary measures.

17. With more and more speculated exchange of transgenics in plants, animals and fisheries during the coming years, disciplines like biosafety needs to be upgraded to international levels. For this, the biotechnology laboratories need to be equipped with suitable manpower and equipments to detect transgenes and terminator genes in the suspected agricultural produce (in bulk) and processed products. Trained manpower is required to study and compile information on adverse effects of the transgenics on environment, human beings, biodiversity, wild flora and fauna.

18. At present there are a large number of cases of dispute related to technical aspects of import and export of agricultural products that are lying pending for settlement of both developing as well as developed country members before the Dispute Settlement Committee of WTO. Looking at the number of such cases being addressed, there is a need for developing legal expertise in this field.
C. Quality Literacy Programme: Sensitization and Awareness Building:

19. Awareness about SPS measures has to percolate down to the producer and processor levels so that the significance of these issues in enhanced global trade could be highlighted. Such an efforts needs development of tailor-made training programmes for different clientele groups and targeting the field-level awareness-building. ‘Hands on’ training should be imparted to selected clientele groups who can help in horizontal dissemination of technology especially for mycotoxin estimation, pest-diagnosis etc. ICT based Village knowledge centres must play a major role in creating the awareness among producers and consumers alike in rural areas (Ref Chapter VIII). The use of existing technical systems such as the Virtual Academy for Semi-Arid Tropics (VASAT) could be used as a platform for quick dissemination of Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs) for different production systems.

20. The State governments need to be sensitized and supported to develop mechanisms for ensuring compliance to legislative measures and SPS standards through local stakeholders. They need to ensure funding and establishment of facilities such as post-entry quarantine glasshouses, well-equipped laboratories for diagnostics and determination of residual toxicities and should encourage human resource development in the relevant areas. All stakeholders must be sensitized of the need for adherence to biosecurity provisions.

Financial Resources

21. In order to meet our SPS commitments, the country should urgently strengthen the operation system at all strategic points, diagnostic surveillance and accreditation system, science-based pest risk assessment and management, audit and quality control system and information and literacy campaign. To attain these outputs, additional investments are needed for creating infrastructure missing at strategic sites, for improving laboratory facilities, for augmenting trained human resources, for undertaking emergency actions and for creating databases. An additional sum of Rs. 100 crore is required for the next two years to achieve the goal. An allocation of Rs. 60 crore is recommended during 2005-06.
# Annexure-I

## REJECTED TRADE CONSIGNMENTS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>COMMODITIES</th>
<th>REJECTED BY</th>
<th>REASON OF REJECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Indian Soft drinks</td>
<td>The United Kingdom</td>
<td>Presence of colour Sunset Yellow –E 110</td>
</tr>
<tr>
<td>2.</td>
<td>Chilli products including curry powders, sauce &amp; spices mix (hotChilli powder, red chilli crushed, hot chilli peppers, ground chilli, curry powder, south Indian curry powder. tandoori masala, spice mix, chilli sauce, spices containing chilli powder.</td>
<td>European Union</td>
<td>Presence of colour Sudan 1 and aflotoxins</td>
</tr>
<tr>
<td>3.</td>
<td>Dried apricot</td>
<td>European Union</td>
<td>Presence of sulphur dioxide</td>
</tr>
<tr>
<td>4.</td>
<td>Grapes (Thompson seedless grapes, sunripened seedless grapes, white seedless grapes)</td>
<td>European Union</td>
<td>Containing methomyl, monocrotophos Acephate, methomidophos and monocrolophos</td>
</tr>
<tr>
<td>5.</td>
<td>Prawns, Cuttlefish and squids (frozen prawns, whole washed cuttlefish, frozen squid tentacles, squids and strips of squids, frozen raw peeled, black tiger shrimps, black shrimps skewer, black tiger shrimps (pealed and deveined)</td>
<td>European Union</td>
<td>Containing cadmium, Salmonelia, Furazolidone, Nitrofuran, Nitrofurazone, Mesophiles, Cadmium and Vibrie Cholerae</td>
</tr>
<tr>
<td>6.</td>
<td>Fish and meat seasoning</td>
<td>European Union</td>
<td>Presence of colour Sudan 1</td>
</tr>
<tr>
<td>7.</td>
<td>Frozen baby octopus</td>
<td>European Union</td>
<td>Aerobic mesophiles</td>
</tr>
<tr>
<td>8.</td>
<td>Egg and yolk powder (Pasteurized spray dried hen whole egg powder)</td>
<td>European Union</td>
<td>Nitrofuran, Nitrofurozone, Furazolidone</td>
</tr>
<tr>
<td>9.</td>
<td>Honey</td>
<td>European Union</td>
<td>Containing Nitrofuran</td>
</tr>
</tbody>
</table>

Ecologically sound agriculture is knowledge intensive. Farm women and men need dynamic information relating to meteorological, management and marketing factors as related to crops and animal husbandry, fisheries, agro-forestry and agro-processing. The new approach to productivity improvement and employment generation is also information and knowledge intensive. In the context of globalization of trade, there is need for launching a genetic (i.e. relating to genetically modified farm products), legal (i.e. IPR and Farmers’ and Breeders’ Rights), quality (i.e. sanitary and phytosanitary measures and codex alimentarius standards), and trade (i.e. prices in home and external markets) literacy movement. There is presently a disconnect between what farm families need by way of generic and dynamic information and what the conventional extension agencies are able to provide.

It is also important to address the need for demand driven and value added information which is time and location specific. There is also need for knowledge transfers between and across rural communities, scientists, educators, administrators, healthcare providers, technology enablers on local agro-ecological and socio-cultural conditions of each village, and also relating to various farming methods and techniques. This can be effectively done through a network of Rural Knowledge Centres (RKCs) across the country. The principles of social inclusion, gender equity, reaching remote areas and remedying regional imbalances should be inbuilt prerequisites in the design of the RKCs. With a system of rural Knowledge Centres in place, families in rain-fed and dryland areas can access their information needs with facilitation from a district level consortium, and can raise their queries. This arrangement can be used in skill building at the local level and information empowerment with the help of contemporary Information and Communication Technology (ICT) methods, using the practice of just-in-time instruction.

2. Apart from information related to farming, rural women and men urgently need access to healthcare information. Increased health expenditure is an important cause of farmers’ indebtedness, leading occasionally to suicides. Information on the health status of
livestock and poultry, on-farm and off-farm livelihoods and market-led entrepreneurship opportunities for the poor and the marginalised in rural India need attention. There is also need for promoting functional literacy among the adult illiterate and making learning joyful for the young through interactive pedagogic methodologies.

3. Fortunately, the country is now in a position to take the benefits of the internet, community radio, cable TV and vernacular press to all the 600,000 villages within the next few years. A National Alliance for MISSION 2007: Every Village a Knowledge Centre has been formed to mobilize the power of partnership among the public and private sectors, academia, mass media and civil society organizations. Article 243 G of Schedule 11 of the Constitution 73rd Amendment Act 1992 on Panchayats, lists agriculture including agricultural education, animal husbandry, fisheries, forestry, education, technical training and vocational education, adult and non-formal education among the responsibilities of the Panchayats. The Rural Knowledge Centres can be located either in Panchayat buildings or rural schools or Study Centres of Open Universities, so that there is social inclusion in access. These Rural / Village Knowledge Centres (VKCs) can be run by self-help groups (SHGs), after the members of the SHGs are thoroughly trained. NABARD could develop a special scheme for supporting ICT SHGs. The community owned VKC will connect to the Internet and use a variety of local methods (e.g. notice boards, loud speakers, local daily etc.) for dissemination. The VKC will provide access to key local information on entitlements, governance and infrastructure, while supporting access to dynamic information on weather, markets and online public services. The centre will also be a retail outlet for a host of online learning, skill building, and training services that are fast coming up in the country, providing information on employment opportunities, and will link to new and emerging extension services.

4. The public policy support and public investment needed for this initiative are indicated in this chapter. We should lose no further time in improving our agricultural efficiency and competitiveness through rural knowledge connectivity. Hence, the recommendations made herein may be examined speedily and appropriate provision made in the Union Budget for 2005-06.

It is important to emphasize that Connectivity, Content, Capacity building and Management should receive concurrent attention. The institutions that can undertake these tasks should be identified and their roles and responsibilities clearly defined. An effective
combination of these enabling agents will help us achieve improved quality of life and sustainable rural livelihoods for millions in rural India, as envisaged under the Common Minimum Programme of the Government.

5. Immediate Thrust Areas:

A. Universal Service Opportunity

ICT based growth of the service sector and concurrent economic growth have been impressive but largely urban centred. 70% of India is rural and dependent on agriculture and allied activities. But rural India is yet to be brought to the forefront of ICT-led knowledge economy. This segment living in rural and semi-urban areas is however the nation’s core strength and would determine the demand and supply base for a range of goods and services. Consumer goods companies, automobile manufacturers, TV and radio producers have proven the strength of this segment by expanding into rural areas. Mobile telephony has followed this trend and proved that the rural markets have a great opportunity to take advantage of ICT tools if the prices are right.

The Universal Service Obligation (USO) Fund offers opportunity to connect the unconnected to the national mainstream by broadband and internet telephony. The goal of reaching all the 600,000 villages can be achieved if the 30,000 BSNL exchanges are extended to rural areas through wireless technologies. Wireless technologies have the potential to develop rural networks on IP to provide unlimited bandwidth on demand and at minimal expenditure. The USO Fund policy must encourage higher bandwidth connections and support developing more innovative bandwidth price fixation formulae. Bandwidth prices may be reduced by reducing International Private Leased Circuit (IPLC) half-circuit prices for international connectivity and domestic lease lines. Telecom Regulatory Authority of India (TRAI) has completed consultations with regard to domestic lease line ceiling tariff as well as IPLC tariff. Their recommendations should address the unused national resource and recognise the need for providing incentives for connectivity projects to reach out to rural areas.

TRAI has recently presented consultation papers on Spectrum Policy, Pricing of IPLC Half-circuit, Domestic Leased Lines, Unified Licensing Policy, and on Rural Connectivity.
B. Need for Rural ICT Policy

A rural-friendly ICT policy that recognises the government’s fibre network as a national asset and offers concession to those who extend the network to rural India will certainly prove to be a big boost to the rural GDP in the coming years. Out of the 16 terabits of international connectivity, only 0.35 terabits have been lit and less than 0.20 terabits are being used. Most of the corporate and government fibre network combined is now dark. Fibre optic network of Bharat Sanchar Nigam Limited’s (BSNL) 30,000 exchanges covers all the 6,000 blocks of India. If only each exchange is extended to 20 villages, the entire country will be covered, and a nationwide e-connectivity network will be a ground reality.

Complementing the new ICT revolution, it is important for the government to recognise the need for the establishment of community radio stations at both village and block levels that have the potential to reach out to rural communities. The Supreme Court’s ruling in 1995 stipulates that airwaves are public property. The government has recognised the technical feasibility of establishing 4000 community radio stations at no cost. These establishments will extend the government’s audiovisual and publicity efforts on various entitlements and programmes and information on technical, socio-economic and health related issues, while empowering the rural community to communicate and develop structures for a knowledge-intensive rural production system.

Community radio, locally owned and managed within a limited range, would offer an inclusive medium to communities, literate and illiterate, men and women, rich and poor, to access locally relevant knowledge, raise concerns and participate in decision making. However, Government policy on Community Radio has opened up licensing only to educational institutions. This excludes Community Radio as an option for the vast majority of village communities. There is an urgent need to review the existing policy on Community radio with a view to making it more inclusive. To make this a viable option for local communities there is also a need to revisit the licensing and spectrum fee structures. We should not deny ourselves the power of the community radio in maximising the reach of the internet.

The recent announcement to declare 90% concession on domestic leased lines used for e-Governance service, needs to be extended to the entire country. While this decision will prove useful in reaching government’s e-Governance services to rural areas, the same
network will help content providers to provide information services and useful ICT-enabled applications to farming families.

The emergence of Rural Knowledge Centres and info-kiosk movement in our country, promoted by NGOs and corporate sector, have demonstrated that the local panchayats and self-help groups can take advantage of appropriate information and communication technologies and with this facility, they can easily access the scientific and technical knowledge they need, to solve local problems with greater precision.

6. Rural Knowledge Centres in 600,000 villages in India

The aim of Mission 2007: Every Village a Knowledge Centre is to trigger a knowledge revolution in rural India by setting up ICT based village Knowledge Centres (VKC) in each of the 600,000 villages in the country by the 60th anniversary of India’s independence. Success of the initiative requires cooperative mobilisation of resources by concerned departments of government, private sector organisations and civil society groups.

The exercise can commence on a priority basis in 2005-2006 in the 150 districts identified by the Planning Commission for the Rural Employment Guarantee Programme. To start with, 20,000 tele-centres can be set up to cater to 100,000 villages in the 150 districts, with each centre servicing 5 villages. A business plan for the budgetary support required is attached as Annexure I.

7. Rural Virtual Academicians – the one million Change Agents

It is important that the knowledge centre in each of 600,000 villages is owned and run by local community members thereby creating a stake in ownership and management. Atleast one woman and one man can be selected from each village as Fellows of the National Virtual Academy (NVA). (The M S Swaminathan Research Foundation with support from the Tata Trusts has established the Jamsetji Tata National Virtual Academy for Rural Prosperity). There is need to select one million Fellows of NVA by 15th August 2007 - the sixtieth anniversary of our independence, through a peer review process. They will serve as the torchbearers of the Knowledge Revolution in Rural India. Several agencies have agreed to support the training of this cadre. These rural academicians affiliated to Panchayati Raj institutions, will be the information providers for the local community and will help to reach the unreached and voice the voiceless.
Government policy must encourage outsourcing of government functions such as digitisation of land records, data entry operations, collation of local data and local resource mapping to the ICT-SHGs and community interest groups that run the Knowledge Centres. This will encourage the Panchayati Raj Institutions and local government structures to utilise these Knowledge Centres for providing accountable and transparent services to citizens. Panchayats can effectively use the VKC as a service provider and revenue earner. Outsourcing from urban to rural India will be a powerful method of bridging the rural-urban digital divide. The active participation of elected women and men members of local bodies is crucial for the success of this movement.

In recent years, the rapid maturity of self-help groups in many parts of India, and the evolution of distance education from postal tuition into IT-mediated learning provide unprecedented opportunities to extend information support to the rural families. SHGs have been linked to the village Knowledge Centres successfully in TN, AP and Pondicherry for micro-enterprise training and marketing of products, while in Maharashtra, considerable progress has been achieved in linking rural IT initiatives to non-formal, non-degree learning.

8. Support systems for rural knowledge revolution - Recognition of Rural Service Providers and their role in creating and sustaining rural micro-enterprises

It is important for the government to support pockets of excellence in content streams and offer assistance to those who handhold rural academicians and the Rural Service Providers (RSPs). The community groups that manage the VKC have to be supported by a range of RSPs. These RSPs could include those who extend the national asset of BSNL’s fibre network and government’s eGovernance programme into rural areas; and those who offer content services to rural people on education, health, and livelihood opportunities. Appropriate incentives to these RSPs would enable employment growth in the form of rural information entrepreneurs. A low or no interest rate lending to rural entrepreneurs, ICT-SHGs and Community Interest Groups with support from Panchayati Raj Institutions can spearhead a rural knowledge movement. Credit institutions such as NABARD and SBI are increasingly interested in rural lending that is founded on knowledge and sound information, and authentication of data; information and training by the established institutions will strengthen the capacity of rural families in credit-seeking efforts. A venture capital fund can also be established to support RSPs and VKCs.
The RSPs are vital for creating sustainable rural micro-enterprises in the area of agriculture, food processing, animal husbandry, fisheries, sericulture, handicrafts, rural industry and even in IT-based services (which rural India could provide to urban areas). The RSPs are all the more vital in developing a rural to urban e-Commerce service network. As a part of the government’s eGovernance rollout, ICT entrepreneurship workshops could be initiated.

The viability, sustainability and scalability of the rural knowledge revolution movement will ultimately depend upon the relevance of ICT to the lives of rural families. Private sector industry can play a major role in linking rural products with markets. This will help in mitigating farmers' distress. The rural economy can flourish if ICTs are leveraged to create new livelihood opportunities in the areas indicated through training and capacity building. Private sector and civil society organisations should be encouraged to develop ICT-based supply-chain management systems to sell rural products.


The support system for a rural knowledge revolution should be complemented, by establishing a National Digital Gateway for Rural Livelihood Security. There is need for investment in creating databases relevant to rural needs. For example, a decade ago, a National Agricultural Drought Assessment and Monitoring System was set up under the National Remote Sensing Agency (NRSA) to facilitate improved decision making by farmers in the kharif and rabi seasons. The potential of this system needs to be harnessed for giving proactive advice to farm families on land and water use planning. The architecture of such a gateway should be based on currently available digital content from diverse agencies, ranging from the ICAR to the NRSA and ICRISAT, with a focus on improving livelihood security in rural India. Every participant agency should be encouraged to create well-adapted and annotated digital content (maps, numeric data or documents etc.) in a manner accessible to non-specialists. About 20 such web servers can be linked by a gateway computing platform through which a user can access the information.

10. Farmers’ Distress Call Centres

Livelihood opportunities in rural areas can be safeguarded by setting up Farmers’ Distress Call Centres in every State of the country. This is especially important in the context of farmers’ suicides. These distress centres will mediate on behalf of the farmers and
enable the experts and those who can offer solutions to the problems faced by the farmers. Application of ICT tools such as telephone and voice mail would enable farmers to obtain timely advice.

11. The role of Civil Society in eGovernance Programme

Civil society groups can provide inputs for the government’s eGovernance policies. Such groups can advise the government on appropriate methods of automating government processes and offering ICT-enabled services and applications for rural communities. Such groups can also ensure sponsoring civil society and professional organisations involved in building capacity among the ICT-SHGs and community interest groups in rural areas.


There are four major components to Mission 2007. These are:

(a) **Connectivity**: As already mentioned, India is in the fortunate position of being able to connect all the 600,000 villages speedily. BSNL and all the other agencies working on connectivity, including educational institutions like IIT, Chennai, should join together in fostering the rural connectivity movement.

(b) **Content**: This has to be location specific and need based. Education, health, water, weather, market and technological empowerment should all receive priority attention. A wide range of agencies will have to be involved for creation of relevant content. A blend of non-formal training approaches, content creation in a virtual mode and its use at Village Knowledge Centre is necessary for making a mass impact. A multi-institutional and multi-disciplinary **Content Consortium** can be formed in every district.

(c) **Capacity Building**: This is a very important component of the Action Plan and again a District level **Capacity Building Consortium** can help to organise capacity building programmes using the pedagogic methodology of learning by doing. The Academicians of the Jamsetji Tata National Virtual Academy can become master trainers.

(d) **Care and Management**: The care of the equipment and management of the Knowledge Centre can be undertaken by trained ICT-SHGs linked to Panchayats.

In this manner, an integrated self-sustaining and self-replicating system of Village Knowledge Centres can be built up. These Centres will be powerful instruments for making the Right to Information (at the correct time and place) a reality.
<table>
<thead>
<tr>
<th>Sl No</th>
<th>Government Support Policy Initiatives and Public Investment</th>
<th>Rationale / Benefits</th>
<th>Department concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A Rural ICT policy</td>
<td>Reaching the unreached in rural areas through ICT revolution</td>
<td>Ministry of Communications and Information Technology</td>
</tr>
<tr>
<td>2.</td>
<td>Declaration of BSNL’s 30,000 exchanges as a national asset</td>
<td>Enhanced usage of unused national resource of India; Revenue for BSNL from the usage</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The USO Fund as a powerful instrument for rural connectivity</td>
<td>Extension of private sector and government’s efforts in providing rural connectivity; Involvement of civil society in administering the Fund; A definite plan for reaching the unreached using this Fund</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Establishment of innovation fund for rural connectivity (allocation of Rupees 100 crore)</td>
<td>Fast tracking rural connectivity and extension of BSNL’s fibre network through wireless connectivity; Such an effort could be supported by a range of IT companies and Civil Society groups</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Incentives and tax holiday for Rural Service Providers from the USO Fund (Investment of about Rupees 100 crore)</td>
<td>Support system to Rural Knowledge Centres; establishment of rural connectivity; extending BSNL’s network into rural India and extension of eGovernment services to rural communities</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>90% reduction in telecom tariff for RSPs from the USO Fund (allocation of Rupees 300 crore)</td>
<td>Support system to rural Knowledge Centres; establishment of rural connectivity; extending BSNL’s network into rural India and extension of eGovernment services to rural communities</td>
<td></td>
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<tr>
<td></td>
<td>Establishment of <strong>National Digital Gateway for Rural Livelihood Security</strong> (allocation of Rupees 100 crore @ Rs.10 crore each by concerned ministries)</td>
<td>Development of databases to meet the rural needs in the area of primary and vocational education, agriculture, food processing, horticulture, animal husbandry, micro credit, micro enterprises, etc; Application and content support to the 600,000 Knowledge Centres by providing appropriate content packages based on the rural needs;</td>
<td>All departments of Government to mainstream ICTs; develop digital libraries of data/information based on rural needs and outsource digitisation work to RKCs</td>
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<td></td>
<td>Outsourcing Government services to rural Knowledge Centres (cost saving options to the Government)</td>
<td>Sustainability of rural Knowledge Centres run by ICT-SHG/Community Interest Groups/Representatives of Panchayati Raj Institutions; Greater incentives to initiate Rural Knowledge Centres; wage employment in the 150 districts identified by the Planning Commission</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>A Community Radio Policy</strong> in India</td>
<td>A people-friendly government policy honouring the Supreme Court Ruling in 1995 that airwaves are public property and taking into account the needs of rural India</td>
<td>Ministry of Information and Broadcasting</td>
</tr>
<tr>
<td></td>
<td>Issuing licences to 4000 community radio stations in India (no cost to government; revenue collection in the form of nominal licence fee)</td>
<td>A rural knowledge revolution enabled through community radio; a major benefit of ICT revolution as an additional channel to create awareness about eGovernment and public services to people; a free and fair and relevant community-led information service to users</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial support to establish Rural Knowledge Centres (allocation of Rupees 50 crore)</td>
<td>Support for set-up cost of Rural Knowledge Centres in each Panchayat and village in the country; Bright possibilities of setting up a Knowledge Centre in each Panchayat run by ICT-SHG/Community Interest Groups with support from local Panchayats</td>
<td>Ministry of Panchayati Raj</td>
</tr>
<tr>
<td>12.</td>
<td>Incentives and support to information entrepreneurs (Rupees 100 crore)</td>
<td>Establishment of one million rural academicians as the torch bearers of knowledge society and the facilitators of enhanced rural GDP; Possibilities of setting up 50,000 Knowledge Centres and building capacity among 100,000 rural entrepreneurs.</td>
<td>Ministry of Panchayati Raj</td>
</tr>
<tr>
<td>13.</td>
<td>Setting up of 20000 VKCs in the 150 districts – (Rupees 500 crore in the first year and support for operational costs over a five-year period on tapering basis as per Annexure I)</td>
<td>Incentives to one million resource persons/rural academicians from the ICT-SHG, Community Interest Groups and Panchayat Raj Institutions who run the Rural Knowledge Centres; Set up 20,000 centres in 2005</td>
<td>Ministry of Panchayati Raj or USO Fund under Ministry of Communications and Information Technology</td>
</tr>
<tr>
<td>14.</td>
<td>Establishment of Farmers’ Distress Call Centres in each State (Rupees 100 crore) Setting up of 30 Centres</td>
<td>Information advice to farmers living under stress in drought and suicide hot spots in the identified 150 wage employment districts; Such an effort will save lives of the thousands of farmers in distress; also save these farming communities from accessing credit from unauthorised sources while at the same time offer appropriate advice and support for accessing resources.</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>15.</td>
<td>Low Interest Loan for VKC Operation (Rupees 100 crore)</td>
<td>Incentives to one million resource persons/rural academicians from ICT-SHG, Community Interest Groups and Panchayat Raj Institutions who run the Rural Knowledge Centres; ICT entrepreneurship and employment opportunities for 100,000 people in rural areas.</td>
<td>NABARD and Banking Institutions</td>
</tr>
</tbody>
</table>
Annexure I

Setting up a Village Knowledge Centre

VKC space provided by: Panchayat.

Infrastructure Required:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (in Rupees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer (Multimedia)</td>
<td>50,000</td>
</tr>
<tr>
<td>Printer</td>
<td>7,000</td>
</tr>
<tr>
<td>Modem</td>
<td>3,000</td>
</tr>
<tr>
<td>Scanner</td>
<td>8,000</td>
</tr>
<tr>
<td>Web Camera</td>
<td>6,000</td>
</tr>
<tr>
<td>UPS</td>
<td>3,000</td>
</tr>
<tr>
<td>Telephone Set</td>
<td>3,000</td>
</tr>
<tr>
<td>Software License</td>
<td>10,000</td>
</tr>
<tr>
<td>Electrical Equipments</td>
<td>8,000</td>
</tr>
<tr>
<td>Internet Package</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100,000</strong></td>
</tr>
</tbody>
</table>

Wireless Connectivity

Two phones: Rs. 20,000

**Total: Rs. 1,20,000**

(Government should facilitate providing connectivity through BSNL, ISRO and MIT).

Basic Cost of setting up a Knowledge Centre is Rs.120,000

**Additional Cost**

Power Supply through Generator: Rs.30,000

or

Solar Power: Rs.1,25,000 (possible subsidy from Ministry of Non-Conventional Energy Sources)

Assuming use of generator, **Rs.1,50,000** (Rs.1,20,000 + Rs.30,000) is the **basic cost** for setting up the infrastructure of a VKC.

Minimum Running Cost

Salaries for two - Rs. 6000/- per month = Rs.72,000 per annum

Telephone, Maintenance, Administration @ Rs.2500 per month = Rs.30,000 per annum

Total: Rs.72,000 + Rs.30,000 = Rs.102,000 per annum

**Basic Cost + Running Cost** = Rs.252,000 (Rs.1,50,000 + Rs.1,02,000) in the first year, say **Rs.2,50,000**
Therefore Cost of Setting up and operating a VKC will be Rs.250,000 in the first year.

From the second year there will only be the recurrent cost of Rs.1,00,000 per year.

A provision may be made under the USO Fund or Ministry of Panchayati Raj for setting up 20,000 VKCs in Panchayats in the 150 districts, each VKC catering to a cluster of five villages (population served 10,000 – 12,000).

This will require a one-time allocation of **Rs.500 crore** in the first year. Subsequently the running cost may be met on a tapering basis over a four-year period from the second year onwards, with 20% of the cost being self generated cumulatively in each successive year and the centre being fully self-supporting from the 6th year onwards.

The Centres will be powerful instrument for making the right to information (at the correct time and place) a reality. Content Creation and Capacity building of trainers and users will be additional costs over and above this basic cost. This will have to be met by a pool of agencies (Government, Private Sector, Civil Society Groups) in the initial years and may be coordinated by the District Level Content and Capacity Building Consortia.

(Amounts in Rupees)

<table>
<thead>
<tr>
<th>Per VKC</th>
<th>1st Yr</th>
<th>2nd Yr</th>
<th>3rd Yr</th>
<th>4th Yr</th>
<th>5th Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Cost</td>
<td>150000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td>100000</td>
<td>80000</td>
<td>60000</td>
<td>40000</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20000*</td>
<td>40000*</td>
<td>60000*</td>
<td>80000*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>250000</td>
<td>100000</td>
<td>100000</td>
<td>100000</td>
<td>100000</td>
</tr>
</tbody>
</table>

*Self-generation through fee-based training programmes and services

Total Allocation for 20,000 centres

| 500 cr | 160 cr | 120 cr | 80 cr | 40 cr |
CHAPTER IX

FOOD AND NUTRITION SECURITY

The terms of reference to the National Commission on Farmers call upon the Commission to work out a comprehensive medium-term strategy for food and nutrition security in the country. Based on widespread consultations and on the findings reported in the Food Insecurity Atlases of Rural and Urban India prepared by the M.S.Swaminathan Research Foundation and the U.N.World Food Programme, the following 7-point Action Plan is recommended for inclusion in the Union Budget for 2005-06, under the title “Mission 2007: A Nutrition Secure India”. The Tenth Plan calls for a paradigm shift from food security at the national level to nutrition security at the level of every child, woman and man. NCF suggests the following definition of Nutrition Security: “to ensure physical, economic, social and environmental access to balanced diet and clean drinking water for all and for ever”.

Physical access is a function of production, while economic access is a function of purchasing power based on sustainable livelihood opportunities. Social access calls for gender equity in access to food, while environmental access involves the impact of drought and floods on food availability as well as sanitation and environmental hygiene. Balanced diet demands concurrent attention to protein calorie under-nutrition and to hidden hunger caused by the deficiency of micronutrients like iron, zinc, iodine and Vitamin A in the diet. Adequate nutrition and education are two basic requirements for a healthy and productive life. Malnutrition leads to significant macroeconomic costs. It has been estimated that malnutrition is reducing national GDP by more than 3 percent. Maternal and foetal undernutrition resulting in the birth of babies with low birth weight (2.2 Kgs or below) represents the cruelest form of inequity, since it denies a child even at birth an opportunity for the full expression of the child’s innate genetic potential for physical and mental development. According to the surveys of the National Nutrition Monitoring Bureau, at least 200 million children, women and men suffer from protein-calorie malnutrition. The extent of malnutrition varies among and within States, but is
higher in rural India as well as among women and girl children. There is a close correlation between hunger and poverty and that is why the eradication of hunger and poverty occupies the first place among the U.N. Millennium Development Goals.

**Nutrition Security Action Plan**

a) **Adopt a life cycle approach in the delivery of Nutrition Safety-net programmes under the aegis of Panchayati Raj institutions.**

The principal safety-net programmes currently in operation are the following.

- The targeted PDS designed to provide subsidized foodgrains to all households below the poverty line.

- The ICDS aimed at supplementary nutrition, growth monitoring, nutritional education for pre-school children and expectant/nursing mothers.

- The National Programme of Nutritional Support to Primary Education.

- The National Food for Work Programme in 150 rain-fed districts and the Rural Employment Guarantee Scheme aimed at providing 100 days of employment per household per year.

- The Annapurna Scheme aimed at providing relief for the aged poor (10 Kg. of foodgrains per month per person free of cost)

- The Antyodaya Anna Yojana aimed at the poorest of the poor.

There are also special schemes to promote breast feeding and complementary feeding in the case of infants and to address micronutrient deficiencies like iron, iodine and Vitamin A. **Kishori Shakti Yojana** is a special intervention designed for adolescent girls in the age group 11-18 years using the ICDS infrastructure. A Nutrition Monitoring, Mapping and Surveillance System has been established through ICDS. **A National Nutrition Mission** has been initiated under the Department of Women and Child Development of the Ministry of Human Resource Development.
In spite of all these initiatives, endemic hunger arising from poverty is widespread and seems to be on the rise. The incidence of Low Birth Weight babies is also very high. Hence, there is need to streamline the delivery mechanisms by introducing a horizontal dimension to the numerous vertically structured programmes. The whole life cycle approach will cover the vulnerable sections from birth to death in a holistic manner. Such an integrated nutrition delivery system is best established under the Panchayati Raj institutions. Transaction costs can be reduced by adopting a whole life cycle approach.

b) Fill gaps in on-going programmes.

It is widely recognized that young infants in the age group 0-2 are not reached through ICDS. Yet, this is the stage when brain development is proceeding at a fast pace. Additional support will have to be provided to pregnant and nursing mothers to ensure both adequate foetal nutrition and later, infant nutrition. Another gap which needs to be filled up is the provision of nutrition support to HIV/AIDS-Tuberculosis infected women and men in rural areas. A drug based approach alone is not adequate to help farmers and farm labour regain the necessary strength for working efficiently on the farms. It is suggested that during 2005-06, the following provisions may be made to fill these critical gaps:

- Supplementary nutrition for adolescent girls, pregnant women and infants (0 to 2 years) – 250,000 tons of foodgrains.
- Nutrition support for HIV/AIDS-Tuberculosis affected persons in rural areas – 100,000 tons of foodgrains.

c) Provide Household Entitlement Cards to all eligible persons.

Information empowerment is vital for ensuring that entitlements reach the poor. Access to entitlements can be improved by issuing to all eligible families Household Entitlement Cards which provide precise information on their entitlements to social and nutritional safety net programmes and on methods of accessing them.
d) Introduce an Integrated Food Guarantee Programme, combining the features of the National Rural Employment and Food for Work schemes. Such a programme should be gender sensitive and should enlarge the scope of work in the case of women to include items like organizing and managing crèches and child care centres for working mothers, assisting the Anganwadi Centres in implementing the immunization, health and supplementary nutrition programmes, the management of Food and Fodder Banks, etc. Using foodgrains as cash has the additional advantage of stimulating increased production, since farmers will produce more if the consumption capacity goes up.

e) Promote the establishment of Community Food and Fodder Banks by SHGs, to enable the needy to borrow grain when required and repay soon after harvest. Community Food Banks will also help to widen the food basket by including locally grown millets, legumes and other food crops. Such underutilized or “orphan” crops are also often rich in protein, minerals and vitamins.

An allocation of Rs. 75 crore is recommended for setting up 10000 Food Banks on priority basis in 38 of the 150 districts where the SC/ST population is more than 50 percent, in 2005-06 as discussed in detail in Chapter II. In addition, an allocation of Rs. 25 crore is recommended for setting up Community Fodder banks. Livestock and livelihoods are intimately related and therefore it is equally important to provide for setting up fodder and feed banks in the 150 districts and other arid and semiarid areas. Landless labourers have to essentially depend on stall-fed animal husbandry due to lack of grazing land. Fodder Banks are very crucial in such areas for sustenance of livestock. The limited experience of the M S Swaminathan Research Foundation in setting up community managed Fodder banks in Ladakh shows that they are of great relevance and use to communities in these areas.

f) Launch a home nutrition garden movement for the cultivation and consumption of fruits and vegetables and also link the Horticulture and Dairy Missions with the Nutrition Security programme. High value dairy, fruit and vegetable production and marketing will also lead to an increase in the income of farmers.
g) **Fighting Hidden Hunger**

More than a third of the country’s population, particularly women and children suffer from micronutrient deficiencies, especially Iron, Vitamin A and Zinc. Along with a frontal attack on poverty induced endemic hunger, a movement to eradicate hidden hunger caused by the deficiency of micronutrients in the diet should be launched. All Antyodaya households may be supplied with either a Vitamin premix or multiple fortified salt. The annual cost of such support will be about Rs.200 per family of 5 persons per year. **A provision of Rs.200 crore may be made in the budget for fighting iron deficiency anaemia among pregnant women and other micronutrient deficiencies like zinc, iodine and Vitamin A.** The hidden hunger elimination programme can be implemented through Panchayats and local bodies.

h) **Drinking Water and environmental hygiene**

Clean drinking water is becoming a luxury. It is important that the programmes of the Rajiv Gandhi Drinking Water Mission are implemented with speed, with the active involvement of Panchayati Raj institutions. Provision of toilets and improvement of environmental hygiene and sanitation require utmost priority.

i) **Hunger Free India**

**Set up a National Committee for a Hunger Free India** under the Chairmanship of the Prime Minister, with the Union Minister for Food and Agriculture and Co-Chair, for preparing a road map for launching a **National Food Guarantee Programme**, combining the features of Employment Guarantee and Food for Work Programmes. The National Committee should include in its membership Chief Ministers of States characterized by the high incidence of hunger hot spots.

The aim of the **National Food Guarantee Programme** is to enable every child, woman and man to have an opportunity for a healthy and productive life. While nutritional safety net programmes are a must at present, ultimately, every one should be enabled to earn his or her daily bread. This will call for a revolution in sustainable livelihood opportunities.
If the above programme is implemented with dedication, it should be possible to achieve a substantial freedom from endemic and hidden hunger by 15th August 2007 which marks the 60th anniversary of our independence.
CHAPTER X
LIVESTOCK AND LIVELIHOODS

The livestock sector plays a vital role in the rural economy of India. Also, the ownership of livestock is more egalitarian. Unlike land, the poor own nearly 80% of the livestock. Therefore, livestock and livelihoods have an intimate relationship particularly in arid and semi-arid areas. The most important sector is dairy, which alone contributes approximately Rs 100,000 crore to GDP. Relative to this huge contribution, investment in the dairy sector has been extremely low. The dairy industry provides employment to 18 million people (9.8 million primary and 8.6 million subsidiary employment), not including persons employed in sale, re-processing and transport of animal products at secondary market level. Of these, 70% are women and 67% have no access to land, credit or technology. Of the 70% of rural households that own livestock, the vast majority are either landless or marginal farmers. Therefore, economic development of the dairy industry can be a powerful lever for increasing rural income and employment as well as eradication of poverty.

2. The dairy sector is also vital for abolishing malnutrition and achieving food security. In a country where 42% of the population consume only a lacto-vegetarian diet and most of the rest of the population consume comparatively low levels of animal protein, milk products constitute a major source of protein required for a balanced diet. Per capita milk consumption in India has risen dramatically over the past three decades but still remains 25% below the world average. This figure appears even less adequate in view of the low levels of consumption of non-dairy protein.

The growth of the dairy industry has largely been achieved by the organization of producers processing and marketing cooperatives, the promotion of crossbred stock and delivery of veterinary services. Yet, only 35% of milk production is in the organized sector, which means that most dairy farmers lack access to these critical services. At the same time 70% of India’s milk production is generated by only seven States, indicating
that there is still substantial scope for extending the White Revolution to low production regions.

While India’s total milk production is the highest in the world, productivity per animal is extremely low by international standards. Milk yields of indigenous animals range from a high of 7.5 kg per day in Gujarat to 5 kg or less in some areas. Yields of breedable cows remain more than 60% below world averages and a third to two-thirds lower than average yields in most developed countries. The most important factors contributing to the low yields are the poor genetic stock of the milch cows and the lack of nutritious fodder and feed. In spite of an extensive breeding programme, out of approximately 220 million cattle in the country, only about 10% are cross-bred.

The most significant deficiency in the dairy industry is what the Planning Commission’s Working Group on Animal Husbandry & Dairying termed the “alarming gap between supply and demand” for fodder. It is estimated that current levels of fodder production are sufficient to meet the needs of only 47% of India’s animal population. Total production of dry and green fodder in the country is approximately 900 million tonnes. Even assuming that the entire quantity is used for feeding the cattle population, it works to only 10 kg per animal per day, as against a requirement of 35-40 kg for optimal milk production. Put simply, India’s animal population is grossly underfed.

3. The primary cause for this deficit is the lack of a well-organized system for production and distribution of nutritious fodder crops. Crop residues such as paddy straw, which constitute the major portion of animal feed, lack the nutritional content required for healthy growth and high productivity. The portion of harvested crop residues is also declining with the spread of mechanized harvesting. These are however opportunities for enriching rice straw and other cellulosic material with urea and molasses.

The area under permanent pastures is declining and productivity is falling due to overgrazing. The greatest potential for increasing the availability of nutritious fodder is by intensive cultivation of hybrid fodder crops. Few farmers recognize that the cultivation of enriched fodder grasses can be as remunerative as sugarcane cultivation and not subject to the same vagaries and fluctuations as the sugar industry. High yielding
varieties of fodder such as Bajra-Napier Hybrids and Lucerne in combination can yield about 400 tonnes per ha. under irrigated cultivation and return a net profit of Rs 35,000 per ha. or more on a cultivation cost of Rs 10,000 to 12,000. Since even small areas can be cultivated, even marginal farmers can generate high incomes from this crop. Fodder grasses can also be cultivated as an intercrop with jatropha or as a dryland crop, returning a net income of Rs 7500 per ha. Dairying and fodder production combined offer enormous potential for raising farm incomes on irrigated lands. Sylie-pastoral systems are ideal in many semi-arid areas.

The enormous economic potential of cultivated fodder production has been obscured by the fact that the buyers for fodder are among the poorest section of the population. The absence of an organized market for bulk quantities of fodder grass has been a significant deterrent to widespread commercial cultivation of fodder crops. This can be remedied by utilizing the dairy cooperatives as marketing and distribution organizations for fodder crops. A contract farming model can be developed by the dairy industry similar to the system of registered crops adopted by the sugar industry. This can provide access to bank credit, quality inputs, an assured floor price and guaranteed market for fodder growers. At the same time, the dairy cooperatives can agree to supply fodder grasses to their members in exchange for milk supplied, ensuring a ready channel for distribution and a means for impoverished dairy farmers to finance the increased dietary inputs required to raise their milk production and incomes. Loans for procurement of milch animals can also include a allocation for supply of fodder in kind and in exchange for milk through the local dairy cooperative.

Landless agricultural labour families can take to stall-fed animal enterprises, provided they are helped through Fodder and Feed Banks. In the cold desert area of Ladakh, fodder is a major constraint for Pashmina sheep. The establishment of Fodder and Feed Banks can help to promote higher productivity of sheep.

4. Business Plan for Fodder Development

1. Objective:
   a. Increase productivity of milch cows through improved nutrition.
b. Raise the incomes of dairy farmers.

c. Introduce leguminous fodder crops like berseem and lucerne in the rotation.

d. Raise the production of fodder in the country by 50 percent.

2. Strategy:

a. Introduce a contract farming system for fodder production by which dairy cooperatives and private dairies register cultivation of fodder crop lands in the same manner that sugar factories register sugarcane.

b. A tie-up between the dairies, the growers, financial institutions and input suppliers can ensure timely access to credit, quality inputs provided in kind and an assured market at remunerative prices.

c. Dairies can also be required to operate nurseries for the production of fodder seeds.

d. Veterinary and Animal Science Universities should help to establish Farm Schools for providing integrated training on breeding, feeding, management of diseases and marketing.

3. Actions Required by Government:

a. Field level demonstration plots should be established in all dairy regions to demonstrate the productivity and profitability of hybrid green fodder crops and fodder legumes and popularize their cultivation.

b. Establish a mandatory requirement for all dairy cooperatives to contract with farmers for production of fodder equivalent to 25% of the estimated total consumption of fodder by cooperative members.

c. A Livestock Food Corporation may be set up jointly with NDDB, SFAC and NABARD to stimulate and support SHGs in the production and consumption of nutritious fodder and feed by large and small ruminants.
d. The production of quality fodder seed could be outsourced to private growers on a buy-back arrangement, subject to quality certification of the seed by appropriate government agencies.

e. Special bank credit schemes should be made available to dairy farmers whereby they can obtain loans for fodder in kind on a daily or weekly basis in exchange for payment or delivery of milk.

f. NDDB can help to organise Farm Schools for Dairying in the farms of outstanding farm women and men who have mastered the science and dairy farming.

5. **Poultry Farming**

In the past, several small-scale, rural poultry units, promoted under the Integrated Rural Development Programme (IRDP) and other employment-oriented schemes have not been so successful, mainly due to:

a. Uneconomical size of the farms

b. Lack of training

c. Inadequate technical support

d. Inadequate marketing support

e. Absence of proper financial/managerial guidance

To overcome these deficiencies and to help the small scale rural poultry units operate successfully, we propose the concept of **Poultry Estates**.

The salient features of this concept are as under:

a. There would be a Central Unit – a Mother Unit – located in a cluster of villages.
b. Under the umbrella of this mother unit, there would be several small Production units, each owned and managed by an individual farmer or a single family or a self-help group.

c. The mother unit would take care of all the critical aspects of the operations like, brooding and rearing up to point of lay, vaccination etc. and then supply the ready – to – lay birds to the individual entrepreneurs.

d. The participants would then take care of the simple aspects of the operation like feeding and watering of the birds, and collection of eggs.

e. The mother unit would also prepare and supply balanced feed; provide technical assistance; and marketing support.

f. The mother unit would also handle the finance i.e. it collects the eggs, markets them; and out of the proceeds, after deducting the cost of birds, feed, etc., and repayment to the bank, would pay the balance to the concerned small scale poultry farmers.

The concept of Poultry Estate thus involves decentralised production supported by key centralised services in such areas as breeding, feed production, disease management and marketing.

6. General Recommendations

There is urgent need for launching a Sanitation Literacy programme among all engaged in farm animal rearing (cows, buffalos, sheep, poultry) to avoid infection of milk or eggs with Salmonella or other mycotoxin producing organisms. If the sanitary conditions under which farm animals are reared are not improved, it will not be possible for us to capture or retain external markets.

Eternal vigilance is the price of a stable and successful livestock industry. It is important to screen rigorously imported animal products for pathogens which could spell disaster to our farm animals including poultry. SPS measures should be such that invasive alien species of pests and pathogens do not get entry into India.
CHAPTER-XI

BEYOND TSUNAMI: SAVING LIVES AND LIVELIHOODS

Recommendations for Alleviating Fisher and Farm Families’ Distress and for Rehabilitation

1. The Prime Minister has rightly stressed that every calamity presents also an opportunity for equipping ourselves to face with greater confidence and competence similar calamities in the future. The Government of India has announced that a Tsunami Early Warning System as well as a National Disaster Management Authority will be set up soon.

2. Relief measures are in progress on an unprecedented scale, thanks to intensive and extensive efforts by the Central and State Governments, national and international Civil Society Organisations (NGOs), Private and Public Sector Industry, academia, the mass media and bilateral and multilateral donors.

3. Fifteen days after the titanic Tsunami hit our coast and islands, we are in a position to begin rehabilitation efforts in three time dimensions.

A. **Immediate (January – March, 2005)**
   - Water, shelter, sanitation, health and revival of livelihoods.
   - Psychological rehabilitation
   - Repair of catamarans
   - Achieving convergence and synergy among all on-going programmes with similar objectives *(this is an urgent task)*

B. **Medium Term (2005-07):**
   - Ecological rehabilitation
• Agronomic rehabilitation
• Economic rehabilitation
• Disaster preparedness, mitigation and management

C. **Long Term (2005-10):**

• Strengthening environmental defense systems

• Enlarging opportunities for sustainable livelihoods based on a pro-nature, pro-poor, pro-women orientation to technology development and dissemination.

• Improving the productivity, profitability and sustainability of agriculture and fisheries.

A. **Immediate:**

**Psychological Rehabilitation:**

It will be necessary to form teams of men and women psychiatrists and trauma counsellors who can cover the severely affected areas during the next few weeks to bring comfort and confidence to those who have lost their dear and near ones. Fishermen will have to be assisted in overcoming their fear of the sea. Farmers also need technical help and moral support. The professional / counseling sessions could be organized by appropriate civil society organizations in association with Panchayats. Those living in relief camps need particular attention. To the extent possible, destitute women and orphaned children should be rehabilitated in their own community and should not be herded in destitute homes, either old or new.

**Livelihood Rehabilitation:**

*A Special Food for Livelihood Revival and Eco-protection programme* should be initiated immediately in all the affected areas. Such an open-ended Food for Work Programme, which can be sanctioned for a year in the first instance, **should aim to create assets for the Tsunami ravaged families**, and should not solely be community centred, as in the
case of normal Food for Work programmes. The concept of work under this special programme should include items such as:

a. Rebuilding houses
b. Repairing and building fishing boats and vessels
c. Rebuilding jetties, access roads and market yards
d. Rebuilding schools
e. Rebuilding health care centres
f. Establishing day care centres and crèches for children
g. Eco-restoration programmes like rehabilitation of mangrove wetlands and reclamation of soils inundated with sea water.

The precise priorities can be developed for each village in consultation with local Panchayats and affected families. **It is suggested that about 300,000 tonnes of food grains may be allotted immediately for this special programme,** which will allow Tsunami affected families to have access to food while they are rebuilding their lives and livelihoods, as well as essential infrastructure for human resource development.

**B. Medium and Long-term:**

These programmes should cover all families along the coast – both fisher and farming families, including the families of those who have no assets like land, livestock or fish pond. They fall under three broad groups.

i. **Strengthening the ecological foundations of sustainable human security:**

This programme will include the following:

a. Initiating a coastal *Bio-shield* movement along coastal areas, involving the raising of mangrove forests, plantations of *casuarina, salicornia, laucaena, atriplex,*
palms, bamboo and other tree species and halophytes which can grow near the sea. They will serve as speed-breakers under conditions of coastal storms, cyclones and Tsunami. They will in addition serve as carbon sinks, since they will help to enhance carbon sequestration and thereby contribute to reducing the growing imbalance between carbon emissions and absorption. Mangroves are very efficient in carbon sequestration. They also promote sustainable fisheries by releasing nutrients in the water. In addition, they will provide additional income and make coastal communities eligible for carbon credit.

The Coastal Bio-shield can also involve agro-forestry programmes, like the intercropping of casuarina with hybrid pigeon pea (cajanus cajan) or Red gram, to be undertaken by farming families. Thus, the Bio-shield movement will confer multiple benefits to local communities as well as to the country as a whole.

b. **Promote Peoples’ Participation** in the conservation and enhancement of mangrove and other coastal wetlands, as well as coral reefs and coastal and marine biodiversity.

*A Participatory Mangrove Forest Management Programme* on the basis of the guidelines already developed by the M S Swaminathan Research Foundation (MSSRF) should be introduced. The Joint Mangrove Forest Management is based on the successful model of Joint Forest Management already in progress in most parts of India. The super cyclone havoc in Orissa and the current Tsunami tragedy have created widespread awareness among the people on the role Mangrove forests play in reducing the fury of cyclonic storms and tidal waves.

c. Promote the organization of *Community nurseries* of Mangrove species and other appropriate tree species chosen under the coastal Bio-shield and agro-forestry programmes. Techniques for raising such nurseries have been standardized by MSSRF. Community nurseries can be raised under the auspices of both Forest Departments and Panchayats. Where appropriate, such nurseries can be raised on
the basis of a buy-back arrangement. Farm families can raise nurseries / produce seeds of crops chosen for the agro-forestry programme.

d. **Regeneration of Fisheries and fostering a sustainable fisheries programme:**

The new fishing vessels and nets should be designed in a manner that they do not disrupt the fish life cycle by catching young ones and also do not destroy seagrass beds, which serve as habitats for dugongs. The calamity provides an opportunity for achieving a paradigm shift from unsustainable to sustainable fisheries.

e. **Raising artificial coral reefs:**

The work done in the Gulf of Mannar area indicates that artificial reefs can stimulate fish breeding and revival. These can be laid and managed by fisher self-help groups (SHGs). NABARD can develop a special programme to promote the growth of such SHGs.

f. **Managing Marine Biosphere Reserves in a Trusteeship Mode:**

A trusteeship pattern of management of coastal bio-resources should be fostered. This will help local communities and government departments to manage unique biological resources in a trusteeship mode, *i.e.* people considering themselves as trustees of such assets with a commitment to conserve them for posterity. A beginning has been made in the Gulf of Mannar Marine Biosphere Reserve, but this system needs to get institutionalized all along the coast as well as in the Andaman and Nicobar and Lakshadweep group of islands.

g. **Housing for Fisher families:**
The new houses should respect the 500 meter restriction and should be cologically designed. If all fisher folk had their housing sites on the landward side of coastal roads, the death toll as a result of Tsunami would have been much lower. Anticipatory action against sea level rise also demands a human security driven design of coastal habitations. A group of architects should be assembled for this purpose immediately.

h.  *Construction of sea walls and dykes:*

The construction of permanent sea walls can be taken up in places where there is sea erosion due to heavy anthropogenic pressures. The locations for such non-living barriers should be determined on the basis of a carefully conducted erosion vulnerability analysis.

i.  *Agronomic rehabilitation : Reclamation of salinised soils:*

Sea water ingress has led to soil salinisation in some areas. A scientific Team consisting of representatives of Agricultural Universities, ICAR (Central Soil Salinity Research Institute) and CSIR may be set up to survey the areas, study the nature and severity of the problem and suggest remedial measures. **This should be done within the next two months, so that farmers are able to resume normal farm operations without losing a crop season.**


The serious loss of life and property caused by Tsunami highlights the vision and wisdom of Smt Indira Gandhi when nearly 24 years ago, she took steps to ensure that no permanent construction is permitted within 500 meters of the high tide. We should not only strengthen this national resolve, but also **develop a code of conduct for construction beyond 500 meters.** Such a code can consist of a
package of rewards for initiatives in the areas of sunward oriented buildings, energy efficient construction, use of wind / tidal / solar energy, rainwater harvesting, use of local construction material, effluent treatment and use of biodegradable material. The coastal ecological security literacy programme should bring to the attention of builders the opportunities now available for mainstreaming ecology in building design and construction.

k.  

**Vulnerability Mapping:**

Based on an analysis of 100-year data, the areas prone to cyclones and other natural disasters can be mapped. Priority may be given to such areas in erecting bio-shields and in undertaking eco-restoration and erosion prevention measures. Human and agricultural vulnerability to potential changes in sea level should also be mapped. A Consortium of R & D institutions set up by the Department of Ocean Development, Department of Science and Technology, and the Indian Meteorological Department, Government of India, should take up this task immediately.

k.  

**Sustainable Management of Coastal Land and Water Resources:**

Scientific land and water use planning will have to be done to prevent salinisation of ground water. Land and water use patterns based on principles of ecology, economics and social and gender equity will have to be prepared by Panchayats with the help of ICAR (National Bureau of Soil Survey and Land Use Planning), the concerned Farm University and the Forest, Fisheries and Agriculture Departments of State Governments.
ii. Rehabilitation of Livelihoods and fostering sustainable livelihood security:

The sustainable livelihood security strategy should be based on the principles of *social inclusion and gender equity*. They should cover both fisher and land based farming communities as well as landless labour families. The following steps are needed:

a. *Aquarian Reform:*

This is essential to foster harmony in the use of living aquatic resources by artesenal fishermen operating catamarans, and commercial families operating mechanized fishing boats and trawlers. The major aim of the Aquarian policy should be:

- Conservation of living aquatic resources
- Sustainable use
- Equitable sharing of benefits
- Harmony between artesenal and mechanized fishing.

b. *Integrated capture and culture fisheries : Sea Water Farming:*

Fisher families, particularly women, can take to the rearing of prawns and suitable salt tolerant fish species in canals along the sea coast, using low external input sustainable aquaculture (LEISA) techniques. Agro-aqua farms involving the concurrent cultivation of tree species and rearing of fish and prawns can be promoted to enhance income and employment opportunities. The Tsunami tragedy should lead to the emergence of new sea farming communities, well versed in both production and post-harvest technologies, quality management and value addition.
c.  *Establishment of Coastal Biovillages:*

The economy of coastal villages can be strengthened through the biovillage model of rural development. This involves the sustainable use of natural resources and introduction of market driven non-farm enterprises as well as value addition to primary products. It also involves a paradigm shift from unskilled to skilled work, resulting in the addition of economic value to time and labour. The micro-enterprises chosen for being undertaken by SHGs with micro-credit support should be based on both value addition to under-utilised resources and market demand. The coastal Biovillage movement to be fostered by Panchayati raj institutions should be based on a pro-nature, pro-poor and pro-women orientation to enterprise development and adoption. An important component of coastal biovillages should be the establishment of *Aquaculture Estates* which can help to confer the power of scale to fisher families in the production, processing and marketing of fish.

d.  *Establishment of a coastal grid of Farm Schools and Demonstration Centres:*

Farm and Fisher families practising the use of natural resources based on principles of ecological economics can be chosen for establishing Farm Schools. Lateral learning among farmers and fisher families will be more effective than formal institutional learning. Both can go together. Demonstration of environmentally sound sea farming techniques should also be organized.

iii.  *Network of Rural Knowledge Centres (RKC):*

The crucial importance of timely information is now widely recognized in minimizing the loss of life caused by disasters like Tsunami. *It is therefore essential that a network of Rural Knowledge Centres is established all along the coast as soon as possible.* Such RKC's will use in an integrated way the internet, community (FM) radio, cable TV and the vernacular press. They will provide
both generic and dynamic information and will help to disseminate locale-specific and demand driven information. They will also serve as an integral part of the National Early Warning system. They can empower fisher, farm and other coastal inhabitants with information on their entitlements to government programmes and attend to other essential needs relating to education, health, weather and market.

*Training should be imparted* in disaster preparedness and management, as well as in trade and quality literacy. Food safety issues and codex alimentarius standards should be highlighted in the training programmes. Even if there is an efficient early warning system, the information will have to reach the unreached, particularly fishermen in sea. Therefore, a network of community radio (FM) centres will have to become an integral part of the coastal area knowledge connectivity. The policy support needed for this programme has already been described and spelt out in detail in Chapter VIII of the Report.

iv. **Resource Centres for Capacity Building:**

There is need for establishing a network of capacity building centres along the coast. A Resource Centre for Mangrove Forest Conservation, rehabilitation and expansion is urgently needed. There is need for preparing training modules in local languages on a wide range of topics relating to both ecological and livelihood security. Training programmes will have to be organized for SHGs who wish to take up work in the areas of raising community nurseries, eco-restoration, reclamation of salt affected soils, market-led enterprise development and managing Rural Knowledge Centres.

Education, social mobilization and regulation will have to become the pillars of the coastal ecological and livelihood security systems. The RKC’s will provide an opportunity to professionals for sustained engagement with local communities.

v. **Conclusions:**
The Tsunami disaster has provided an unique opportunity for launching through public-private sector partnership an integrated psychological, ecological, agronomic and livelihood rehabilitation programme. To succeed, such programmes should be people centred and managed by local communities with appropriate guidance and support from government and panchayati raj institutions. Government agencies, academia, and local communities should jointly develop Integrated Coastal Zone Management plans which would help to transform sustainable development from a desirable objective into a practical reality.
MSS/DB/
15 January 2005

Hon.ble Shri Manmohan Singh
Prime Minister of India
Prime Minister's Office
New Delhi 110 001

Dear Dr. Manmohan Singh

Sub: Reports of the National Commission on Farmers (NCF)

The National Commission on Farmers (NCF) submitted last month its first report titled “Serving Farmers and Saving Farming” dealing with ten urgent issues. Early this month, NCF also finalised its recommendations for assisting fisher and farm families affected by the Tsunami disaster to regain their livelihoods. This report titled, “Beyond Tsunami: Saving Lives and Livelihoods” was forwarded to you last week.

For facilitating speedy decisions on items for which financial provision is needed in the Union Budget for 2005-06, as well as items relating to policy and administrative reforms, I enclose a concise statement. In my view, the agrarian crisis will get aggravated if action is not taken on these recommendations. The six basic principles which have guided our recommendations are:

- Affordability.
- Actionability.
- Accelerated agricultural progress through bridging the wide gap between prevailing scientific know-how and field level do-how.
- Assisting Government to maximize the social impact and benefits of its numerous ongoing programmes involving large financial outlays through convergence and synergy in delivery systems.
- Assisting farm families to maximize the benefits of their resource endowments in the areas of land, water, labour and capital.
• Promoting a symbiotic alliance with rural families by implementing the provisions of article 243G of the 11th schedule of Constitution 73rd Amendment Act of 1992.

With warm regards,

Yours sincerely,

M S Swaminathan

Encl: a/a
National Commission on Farmers (NCF)

Recommendations needing urgent attention and action in the Union Budget for 2005-06

Details are contained in the Report “Serving Farmers and Saving Farming” submitted in December 2004.

Chapter-II

1. Assisting local communities to establish 10,000 Community Grain Banks in the hunger hot-spots in the 150 districts identified for the National Food for Work Programme – Outlay: Rs. 75 crore.

2. Parivar Bima and other policies for healthcare, accidents and loss of property – Outlay: Rs. 260 crore.

3. Rural Insurance Development Fund – Outlay: Rs. 50 crore.

   Recommended total Allocation: Rs. 385 crore.

Chapter-III

4. Water for Agriculture

   - Implement a Million Wells Recharge Programme during 2005-06, by providing a rebate in the rate of interest provided under the enhanced agricultural credit programme.

   - Restoring water bodies and promoting water harvesting – Outlay: Rs. 70 crore for fostering a community water saving and sharing movement.

5. Soil Health Enhancement

   Establish a National Network of advanced soil testing laboratories capable of testing large volumes of soil samples for 16 macro and micronutrients – 1000 laboratories in all parts of the country, with 500 of them being located in dry farming areas, where there is scope for doubling average yields immediately through addressing the deficiencies of micro-nutrients in the soil, in addition to attending to the needs for N, P & K. Cost Rs. 50 lakhs per laboratory – Outlay: Rs. 500 crore.
6. Bridging the growing gap between scientific know-how and field level do-how:

Establish 50,000 Farm Schools in the farms of farmer-achievers who have mastered the art and science of enhancing the productivity, profitability and sustainability of crop and animal husbandry, horticulture, fisheries and agro-forestry. Such farmer to farmer learning has the added advantage of mainstreaming cost-risk-return considerations in farming, since the experience of fellow farm men and women has higher creditability. Government contribution will be in the form of support to the construction of hostels in the farms of participating Farmer Trainers and some remuneration for the time and efforts of the farm family. Provision will also have to be made for the travel, boarding and lodging expenses of farmer-trainers. Priority may be given to horticulture, pulses, oilseeds, millets, tuber crops, medicinal plants, cotton, dairy and poultry farming and inland and coastal fisheries – Outlay: Rs. 150 crore.

7. Capacity building in post-harvest technology and value addition:

A post-harvest technology wing may be added to the existing Krishi Vigyan Kendras (KVK), in order to bridge the huge gap between production and post-harvest technologies, particularly in horticulture resulting in considerable post-harvest losses as well as loss in opportunities for value-addition – Outlay: Rs 100 crore.

8. Enhancing yield, income and employment in dryland farming areas

- 2000 Largescale Farming systems demonstrations.
- 3000 factor demonstrations to introduce new implements, hybrid arhar and new agronomic practices, particularly the application of micronutrients.
- 6000 Small holders Estates.
- 1500 Seed Banks

Outlay: - Rs. 230 crore.

**Recommended total Allocation: Rs 1050 crore**

Chapter-IV

9. New Deal for Women in Agriculture

- Ensuring women’s access to credit, including Kisan Credit Cards.
- Gram Panchayat Mahila Fund. Outlay: Rs 200 crore
- Childcare and other support services for women in agriculture.
- Supplementary nutrition for 0-2 years age group children. Outlay: Rs 500 crore
- Support to Women Self-Help Groups. Outlay: Rs 25 crore
- Engendering the curriculum of Agricultural Universities etc. Outlay: Rs 1 crore

**Recommended total Allocation: Rs. 726 crore.**
Chapter-V
10. Strengthening and expanding the Horticulture Revolution

- Small Farmers’ Horticulture Estates
- Post Harvest Management.
- Production of good quality seeds and planting materials.
- Imparting quality literacy.

Provision for these items will have to be made in the National Horticulture Mission already proposed by the Ministry of Agriculture.

Chapter-VI
11. Enhancing national competitiveness in Cotton

- Organisation of 100 Small Farmers’ Cotton Estates, each covering 1000 ha. Outlay: Rs 175 crore
- Integrated Technology. Demonstrations including value addition to cotton biomass. Outlay: Rs 75 crore
- Appointment of an overall Mission Director to coordinate the activities in progress under 4 Mini Missions

**Recommended total Allocation: Rs. 250 crore (in addition to the provision for the Cotton Technology Mission).**

Chapter-VII
12. Strengthening Sanitary and Phyto-sanitary Measures

Imparting quality and trade literacy, meeting **codex alimentarius** standards and preventing the introduction of invasive alien species

**Recommended total Allocation: Rs.60 crore.**

Chapter-VIII
13. Every Village a Knowledge Centre

- Mobilizing Information Communication Technologies (ICT) for the knowledge empowerment of rural families in areas relating to weather, water, health, education, nutrition, agriculture, markets and government entitlements through Village Knowledge Centres. Outlay: Rs 750 crore

- Establishment of a National Digital Highway for Rural Livelihood Security. Outlay: Rs 100 crore

- Establishment of Farmers’ Distress Call Centres. Outlay: Rs 100 crore
• Establishment of 20,000 Rural Knowledge Centres. Outlay: Rs 500 crore

  **Recommended total Allocation: Rs.1450 crore (most of it from the USO fund)**

**Chapter-IX**

14. Hunger-free India

• Supplementary nutrition to adolescent girls, pregnant women and 0-2 age group children. Outlay: 2.5 lakh tonnes of foodgrains

• Nutrition support to HIV/AIDS and Tuberculosis affected children, women and men. Outlay: 1.0 lakh tonnes of foodgrains

• Elimination of hidden hunger caused by the deficiency of micro-nutrients. Outlay: Rs 200 crore

• Establishment of Community Food & Fodder Banks. Outlay: Rs 25 crore for fodder Banks

  **Recommended total Allocation: Rs.225 crore and 3.5 lakhs tonnes of foodgrains.**

**Chapter-X**

15. Livestock and Livelihoods

• Organisation of a Livestock Food Corporation of India. Outlay: Rs 100 crore

• Establishment of Small Farmers’ Poultry Estates

  **Recommended total Allocation: Rs.100 crore**

**Chapter-XI**

16. Beyond Tsunami: Saving Lives and Livelihoods

• Food for Livelihood Revival and Eco-protection programme – 300,000 tonnes of food grains.

• Psychological, ecological, agronomic and economic rehabilitation programmes – Fostering a Coastal **Bio-shield** programme for minimising the fury of cyclonic storms and tidal waves.

• Fostering a **Coastal Biovillage Movement** for providing multiple livelihood opportunities.

• Organising a network of Rural Knowledge Centres in Coastal villages.
Aquarian Reforms for promoting sustainable fisheries (funds to be provided under the various rehabilitation programmes now being planned).

**Recommended total Allocation: Rs 3 lakh tonnes of food grains and funds provided for rehabilitation.**

M S Swaminathan  
Chairman, NCF  
15 January  
2005
Summary of the financial implications (2005-06)

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<td>c) Soil Health Enhancement</td>
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<td>d) 50,000 Farm Schools in the fields of farmer-achievers</td>
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<td>f) Largescale demonstrations of dryland farming technologies, overcoming micronutrient deficiencies in the soil, organisation of farmers’ groups, establishment of seed banks and popularisation of hybrid <em>arhar</em></td>
<td>Rs. 230 crore</td>
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<td>Hunger-free India</td>
<td>Rs. 225 crore and 3.5 lakhs tonnes of food grains</td>
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National Commission on Farmers (NCF)

Maximising the benefits of ongoing Government Programmes

Summary and Suggestions for Policy and Management Reform

(Details are contained in the Report)

1. Organise a **S&T Alliance** for Rural Livelihood Security for providing technical backstopping to the National Food for Work and Rural Employment Guarantee programme.

2. Form a **National Federation of Farm Technology Missions**, chaired by a **practising farmer** to bring about convergence and synergy among numerous on-going Technology Missions, with a watershed serving as the hub for the fusion of action under diverse programmes.

3. Set up a multi-stakeholder National Steering Committee to oversee the development of rural and agricultural insurance.

4. Set up a **Commission for Sustainable Livelihood Security in Dry Farming Areas**, headed by a farmer-achiever.

5. Establish a **National Board for Women in Agriculture**, chaired by the Union Minister for Food and Agriculture, with Union Ministers for Women and Child Development and Panchayati Raj serving as Co-chairs.

6. Establish a multi-stakeholder **National Horticulture Council** with Union Minister for Agriculture as Chairman.

7. Set up a **National Cotton Council** with the Union Minister for Agriculture as Chairman and the Union Ministers for Textiles and Commerce as Co-chairs.

8. Redefine and enlarge the role of the Cotton Corporation of India.

9. Establish a **Food Safety Council of India** with the Union Minister for Food and Agriculture as Chairman and the Union Ministers for Health and Commerce as Co-chairs.

10. Develop a new policy to encourage the spread of **Community Radio (FM)** in rural areas and organise a **National Digital Gateway for Rural Livelihood Security**.
11. **Set up a National Committee for a Hunger-free India** under the chairmanship of the Prime Minister, with the Union Minister for Food and Agriculture as Co-chair for preparing a road map for launching a **National Food Guarantee Programme**, combining the features of the Employment Guarantee and Food for Work programmes on 15 August 2007, which marks the 60th Anniversary of our Independence. The National Committee for a Hunger-free India should include in its membership Chief Ministers of States characterised by the high incidence of hunger hot spots.

12. Set up a Committee under the chairmanship of Union Home Minister, to monitor progress in the implementation of the integrated rehabilitation strategy suggested by NCF for Tsunami affected regions.

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M S Swaminathan  
Chairman, NCF  
15 January 2005
National Commission on Farmers
Serving Farmers And Saving Farming
From Crisis to Confidence
SECOND REPORT

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TERMS OF REFERENCE
FOR
NATIONAL COMMISSION ON FARMERS

◆ Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.

◆ Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

◆ Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

◆ Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

◆ Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

◆ Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

◆ Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.

◆ Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

◆ Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

◆ Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.
The Commission is to submit a medium term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as soon as practicable and in any case on or before 13th October, 2006. The Commission, however is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

[Ministry of Agriculture Resolution No.8-2/2003-Policy(ES) dated 18th November, 2004]
COMPOSITION OF THE
NATIONAL COMMISSION ON FARMERS

The composition of the reconstituted National Commission on Farmers is as under:-

Chairman
Prof. M.S. Swaminathan

Full-time Members
Dr. Ram Badan Singh
Shri Y.C. Nanda

Part-time Members
Dr. R.L. Pitale
Shri Jagadish Pradhan
Ms. Chanda Nimbkar (Yet to join)
Shri Atul Kumar Anjan

Member Secretary
Shri Atul Sinha

[Ministry of Agriculture Resolution No.8-2/2003-Policy (ES) dated 18th November, 2004]
EXECUTIVE SUMMARY

CHAPTER 1 - FROM CRISIS TO CONFIDENCE

Our agriculture is in a state of serious crisis. The rate of growth in food production has fallen below population growth rate. To achieve a 4% growth rate in agriculture, we must aim at a 8% growth rate in horticulture and animal husbandry. This calls for higher investment in irrigation, animal husbandry, fisheries, post-harvest technology, rural energy supply and communication. The investment in agriculture has stagnated at 1.3% of GNP during the last three Five Year Plans. If we place faces behind figures, over 400 million children, women and men belonging to families with small and marginal holdings, as well as landless labour families are in deep distress.

2. Several solutions offered in our first report on implementing a Million Wells Recharge Programme, establishing a network of advanced soil testing laboratories, setting up Farm Schools in the fields of farmer achievers, strengthening the post-harvest technology and quality literacy wings of KVKs, organizing Small Holders Horticulture Estates and Cotton Estates to harness the economies of scale, large scale demonstrations to initiate a productivity revolution in pulses, setting up a Livestock Feed Corporation of India, convergence of appropriate Technology Missions around a Watershed or the command area of an irrigation project, need to be implemented without further delay.

3. Enhancement of small farm productivity coupled with assured and remunerative marketing opportunities is the most effective means of reducing rural poverty. Among the immediate steps needed to prevent farmers’ suicides are - credit reform to enhance the total amount available for farm loans, a reduction in interest rates, linkages with technology and market and reduction in dependence on the informal sector for loans; a corpus (on the line of calamity funds) for assisting farmers affected by crop losses; expansion of crop insurance to cover the entire country and all crops; Cultivation of water intensive cash crops in “dark and grey zones” should be regulated; there should be appropriate legislation to regulate and deter the sale
of spurious seeds and chemicals; implementation of MSP for coarse cereals and pulses, which are the primary crops in rainfed drylands across the country;

5. It would be prudent to introduce a Farmers’ Livelihood Security Compact, consisting of the following integrated package of measures:
   i) Set up State level Farmers’ Commission for the purpose of ensuring dynamic government response to farmers’ problems.
   ii) Conduct Census of Suicides to have a proper understanding, assessment of reasons and count of suicides
   iii) Initiate a Paradigm shift from Micro-finance to Livelihood Finance
   iv) Debt survey to take into account newer forms of credit and indebtedness and newer forms of bondage
   v) Decide on cut-off for Debt waiver in consultation with Panchayats and farmers’ representatives in the distress hotspot areas.
   vi) Examine revival of lapsed insurance policies; there are provisions in the insurance laws that allow LIC to revive them.
   vii) The integrated family insurance policy (Parivar Bima) recommended by NCF in its first report deserves to be examined and introduced to begin with, in dry farming areas.
   viii) Revision in import policies, measures to expand farm exports and conduct of quality literacy programmes.
   ix) Swift action to overhaul the ryuthu bazars or farmers’ markets. Most of these are presently controlled not by farmers but by traders, from whose control they must be released. There is also need for introducing focused Market Intervention Schemes (MIS) in the case of life-saving crops such as cumin in arid areas.
   x) Agricultural and Animal Sciences Universities could form Hope Generation Teams (like NSS) of young male and female students who could stay in the distress villages during vacations and extend both technical and psychological support.
   xi) There is need for establishing Village Knowledge Centres (VKCs) in the farmers’ distress hotspots operated to the extent feasible by the wives or children of the farmers who had unfortunately taken their lives. These VKCs could be linked to a Block level Village Resource
Centre (VRC) with the help of the Indian Space Research Organisation (ISRO). The VRC-VKC grid could provide dynamic and demand driven information on all aspects of agricultural and non-farm livelihoods.

6. The NCF supported Travelling Workshop for **Agronomic Rehabilitation of Tsunami affected coastal agriculture** has made detailed recommendations in the areas of Soil Health Restoration, Desirable Cropping Systems, Crop Diversification and Promotion of Multiple Livelihoods and initiation of “Beyond Tsunami” Agricultural Rehabilitation Demonstration programme. Funds for the Demonstration cum Training programme may be provided from the Tsunami Relief Allocation. This will have to be done immediately, if the problems of the tsunami affected farmers are to be solved and their livelihoods revived.

7. **Indo-US Collaboration in Agronomic Rehabilitation Strategy** - The GreenLine Group, a group of scientists, professional, and technical experts from the US has offered to work closely with scientists in India and seeks a site in Tamil Nadu where they can help to start work on 100 ha of farmland. This can become an important programme to promote sharing of knowledge and technology. The timing of this project is critical to launch at the beginning of the October monsoon season. We suggest that Rs.1 crore be allotted for this collaborative programme from the Prime Minister’s Relief Fund.

8. We envisage that knowledge connectivity should be a key component of the Bharat Nirman programme designed to provide a New Deal for Rural India. The NCF proposal for **Mission 2007: Every Village a Knowledge Centre** received support in the union budget for 2005-06. We recommend that the Ministries of Rural Development and Panchayati Raj provide Rs. 50 crores each for such training and capacity building activities during 2005-06. The Union Ministry of Agriculture may also provide Rs. 50 crores annually during the next 3 years for content creation and capacity building in the areas of crop and animal husbandry, fisheries, forestry, agro-processing and marketing and for imparting quality trade and genetic literacy.

9. Several farmers’ organizations have suggested that the Ministry of Agriculture should be renamed as **Ministry of Agriculture and Farmers’ Welfare**. We recommend the serious
consideration of this suggestion since farmers’ well-being should be the main goal of the Ministry.

10. We are happy that a NDC Committee on Agriculture has been set-up under the Chairmanship of Shri Sharad Pawar. We request that the suggestions contained in this Report as well as the earlier one may kindly be examined by the NDC Committee so that appropriate action can be taken concurrently at the Central and State levels.
CHAPTER 2 - FOOD FOR ALL

Medium Term Strategy for Food and Nutrition Security with a view to move towards the goal of universal food security over time.

The Mid-term appraisal of the Tenth Plan reveals that we are lagging behind in achieving the Millennium Development Goal of halving hunger by 2015. Under-nutrition and malnutrition are still widespread. Maternal and foetal under-nutrition is resulting in the birth of babies with low birth weight. This has serious consequences for the future intellectual capital of India. Therefore building a sustainable food and nutrition security system is an urgent task.

2. The current trend of a decline in per capita food grain availability and its unequal distribution have serious implications for food security in both rural and urban areas. Going by the Union Planning Commission estimate of the proportions of population below the poverty line, a total of 260.27 million people in both rural and urban areas put together can be definitely assumed to be unable to buy sufficient food to achieve food and nutrition security.

3. Detailed analysis of the causes of food insecurity in rural and urban India have revealed that inadequate purchasing power due to lack of job/livelihood opportunities is the primary cause of endemic or chronic hunger in the country. Further, during the 1990s, the PDS has been weakened, both by repeated increases in the issue prices of food grains and by the switch to a system of targeted PDS. We recommend that people should be able to access grains from PDS whenever they want, wherever they want and in any quantity they want, subject to a few ground rules which will prevent purchase for hoarding and subsequent sale at high prices.

4. Given the magnitude of the employment problem in urban India, particularly in the small towns, there is a strong case for a National Urban Employment Guarantee Programme on the lines of the proposed National Rural Employment Guarantee Programme. The National Food Guarantee Act we are proposing will address hunger in its totality – both rural and urban.
5. **A Six Point Action Plan is outlined below for making India Hunger-Free:**

1. Reorganise the delivery of nutrition support programmes on a life-cycle basis with the participation of Panchayats and local bodies.

2. Eliminate micronutrient deficiency induced hidden hunger through an integrated food cum fortification approach.

3. Promote the establishment of Community Food and Water Banks operated by Women Self-help Groups, based on the principle “**Store Grain and Water Everywhere**”.

4. Help small and marginal farmers to improve the productivity and quality of farm enterprises.

5. Introduce support systems to SHGs to make them economically and organizationally sustainable. Establish for this purpose SHG Capacity Building and Mentoring Centres and focus on Livelihood Finance.

6. Formulate a **National Food Guarantee Act** continuing the useful features of the Food for Work and Employment Guarantee programmes and introduce it on 15 August, 2007, which marks the 60th anniversary of our independence. The Food Guarantee Act will be a powerful tool in achieving the goal of a hunger-free India.
CHAPTER 3 - FISH FOR ALL

Fisheries sector has grown at the rate of 4.3 per cent during the Ninth Plan and represents a major opportunity for growth of the Agriculture and allied sectors in particular and the GDP in general, since it already contributes 6.2 per cent of agricultural GDP and 1.4 per cent of GDP and also contributes 21 per cent of national Agricultural Exports. India already occupies fourth position in fisheries and second position in aquaculture globally and fisheries contribute export earnings of Rs.6,800 crores. The strength of the Fisheries sector consists of large under-utilized areas of fresh water tanks/ponds, lakes and derelict bodies, reservoirs, rivers, saline and brackish water resources, Exclusive Economic Zone and a large coastline. India also has a large variety of agro-climatic zones, fish fauna, research infrastructure and processing capacity.

2. Opportunities for employment and export through exploitation of our premium varieties and mariculture /ornamental fish culture/ sewage fish culture/composite fish culture etc. can be exploited provided our weaknesses like siltation/pollution of water bodies, sub-optimal management, inadequate quality control of seed and feed, inadequate exploitation of available species, and weak infrastructure for landing and marketing as well as problems of open access/multi-user conflicts/inappropriate leasing policies could be tackled. Aquarian reforms to permit optimum exploitation at ecologically sustainable levels are needed urgently along with a review of the Marine Fisheries Regulation Act of the States.

3. Inland fisheries which is already 53 per cent of our total production can be substantially boosted through greater attention to aquaculture both in fresh, saline and brackish water. This would involve production and culture of a larger range of available species, particularly for cold-water species like trout and mahseer and air-breathing fish like magur. The large potential of reservoirs can be optimally utilized for production and employment generation through better leasing policies, appropriate stocking and management and pen culture. Capture fisheries can be promoted through control of pollution of river systems, control of weeds in flood plains/wetlands etc. While inland saline soils in over-irrigated areas can be utilized for production of scampi (prawn), brackish water areas can provide substantial additional
employment and export incomes provided aquaculture is treated at par with agriculture and sound leasing policies are adopted along with reduced duties on feed and lower power tariffs. Above all, transparent quality control of feed and seed through certification cells can boost productivity. Aqua shops/Village Knowledge Centres along with pathological laboratories for better fish/shrimp health and easy bank loans/insurance can further promote this sunrise sub-sector. Design and construction of large assembly/auction markets and small hygienic shops in cities and hygienic boxes for fish sellers particularly women are important components of an efficient marketing infrastructure.

4. Marine fisheries too can see substantial growth through proper registration of all boats, demarcation and enforcement of fishing jurisdictions, and eco-friendly fishing gears/practices greater encouragement to fishing in 90-150 m depths, encouragement to pelagic and mid-water trawling and species-specific fishing like purse seining, squid jigging etc. Introduction of mother vessels for support to artesenal fisheries can improve catches and their quality. Insistence on discharge of the catch by deep-sea vessels on Indian shores can lead to optimum utilization of our processing capacity. An ambitious programme of construction of fish landing centers with cold chains and aqua shops can lead to better value realization and fishing efficiency. Regular dredging has to be undertaken to maintain and enhance the utility of existing fish landing centres etc. Promotion of mariculture, seaweed culture, fish aggregating devices, artificial reefs, mussel culture are some other untapped areas providing employment opportunities provided technology is disseminated and facilitated and user friendly leasing policies in consultation with stakeholders are put in place. Institutionally, the potential of these initiatives can be optimized through setting up of a separate Department of Fisheries under Ministry of Agriculture, a National Fisheries Development Board to provide technical and infrastructural support to fishers, a Central Fisheries Harbour Development Authority and restructuring of Central Institute of Fisheries Education, Mumbai alongwith setting up of Fish for all training centres for capacity building to provide a fillip for human resource development to all the stakeholders in fisheries.

5. Welfare of fishers can be promoted through a substantial hike in their compensation during close season and an Endowment Scheme for fishers more than 60 years of age. Some 3600 fisher villages should be provided better infrastructure of roads, housing, drinking water,
electricity etc. in view of their precarious living conditions and hazardous occupation. Benefits of Prime Minister’s Bharat Nirman should flow to these villages on priority.

7. Additional requirements of funds up to the end of 11th Plan
   1. Margin money for ICAR Fisheries Institutions  (Para 3.1.1.20.3)  Rs. 30 crore
   2. Fishermen’ Welfare Scheme  (Para 3.1.4.5)  Rs. 350 crore
   3. 10 fish hatcheries  (Para 3.1.11.2)  Rs. 15 crore
   4. 10 Common Infrastructure Support Units
      for shrimp States  (Para 3.1.18.18 )  Rs. 50 crore
   5. 20 composite fish marketing support units  (Para 3.1.24.4.3)  Rs.20 crore
   6. 2 mother ships  (Para 3.2.9.3)  Rs.10 crore
   7. 20 minor fisheries harbours  (Para 3.2.12.3)  Rs.240 crore
   8. 40 fish landing centres  (Para 3.2.12.3)  Rs. 120 crore
   9. 3 small sized Dredgers  (Para 3.2.12.4)  Rs. 30 crore
   10. 34 Village Knowledge Centres  (Para 3.2.18.3)  Rs. 17 crore

   Sub-total:  Rs. 882 crores

Note: A sum of Rs.3500 crores would be needed for the National Fisheries Development Board, consisting of 50% grant and 50% loan, if the Board is set up.
ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

CHAPTER 4.1 - HILL AGRO ECOSYSTEM

The hill agro ecosystem represents the vast reservoir of fresh water, biological diversity and niche resources for hydropower and forests. It, however, suffers from inaccessibility, marginality, fragility and higher costs of services and marketing. The development, investment and governance paths adopted in the past have often been divorced from ground realities and local communities.

2. **New Policy: Correcting the Big Mistake:** The National Policy on Agriculture should have a specific, yet integrated, policy on hill agriculture so that commensurate strategies, programmes and activities for hills–plains integration and hill agriculture development geared towards socio-economic and agro ecological synergy could be established. The hillside development policies focusing on forest cover through regulations had wrongly excluded local users across a wide range of ecological and socio-economic regimes. **Inter-disciplinary studies should be undertaken to analyse the cause-effect relationships and to test the old and new approaches to guide future efforts based on scientific facts.** Baskets of eco-technological and knowledge-based options are needed to achieve synergistic enhancement of productivity, profitability and sustainability. A **National Hill Coordinating Centre** to integrate all programmes of the Government of India on Hill Agriculture should be established. The Centre may be Chaired by the Union Minister for Agriculture and closely linked with other concerned Ministries as well as with the National Development Council. A **National Hill Agriculture and Livelihood Development Fund** should be created for judicious implementation of the Hill Policy.

3. While the population growth rate should decelerate, off-farm and non-farm employment opportunities should be created to reduce the pressure on land and other natural resources. The issues of synergy amongst all sub-sectors of agriculture, namely, crops, livestock, fisheries and forestry, inclusiveness, rights and aspiration of all hill people should be specifically addressed. The policy should provide for niche-based high-value farming and income generation, diversification, value addition, market reforms, entrepreneurship development and other
institutional supports. Accurate survey and measurement of area and use patterns of hill/mountain lands should be undertaken to ensure knowledge-based and informed allocation and deployment of natural resources.
4. **Food, Nutrition and Income Security: A Hill Farmers’ Council for Sustainable Food Security** should be established to coordinate and integrate NEGS and FFW and other programmes under the proposed **National Food Guarantee Act**, adopting the whole-life cycle approach. It should promote SHGs to establish and operate **Community Food Banks (CFB)** and promote sustainable enhancement of productivity to further increase the productivity and marketable surpluses, specially of small farmers. The **Land Use Boards** should be restructured to be able to proactively advise farmers, based on congruence of agro-climatic capacity with agro-economic-ecological opportunities and market prospects. Fodder and feed availability should be ensured by promoting integrated management of grazing lands, fodder production and stall feeding, creation of **fodder and feed banks** and by establishing **Livestock Food Corporations**. The underexploited potential of fisheries sub-sector should also be harnessed.

5. **Towards Jal Swaraj : Hydrological Balance  and Water Security**: Two complementary approaches are needed: (a) harvesting of rainwater, groundwater recharge and efficient use of water and (b) the hydrological balance in the Himalayas as dictated by the snow and glacier regimes and climate change. As regards the first component, water harvesting structures, including roof-top water harvesting, and improvement and creation of lift irrigation schemes should be ensured by involving water user associations including PRIs, NGOs and local communities. Pressurised micro irrigation (with assured quality of appliances), rehabilitation of hydrological hot-spots and water bodies, establishment of Low Water Parks, promotion of low water requiring high value crops, popularization of low-cost green houses coupled with fertigation, recharging of dead wells, reviving of the “dying wisdom”, establishment of water banks, creation of skilled manpower and human resources for managing water at various levels and, above all, fostering water literacy so that water becomes everyone’s business, constitute the essential elements of ensuring water security at the household and farm levels.

6. As regards the hydrological balance, a **National Research Centre on Glacierology** should be established for collection, storage and dissemination of information on status of seasonal/perennial snow and ice. The Centre should undertake research on understanding the interaction amongst biological processes, physical environment and the climate change and
develop early, medium and long-term warning systems and advise on trends of water availability and overall hydrological situation in the medium and long-term. Further, an iterative process of **integrated basin management** should be established with clearly defined objectives, planning process, implementation modality and monitoring and evaluation mechanisms, which would help also in accessing the proposed national plan of physically linking all the major rivers of the country.

7. **Soil Health and Bio Diversity Security:** The following sets of actions should be taken towards ensuring soil health and bio diversity security: (i) Correct soil micro nutrient deficiency (**hidden hunger**), adopt IPM and IPNS, issue **soil health card** to each farmer and establish atleast one modern soil testing laboratory in each District for micro-nutrient analysis, and launch a **community land care movement**, (ii) digitize inventory of plant, animal, fish and microbial bio diversity, ensure priority collection of endangered species and prepare and **undertake an integrated collection and conservation programme**, including the establishment of gene sanctuaries, and (iii) undertake niche-production of unique local bioresources and intensify **gene literacy** campaign to enhance participatory conservation and equitable sharing of benefits accruing through the use of genetic resources of specific locations (realization of **Farmers’ Right**).

8. **Reversing the Technology Fatigue:** Each hill State should formulate/update **State Science Policy** to reorient it to be farmer-centred and geared to pursue knowledge-intensive agriculture. **Ecotechnologies** encompassing genetically improved strains, IPM and IPNS should be promoted through **Farmer Participatory Research and Knowledge Management System**. Greater emphasis should be placed on post-harvest management - processing, value-addition, policy and market research, skill development and retooling to strengthen the **production-consumption chain system**. Mandates of the KVKs and ATMAs should be changed to internalize the new developments and priorities in the areas of post harvest management. New extension approaches viz PPP, farmer-to-farmer (**Farm Schools**) etc. should be adopted. Timely and adequate supply of quality seed and other planting materials as well as other inputs should be ensured. **Seed Banks** should be established and preferably operated by SHGs and WSHGs to ensure regular flow of quality materials, particularly under drought and other aberrant weather
conditions. Need-based mechanization of hill agriculture and certification and market-driven and knowledge-based development of organic farming should be streamlined. Following the success story in Uttaranchal, organic villages, covering large number of farmers, should be organized with clearcut outcome in mind.

9. Farmer-centric Market and Institutional Support and Gender Mainstreaming:
Planning for marketing should begin with planning for production. Land Use Boards should have the capacity to advise farmers on market opportunity-based production planning. Given the high marketing costs in hills and to protect farmers’ income, the use of market infrastructures such as warehouses, storages, transport, etc. should be subsidized for the hill farmers. On the other hand, MSP and MIS should be expanded and operationalised also for certain catalytic products from hills. The NHM should give highest priority to value addition, processing, prevention of post-harvest losses and marketing and should adjust its budget allocation accordingly. Separate Regional Master Plans for Market Development in NER and NWR should be prepared, integrating them respectively with SE Asian and West Asian markets.

10. As regards institutional support, credit regulations and packages should be aligned with actual settings in the hills - land rights, jhuming and CPR, and the high costs of services and markets. The Government of India should assist banks in covering the undue risk in hill agriculture and sharpen its life-support assistance to the clearly identified targets. All agricultural development programmes should be engendered. Women must be given land rights and should have access to credit, water, education, health, knowledge and insurance. The indigenous and traditional knowledge uniquely possessed by female farmers should be protected and duly rewarded.
### Additional resource required for the next seven years:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount (Rs. in Crore)</th>
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<tbody>
<tr>
<td>Water conservation tanks with and without distribution attachments</td>
<td>365</td>
</tr>
<tr>
<td>Micro-irrigation, repair of degraded irrigation systems, expansion of lift irrigation, machines and implements</td>
<td>300</td>
</tr>
<tr>
<td>National Centre on Glacierology</td>
<td>50</td>
</tr>
<tr>
<td>Special credit and insurance products, transport subsidy</td>
<td>500</td>
</tr>
<tr>
<td>Market infrastructure development</td>
<td>300</td>
</tr>
<tr>
<td>Organic farming certification, model organic villages and marketing</td>
<td>250</td>
</tr>
<tr>
<td>Capacity building, training, strengthening and mentoring of SHGs, SFEs, etc; Soil Testing Laboratories</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2265 Crores</strong></td>
</tr>
</tbody>
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ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

CHAPTER 4.2 - ARID AGRO ECOSYSTEMS

Arid agro-ecosystems, receiving less than 450 mm annual rainfall with 40-60% coefficient of variability, covering 31.7 million ha in hot arid and 7 million ha in cold arid zones, account for 12 percent of the geographical area of the country. The arid zones are characterized by permanent water scarcity, intense aridity, fragility of natural resources and recurrent droughts.

2. **Policy Actions for Enhancing and Sustaining Livelihood Security:** The arid region should be separated out for an exclusive policy for drought proofing, land management, survival and livelihood security, and not clubbed together with semi arid regions. **Sustainable Land Management (SLM)**, and not Watershed Development, must be the focus in arid zones. Various ongoing and planned Central and State development programmes in arid agro ecosystems should be coordinated by the proposed MoA-hosted **National Authority for Dryland Farming Areas (NADFA).** A **National Committee on Sustainable Land Management (SLM) in Arid Agro Ecosystem,** under the auspices of the NADFA, with due representation of the cold arid, should be constituted and function as a **multistakeholder consortium.** Arid zone States should constitute State level counterpart Committees.

3. Concerned Ministries and financial institutions should facilitate public-private linkages not only in infrastructure development but also in promotion of rural entrepreneurship and in establishment and strengthening of capacity of PRIs, SHGs, cooperatives, Small Farmers’ Estates (SFEs), etc. to facilitate access to quality inputs and to fair markets. The Central Government should create an **Agriculture-Risk Fund** and design a **special insurance product and dispensation mechanism** to insulate farmers from risks. Fifteen percent of the development budget should be allocated to on-farm strategic research to facilitate generation, refinement and adoption of location-specific technologies.
4. **Livestock, Fodder, Feed, Food and Livelihood Security:** Establish Livestock Food Corporation in each State. The District LSD Consortia should ensure enhanced and sustained production of fodder and feed crops and adoption of recommended livestock management technologies. **Fodder and feed banks** should be established at strategic points. As regards food security, the adoption of proven technologies and development strategies for enhanced productivity, prevention of post harvest losses, value addition and remunerative marketing should be emphasized. **Food, grain, seed and water banks**, preferably operated by SHGs, should be established. The proposed **National Food Guarantee Act** should be operationalised. Off-farm and non-farm employment should be created for increasing income and economic access to food.

5. **Water Security: Conserving Every Drop of Water:** Water literacy should be increased to make water conservation everyone’s business towards more income per drop of water. Rainwater harvesting, restoration of water bodies, reviving of “dying wisdom” and groundwater recharging should be made mandatory to everybody. The various water-related development programmes should be coordinated under one umbrella and synergised at the action site by Panchayats and other grassroots organizations under the direction of the District SLM Consortium. About 10 percent of the total investment in watersheds and soil conservation should be allocated for development and fine-tuning of SLM technologies. Location-specific integrated watershed development programmes and increased water use efficiency particularly through the development and adoption of quality microirrigation, fertigation and low cost greenhouses should be promoted. A **travelling workshop** of experts from India and from the Nile, Jordan and Imperial Valleys should be organized to formulate new strategies for water management.

6. **Soil Health and Technological Security for Sustainability:** Soil-test-based micro nutrient amendments to manage the **hidden hunger** of soil should be widely adopted. Each arid zone district should have at least one well-equipped and suitably staffed advanced soil testing laboratory. Each farmer should be issued a **Soil Health Card.** The **Land Use Boards** should be strengthened to play a proactive role in advising farmers. Selective mechanization should be
supported to enhance precision, timeliness and productivity. **Farm schools** should be established to replicate “bright spots”, particularly IPM, IPNS, and integrated crop-livestock-tree and organic farming technologies. Each KVK should be augmented with a post-harvest technology unit.

7. **Conserving Genetic Heritage and Harnessing Unique Niches:** The national bureaus of plant, animal and microbial genetic resources should chronicle and digitise inventories of the bioresources and associated traditional knowledge, and launch gene literacy movements to sensitise all stakeholders. The Suratgarh Farm (Rajasthan) of the Government of India should be developed as an *ex situ* germplasm repository of arid zone livestock genetic resources.

Production and commercialisation of off-season as well as high value crops and commodities should be strongly supported and promoted. The ICAR should establish a **cold arid regional sub-station at Ladakh** to generate technologies and develop new strategies for capturing the opportunities of the region and should work closely with the proposed National Centre on Glacierology.

9. **Farmer-centred Marketing:** Arid zone farmers should be insulated from price dips in “good” years with timely and effective implementation of MSP and MIS, especially for the life-line commodities. Based on market research, special arid zone commodity markets/parks/zones and periodic markets should be established. Adopting the NDDB model, farmers’ cooperative marketing, fully equipped with grading, sorting, standardization and packaging facilities should be developed. Trade and regulatory policies, including SPS, for dairy products, wool and horticultural and other specialty products should be integrated with the development role of these commodities.

10. **Financial Implications:** An additional sum of Rs. 1,275 crore for the next seven years as detailed below, may be provided in the budget to cater to the above mentioned requirements.

   - Agriculture-Risk Fund ---- Rs.500 crore (GOI)
   - Special Insurance Products and Dispensation --- Rs. 300 crore (GOI)
- Micro-Capital Grant to support drought proofing and to assist and mentor SHGs and SFEs --- Rs. 300 crore (State Governments and GOI)
- Special Market Intervention Scheme --- Rs. 100 crore (GOI)
- Establishment of modern marketing centre --- Rs. 75 crore (GOI)
ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

CHAPTER 4.3 - COASTAL ZONE AGRICULTURE

1. Nearly 25% of India’s population lives in coastal areas. Anthropogenic pressures on coastal ecosystems and living aquatic resources are increasing. There is urgent need for sustainable livelihoods and sustained production.

2. We recommend the establishment of **agro-aqua farms** on coastal wastelands under a **National Sea Water Farming for Coastal Area Prosperity Project** in about 50,000 ha in the States of Gujarat (Kutch), Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal, as well as in Andaman and Nicobar and Lakshadweep Islands. **Women’s Aquaculture Estates** should also be established along the coast through Women’s Development Corporations and financial institutions for the purpose of assisting **dalit** and fisherwomen to take to sustainable and profitable aquaculture. The programme based on sound scientific principles of agro-forestry may be given priority in the livelihood rehabilitation programmes being sponsored under the Prime Minister’s Relief Fund in tsunami affected areas.

3. **There is need for a Coastal Systems Research Programme (CSR) on the lines of Farming Systems Research Programme carried out in inland areas.** We recommend that ICAR may initiate an All India Co-ordinated Research Programme on coastal agriculture, jointly with CSIR and State Agricultural / Animal Husbandry / Fisheries Universities.

4. We suggest that a **National Board for Sea Water Farming** be set up under the Chairmanship of Minister for Agriculture and Food. The Board should have the Ministers in charge of Environment and Forests, S & T, Ocean Development, Water Resources and Commerce, and senior representatives from all the Coastal States and Islands, as Members, so that a holistic view on all aspects of seawater use and coastal agriculture management can be taken.
SUGAR INDUSTRY IS THE LARGEST AGRO-BASED INDUSTRY IN RURAL INDIA. THE INDUSTRY HAS ENABLED THE COUNTRY TO BE SELF-RELIANT IN THIS HIGHLY SENSITIVE ESSENTIAL COMMODITY OF MASS CONSUMPTION. INSPITE OF THE FACT THAT SUGAR IS PROBABLY THE MOST DISTORTED AGRICULTURAL PRODUCT IN THE GLOBAL MARKET, INDIA EXPORTED ABOUT 4 MILLION TON OF SUGAR DURING THE LAST THREE YEARS. HOWEVER, THE GROWTH RATES IN CANE CRUSHING CAPACITY, QUANTITY OF CANE CRUSHED AND SUGAR PRODUCTION HAS OUTSTRIPPED THE SAME IN TERMS OF AREA UNDER SUGARCANE, ITS YIELD RATE AND TOTAL PRODUCTION LEADING TO A GENERAL SHORTAGE OF SUGARCANE FOR THE SUGAR FACTORIES. THE STATUTORY MINIMUM PRICE [SMP] OF SUGARCANE [DECLARED BY THE GOVERNMENT OF INDIA] HAS BEEN CONTINUOUSLY INCREASING. BETWEEN 1999-2000 & 2002-03 WHILE THE SUGAR PRICES DECLINED FROM 141.2 [BASE 1993-94] TO 117.1, THE SUGARCANE PRICES INCREASED FROM RS 56.10 PER QTL TO RS 64.50 PER QTL WITH 8.5% BASIC SUGAR RECOVERY. INCIDENTALLY, THE SUGARCANE FARMERS ARE A STRONG FORCE IN THE MAJOR SUGARCANE PRODUCING STATES. THERE ARE PRACTICES REGARDING SUGARCANE AREA RESERVATION, PRICING, PAYMENT FOR SUGARCANE, SUPPLYING ARRANGEMENT AND THE DEVELOPMENTAL ROLE OF THE SUGAR FactORIES, WHICH ARE PEHELAR TO THIS INDUSTRY. WITH THE INCREASE IN POPULATION AND THE ANTICIPATED INCREASE IN PER CAPITA CONSUMPTION OF SUGAR, IT IS ESTIMATED THAT THE DEMAND OF SUGAR WOULD REACH ABOUT 24.5 MILLION TON BY 2010 FROM ABOUT 18 MILLION TON IN 2001-02. WITH THE EXISTING LEVEL OF PRODUCTIVITY AND QUALITY OF SUGARCANE, IT WOULD NEED AN INCREASE IN AREA UNDER SUGARCANE FROM THE EXISTING 4.4 MILLION HECTARE TO ABOUT 5.5 MILLION HECTARE, WHICH MAY BE EXTREMELY DIFFICULT DUE TO CLAIMS OF OTHER CROPS AND LARGE WATER REQUIREMENTS.

2. The all India yield of sugarcane had been nearly stagnant for quite sometime and during the last five years it has continuously declined from 71.2 ton/ha in 1998-99 to 64.6 ton/ha in 2002-03. The need is to introduce packages of improved technology, services and public policies designed to raise productivity and quality of sugarcane crop. It is suggested that a Technical Mission on Sugarcane [TMS] be established jointly with sugarcane growers’ organisations, banks, sugar factories and research organisations on the basis of a ‘seed to sugar’ approach to improve the All India average sugarcane productivity to at least 80 ton/ha and sugar recovery to
at least 11% in five years. India has the technical know how and do how to achieve this. There are huge gaps in yield potential and actual yield. The productivity in the sub-tropical States, which have nearly 60% of the total area under sugarcane, is substantially lower than that in the tropical States. If the levels indicated above were achieved, there would be enough sugarcane to have 25 million ton sugar per year. The TMS could have three major components: (a) Intensification of sugarcane research (b) Transfer of technology (c) Improving productivity and quality of sugarcane

3. The TMS would have to be placed under the exclusive charge of a senior knowledgeable officer of the Government of India to be declared as Mission Director. In the major sugarcane producing provinces, the State Governments may designate State level ‘Mission Director’ to act as ‘nodal officer’. The initial assessment of the cost of the programme for a five-year time slice is Rs 900 crore. However, this would require to be firmed up on a item wise basis. The additional annual production of sugar with increased productivity and quality of sugarcane would be worth about Rs 7000 crore.
Enhancing Productivity, Profitability, Stability and Sustainability

Chapter 4.5 - Conservation, Cultivation and Marketing of Medicinal Plants

Medicinal and aromatic plants provide a window of opportunity to concurrently strengthen health, food, nutrition, and livelihood security of farm families and agro-ecological security of the environment. Traditional systems of medicine have been used in India over the years to address human, animal and plant health. India as one of the biodiversity rich countries with a rich heritage of traditional medicine has the potential to be a leading player in the sector.

Recommendations

2. Immediate measures are needed in the areas of Policy, R&D, Input supply, Market, Pricing Support and Information Portal on MAPs. A National Mission on Medicinal and Aromatic Plants may be organized to ensure that the sector receives the integrated attention it deserves. The recently approved National Horticulture Mission (NHM) includes MAPs, but given the already large number of fruit, vegetable and flower species to be addressed under the NHM, the MAPs may not receive the special attention and leadership it urgently needs. Pending the preparation of a full-fledged Mission, a distinct Mini-Mission may be organized for MAPs under the ongoing NHM. A dynamic leader in the area of medicinal plants and herbal medicine may be appointed as the coordinator of the Mini Mission for MAPs.

3. The Mission should have a Policy Guidance Committee (PGC), an apex level body comprising the Ministers of Agriculture, Health, Environment & Forests, Commerce and Science & Technology, to give direction. The PGC could guide the restructuring of the National Medicinal Plants Board (NMPB) on the lines of NDDB.

4. Measures to ensure supply of quality planting material, research on quality, safety and efficacy of products, standardization of products and suitable regulation, proper pricing for harvested and cultivated produce, a market oriented strategy to guide cultivation for the home
and external markets, documenting and recognition of traditional knowledge on medicinal plants, and setting up a single window information portal are the areas needing immediate attention.

5. Promotion of Public-Private Partnerships (PPP), promotion of Contract farming and appropriate codes of conduct, encouraging different Commodity Boards to promote intercropping with plantation crops, forming Medicinal Plant Growers’ Association, community-based herbal gardens and enterprises and **Herbal Biovalleys** on the model of the Silicon Valley may be nurtured for providing the infrastructure needed for the conservation and sustainable use of medicinal plants.

6. The TF Report on MP had in 2000, recommended an allocation of Rs.1000crore for development the sector. It is recommended that an equivalent amount be made available to the proposed National Mission on MAPs in order to enable it to launch a dynamic programme in the areas of conservation, cultivation, scientific validation, and marketing under distinct brand names.
There is a growing interest in organic farming practices in several parts of India, partly due to an expectation of higher prices for organically produced farm commodities. It will be useful to promote organic farming for low volume, high value crops like spices, medicinal plants, fruits and vegetables. Internationally acceptable certification standards and institutional structures are urgently needed. Cost of certification also has to come down.

2. Preparation of Organic Farming Tool Kits, based on IFOAM principles, to assist farmers on the do’s and don’ts relating to the production of organic farm produce, promoting the formation of Small Farmers’ Organic Agriculture Estates and Organic Farmers’ Clubs to confer the power of scale at the production and post-harvest phases of farming to small farmers, organizing a National Federation of Organic Farmers’ Associations on the pattern of IFOAM, and declaring Organic Farming Zones are some of the steps needed to give direction and support.

4. Organic farming needs even greater research support than chemical farming. Our National Agricultural Research System will have to develop bio-organic farming methodologies.

5. It would be useful to develop a national strategy for organic farming, specifying regions, crops and seasons, ideal for raising crops through organic farming techniques.
ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

CHAPTER 4.7- BIOFUELS

Bio-fuels derived from plant-based resources assume importance in the context of the need to develop non-renewable sources of energy. Farmers’ organizations need proper extension advice on the advisability of shifting their land use to the cultivation of crops for bio-fuel production. A well-defined Biofuel policy based on science and economics needs to be developed jointly by the Union Planning Commission, Ministries of Agriculture, Rural Development, Petroleum, Non-Conventional Energy Sources and Science & Technology. ICAR and CSIR will have to be actively associated. The economic and ecological sustainability of this programme should be the bottom line in decision-making.

2. A systems approach is necessary for ensuring that the different components of bio-diesel programme are effectively coordinated and bio-diesel becomes a cost effective alternative. There is need for convergence and synergy in Technology and Public Policy for farmers to undertake farming of crops used in ethanol and other biofuels. Necessary industrial infrastructure should be developed to process the collected biomass for production of ethanol / other biofuels and the by-product industrial wastes so generated, could be used as manure.

3. ICAR and CSIR should jointly undertake to work on developing suitable process development for biofuels from various feedstocks and for developing agronomic practices for growing crops for biofuels in wasteland in cooperation with State Agricultural Universities.

4. It is recommended that a 'National Biofuel Board' headed by the Member in charge of Energy in the Planning Commission, be set up to develop a roadmap for use of biofuels in petrol and diesel engines in a time bound manner. The Board should be supported with appropriate technical and financial resources and function like the Atomic Energy Commission with specific targets, autonomy and accountability.
CHAPTER 5 - AGRICULTURAL MARKET REFORMS

An efficient marketing system is essential for the development of the agricultural sector, providing incentives to the farmers for commercialisation, increasing production and giving appropriate signals for production planning and research activities. At the time of independence, there was shortage of production against demand and the immediate concern was to save the farmers and the consumers from malpractices of traders and facilitate growth and development of an orderly marketing arrangement. Organized marketing of agricultural produce was promoted though regulated markets. The State Governments and the Union Territories passed the APMC Act and in view of the supply side constraints various other legal enactments were promulgated and orders covering specific products issued. The resultant Government monopoly in setting up agricultural produce markets under the State specific Acts virtually prevented the private sector from taking any important initiative in the development of agricultural marketing infrastructure. There is no doubt that a large network of 7418 wholesale agricultural produce markets under the regulated system has been created and there is improvement in marketed surplus-output ratio, standardization of marketing charges, improvement in quality of market information etc but the lack of basic infrastructure, inadequate development of rural periodic markets, lack of transparency in weighing, auctions, other market related matters, sale of ungraded produce, distress sale immediately after harvest, poor quality of services offered to the farmers and lack of professionalism continue to be some of the constraints.

2. The Ministry of Agriculture is playing a proactive role in bringing about a change in the mindset from trade regulation to trade promotion, establishment of rural godowns, warehouses, cold storages and amending the APMC Act by the State Governments/Union Territories with a view to primarily enable the private and cooperative sector to establish and operate markets for agricultural commodities and offer the farmers an alternative. However, the response of some of the State Governments is inadequate. With increasing commercialisation of agriculture, market planning needs to begin before the production planning. The restructured State Land Use Boards supported by a team of technical experts/agencies could render much needed advice to the farmers based on meteorological,
marketing and management information. More storage including cold storage and warehouse capacity should be created and warehouse receipt be developed as an effective credit instrument. There is also a need to encourage setting up of farmers’ markets, development of farmer’s organisations under the banner of the commodity produced by them, develop farmer centric code of conduct for contract farming, improving quality concern among the producers, increasing flow of marketing credit, tightening of the supply chain, minimizing post harvest losses and improving value addition to enhance the farmer’s income.

3. The various legal enactments concerning agricultural processing and marketing particularly the Essential Commodity Act need a revisit.

4. The Minimum Support Price [MSP] is the major instrument of agriculture price policy of the Government of India. There is need for much stronger protection of MSP across the country. The MSP system, which has contributed towards diversification and commercialisation of Indian agriculture and also in achieving the present level of production, needs to be continued in near foreseeable future and its implementation should be improved. Price behaviour of sensitive commodities not covered by MSP, needs to be closely monitored particularly during the glut season for need based support under the Market Intervention Scheme.
COMPOSITE FINANCIAL SUMMARY

Chapter 1: From Crisis to Confidence

1. Beyond Tsunami Agricultural Rehabilitation Demonstration programme
   Funds for the Demonstration cum Training programme may be provided from the Tsunami Relief Allocation at the rate of Rs. 20 lakhs per demonstration, each covering an area of 200 ha. In all about 15 such demonstrations may be organized in the affected states and in Andaman and Nicobar Islands at a cost of Rs. 3.00 crore.
   Rs. 3.00 Crore

2. Indo-US Collaboration in Agronomic Rehabilitation Strategy: Rs.1 crore may be allotted for this collaborative programme from the Prime Minister’s Relief Fund.
   Rs.1.00 Crore

3. Mission 2007: Every Village a Knowledge Centre: We recommend that the Ministries of Rural Development and Panchayati Raj provide Rs. 50 crores each for training and capacity building activities during 2005-06.
   Rs.100.00 Crore

4. The Union Ministry of Agriculture may also provide Rs. 50 crores annually during the next 3 years for content creation and capacity building in the areas of crop and animal husbandry, fisheries, forestry, agro-processing and marketing and for imparting quality trade and genetic literacy.
   Rs.150.00 Crore

5. A total of about Rs.3000 crores of public investment may be needed during the next 3 years for making the ‘Every Village a Knowledge Centre’ concept a reality. We suggest that investment in the VKC programme should come from a variety of government sources including the USO fund and the vast resources being set apart for Bharat Nirman.
   Sub-total: Rs.254.00 Crore
Chapter 2: Food for All

To be worked out

Chapter 3: Fish for All

Additional requirements of funds upto the end of 11th Plan

11. Margin money for ICAR Fisheries Institutions (Para 3.1.1.20.3) Rs. 30 crore
12. Fishermen’ Welfare Scheme (Para 3.1.4.5) Rs. 350 crore
13. 10 fish hatcheries (Para 3.1.11.2) Rs. 15 crore
14. 10 Common Infrastructure Support Units for shrimp States (Para 3.1.18.18) Rs. 50 crore
15. 20 composite fish marketing support units (Para 3.1.24.4.3) Rs. 20 crore
16. 2 mother ships (Para 3.2.9.3) Rs. 10 crore
17. 20 minor fisheries harbours (Para 3.2.12.3) Rs. 240 crore
18. 40 fish landing centres (Para 3.2.12.3) Rs. 120 crore
19. 3 small sized Dredgers (Para 3.2.12.4) Rs. 30 crore
20. 34 Village Knowledge Centres (Para 3.2.18.3) Rs. 17 crore

Sub-total: Rs. 882 crores

Note: A sum of Rs. 3500 crores would be needed for the National Fisheries Development Board, consisting of 50% grant and 50% loan, if the Board is set up.

Enhancing Productivity, Profitability, Stability and Sustainability

Chapter 4.1: Hill Agro-Ecosystem

1. Water conservation tanks with and without distribution attachments Rs. 356 crore
2. Micro-irrigation, repair of degraded irrigation systems, expansion of lift irrigation, machines and implements for agricultural mechanisation Rs. 300 crore
3. National Centre on Glacierology Rs. 50 crore
4. Special credit and insurance products, transport subsidy Rs. 500 crore
5. Market Infrastructure development Rs. 300 crore
6. Organic farming certification, model organic villages and marketing Rs. 250 crore
7. Capacity building, training, strengthening and mentoring of SHGs, SFEs, etc; Soil Testing Laboratories Rs. 500 crore

Sub-total: Rs. 2256 crore

Chapter 4.2: Arid Agro-Ecosystem

Part A

1. Agriculture-Risk Fund Rs.500 crore (GOI)
2. Special Insurance Products and Dispensation Rs. 300 crore (GOI)
3. Micro-Capital Grant to support drought proofing and to assist and mentor SHGs and SFEs Rs. 300 crore (SG and GOI)*
4. Special Market Intervention Scheme Rs. 100 crore (GOI)
5. Establishment of modern marketing centre Rs. 75 crore (GOI)

Sub Total A Rs 1275 crore

* Rs.200 crore by the State Government (SG) and Rs. 100 crore by GOI

Part B

1. Contingency fund Rs. 500 crore (GOI)
2. Strengthening horticulture-led diversification Rs. 300 crore (NHM)
3. Livestock ex situ germplasm conservation at Suratgarh Farm Rs. 100 crore (ICAR)
4. Augmenting water availability by promoting rainwater harvesting, groundwater recharge and water bodies restoration, development and management Rs. 250 crore
5. Large scale demonstrations, establishment of fodder, feed and grain banks, Farm Schools Rs. 300 crore
6. Soil health care based on soil test, including micronutrients analysis and popularization of agricultural machines and implements
Rs. 200 crore

7. Commercialization of date palm production, support to micro-irrigation, supply of quality vitroplants and other planting materials
Rs. 120 crore

**Sub-total B Rs. 1770 crore**

**A sum of Rs. 1770 crore is to be met through redeployment of resources from existing National Horticulture Mission and other National Missions, Watershed Projects, ATMA, ICAR’s KVK and other projects and by using the National Rural Employment Guarantee Scheme and the Food for Work Programme.**

**Chapter 4.3 : Coastal Zone Agriculture**

To be worked out

**Chapter 4.4 : Mission for the Prosperity of Sugarcane Farmers**

Rough assessment of the outlay for the project [5 year time slice] is about Rs 900 crore as under.

1. Intensification of research: establishing a sugarcane breeding centre, strengthening of the molecular biology and genetic engineering capacities and other research work.
Rs. 125 to 150 crore

2. Technology Transfer including the seed multiplication programme and maintenance of nucleus seeds and extension work.
Rs. 600 crore

3. Improving productivity of sugarcane: supporting establishment of Soil Testing XXXII
Laboratories, Tissue Culture Laboratories, Bio-fertilizer units and service charges to NABARD

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Sub-total: Rs. 900 crore

**Chapter 4.5 : Conservation, Cultivation and Marketing of Medicinal Plants**

1. It is recommended that **Rs.1000 crore** be made available to the proposed National Mission on MAPs in order to enable it to launch a dynamic programme in the areas of conservation, cultivation, scientific validation, and marketing under distinct brand names.

   **Rs. 1000.00 Crore**

   Sub-total: **Rs. 1000.00 Crore**

**Chapter 4.6 : Organic Farming**

To be worked out

**Chapter 4.7 : Bio-fuels**

To be worked out

**Chapter 5 : Agricultural Market Reforms**

1. No specific recommendation with additional financial implication made. However, the inter-ministerial task force on Agricultural Marketing [May, 2002] has estimated investment requirements for development of marketing, storage, cold-storage infrastructure during the Xth Plan at **Rs. 12,230 crore**.

   **Grand Total:** **Rs.8337.00 Crore**
Immediate Steps needed to prevent farmers’ suicides:

1  **Credit supply and reform:**
   - There should be a corpus (on the line of calamity funds) for assisting farmers affected by crop losses.
   - Rate of interest may be reduced to 4% simple with government support, instead of compound rate of interest for arrears.
   - Interest on loans in areas hit by drought and floods and for crops under heavy pest infestation, needs to be waived.
   - Introduce a moratorium on debt recovery, including loans from non-institutional sources, till reasonable profit margins are recorded; stagger debt recovery in easy installments
   - Credit should also be available if the farmer is adopting sustainable farming practices including the upkeep of traditional breeds of cattle. NABARD could develop a suitable project for low external input sustainable agriculture and aquaculture (LEISA).

2  **Irrigation and Cropping Pattern:** Regulate cultivation of water intensive cash crops in “dark and grey zones”. Agronomists should present their data not just on the basis of productivity per hectare but on the basis of net income per unit of water.

3  **Inputs:** Introduce appropriate legislation to regulate and deter the sale of spurious seeds and chemicals; promote community-based and managed seed production and marketing units at the village level; promote integrated pest management and integrated plant nutrient management systems.
Agriculture Marketing and Prices: Implement MSP for coarse cereals and pulses; Create a corpus for stabilizing price fluctuations; Introduce quantitative restrictions on imports of farm commodities which constitute the backbone of the livelihood security system in dry farming areas.

Introduce a Farmers’ Livelihood Security Compact to address the above

- **State level Farmers’ Commission** could be set up for the purpose of ensuring dynamic government response to farmers’ problems.
- **Initiate a Census of Suicides** to have a proper understanding, assessment of reasons and count of suicides.
- **Debt survey**: An All India Debt Survey should be undertaken, taking into account newer forms of credit and indebtedness and newer forms of bondage.
- **Debt waiver**: The amount that is to be the cut-off point could be worked out in consultation with Panchayats and farmers’ representatives in the distress hotspot areas.
- **Insurance revival**: There are provisions in the insurance laws that allow LIC to revive the lapsed policies, which should be done in the distress hotspots.
- **Revising import policies**: Prevent inferior quality pepper from entering the state from Sri Lanka. Re-examine and revise import duty on cotton.
- **Market Support**: There is also need for introducing focused Market Intervention Schemes (MIS) in the case of life-saving crops such as cumin in arid areas.
- **Extension work**: Agricultural and Animal Sciences Universities could form Hope Generation Teams (like NSS) of young male and female students who could stay in the distress villages during vacations and extend both technical and psychological support. The universities must be accountable to the farming community and not to private interests.
- **Basic services**: There is urgent need for both affordable health insurance, as recommended in the first report of NCF and the revitalization of primary health care centres.
• **Knowledge Empowerment:** Village Knowledge Centres (VKCs) should be established in the farmers’ distress hotspots. These VKCs could be linked to a Block level Village Resource Centre (VRC) with the help of the Indian Space Research Organisation (ISRO).

• **Enlarging the export of farm commodities:** The Ministry of Agriculture and ICAR should evolve a policy for ensuring that the appellation basmati is used only for traditional fine grain aromatic rices of great antiquity and of a specific geographic origin.

• Initiate Beyond Tsunami Agricultural Rehabilitation Demonstration programme and give approval for the **Indo-US Collaboration in Agronomic Rehabilitation Strategy in Tsunami affected areas**

**Mission 2007 – Every Village a Knowledge Centre**

**Action Point 1:** The Government of India should include in the **Bharat Nirman programme** the establishment of Village Knowledge Centres (VKCs) in each of the about 237,000 Panchayats in the country and in the local bodies in the North East region.

**Action Point 2:** There is need for convergence and synergy among the numerous initiatives of Central and State Governments in the area of ICT for governance and development

**Action Point 3: Connectivity and Content: National Digital Gateways:** A Connectivity and Content Consortia involving all relevant government, academic and private sector institutions need to be set up in every district of the country.

**Action Point 4: Capacity Building:** The Jamsetji Tata National Virtual Academy for Rural Prosperity could be developed as the umbrella organization for capacity building. A **Consortium of Capacity Building Institutions** will have to be organized for each language of communication.

**Until 2010, the aim should be the knowledge and skill empowerment of rural women and men with public funds.**

The process of obtaining the RSP license should be simple and transparent. We recommend that the Ministries of Agriculture, Rural Development, Panchayati Raj, Communication and
Information Technology and Home may jointly develop a simple set of procedures for RSP license.

**Change in Mindset with reference to the role of the Ministry of Agriculture, Government of India**

Several farmers’ organizations have suggested that the Ministry of Agriculture should be renamed as **Ministry of Agriculture and Farmers’ Welfare**. We recommend the serious consideration of this suggestion since farmers’ well-being should be the main goal of the Ministry. This will also help to link faces with figures.

**NDC Committee on Agriculture:** We are happy that a NDC Committee on Agriculture has been set-up under the Chairmanship of Shri Sharad Pawar. We request that the suggestions contained in this Report as well as the earlier one may kindly be examined by the NDC Committee so that appropriate action can be taken concurrently at the Central and State levels.

**CHAPTER 2 : FOOD FOR ALL**

1. **Access to PDS:** People should be able to access grains from PDS whenever they want, wherever they want and in any quantity they want, subject to a few ground rules which will prevent purchase for hoarding and subsequent sale at high prices. That is, flexibility with regard to time of purchase, place of purchase and quantity of purchase needs to be fitted in to the Public Distribution System.


3. Set up **50 SHG capacity building and mentoring centers** in every State, to enhance the management and marketing capacities of members of the Self-help Groups (SHGs).
Such centers can be established in existing institutions like Agricultural, Rural and Women’s Universities, IITs, institutions operated by NGOs, etc.

CHAPTER 3 : FISH FOR ALL

1. State Fishery Department should have exclusive control over stocking, management, leasing, exploitation and conservation of fisheries resources in reservoirs in consultation with Irrigation Department and stakeholders. (Para 3.1.4.2)

2. Fishermen’ Welfare Scheme needs enlargement particularly in terms of size of assistance through frequent consultations with stakeholders. (Para 3.1.4.5)

3. Wetlands should be developed by adopting appropriate policies for stocking of various species of find and shellfishes. This should be done after removal of weeds etc. through Food and Work/ Employment Guarantee Programme. Village Panchayats may undertake this activity in a time bound manner. (Para 3.1.5.1)

4. Sport fisheries and tourism in the hill areas should be encouraged through large scale seed production and stocking of golden mahseer and rainbow trout. (Para 3.1.7.2)

5. The different species of exotic trout (Rainbow/ Brown/ Brook) and indigenous varieties like snow trout should be stocked in the streams in medium and higher altitudes. In lakes and other static water bodies, mirror carp should be stocked through provision of seed and other assistance in order to provide livelihood opportunities to the people living in the hills. (Para 3.1.7.4)

6. National agency for providing HRD support and training to fishers/ aquaculturists/ entrepreneurs/ corporate sector should be set up by restructuring and revitalizing Central Institute of Fisheries Education, Mumbai. (Para 3.1.9)

7. Integrated fish farming in paddy fields and in conjunction with the piggery/ poultry/ duckery should be encouraged through special incentives and by extension agencies/village knowledge centres, especially in the hilly and tribal areas. (Para 3.1.9.5)

8. A professionally managed National Fisheries Development Board should be set up on the pattern of NDDB. (Para 3.1.11)
9. Exotic species such as arctic char and lake trout should be imported for introduction in upland waters in order to provide income opportunity to people in the higher altitudes. Their impact on native biodiversity will have to be monitored. (Para 3.1.12.2)

10. Air breathing fishes should be stocked in shallow, seasonal and weed choked waters, due to the high medicinal value and consumer preference of these species. Their propagation should be encouraged through provision of good quality brood stock to seed farms and through better extension of the technology for their breeding and rearing. (Para 3.1.13.1)

11. Ornamental fish should be further encouraged in view of their export potential and in view of their amenability for production by women in villages as a Cottage industry. This could be through introduction of highly prized varieties and technology dissemination through Village Knowledge Centres. (Para 3.1.14.1)

12. Fish production as a source of family nutrition should be started as a mass movement through promotion of backyard fish farming involving air breathing species such as magur etc., Village Panchayats, Extension Agencies and Village Knowledge Centres must disseminate the required information. (Para 3.1.15.1)

13. Shrimp farming must be further encouraged for global competition by reducing import duties on feed and feed ingredients, reduction in power tariff to bring it at par with Agriculture for small and marginal farmers etc. Fisheries should be treated at par with Agriculture for the purpose of loan on differential rate interest, loan for tube well, power, water rates and income tax as well as assistance for seed/feed/transport. Above all reasonable rates for insurance must be ensured. (Para 3.1.18.5)

14. There should be a national agency to ensure seed certification to ensure quality seed. There should be a registration of all hatcheries in the States and regular inspection of their brood stock and hatching practices. (Para 3.1.18.7)

15. Aquaculture Service Centres/Aqua shops should be set up with laboratory/storage/communication. (Para 3.1.18.8)

16. States Govt. should set up common effluent treatment plants, water testing and disease control laboratory and another infrastructure facilities for shrimp farm clusters. (Para 3.1.18.17)
17. Similarly, an accreditation Cell should be set up to control the quality of feed based on various parameters worked out in consultation with stakeholders and scientists. (Para 3.1.21.3)

18. Department of Animal Husbandry, Dairying and Fisheries (DAHDF) should set up a technical group to develop internationally accepted protocols, which are desirable and feasible for encouragement of organic fish farming in consultation with stakeholders (Para 3.1.23.1)

19. Considering the critical importance of small cold chains in a tropical country like India. Ice plants in the private sector should be encouraged through reduce power tariff, easy availability of credit from Banks, and other operational facilities, which would ultimately result in higher value realization by the fishers. (Para 3.1.24.2.1)

20. Large assembly/auction markets should be designed by Central Institute of Fishery Technology/National Institute of Agricultural Marketing and constructed all over the country by the States with Central assistance to reduce spoilage of fish and promote marketing of fish in hygienic environment. This would encourage greater competition and, therefore, higher prices for fishers. Institutional finance should also be attracted for the purpose. (Para 3.1.24.4.3)

21. States must encourage local bodies to set up hygienic retail fish market in all medium and large towns in the interest of the consumers as well as women who generally market the fish. They could be provided specific grants to work as seed money for drawing institutional finance. Meanwhile Municipal Committees must strictly enforce existing laws for hygienic retailing of fish. (Para 3.1.24.4.4 and 3.1.24.4.6)

22. Women and men who market fish should be provided insulated fish boxes fitted on cycles for mobile marketing of fish to reduce spoilage. (Para 3.1.26.8)

23. There is a need for comprehensive and cohesive set of Aquarian Reforms in order to foster a sustainable and equitable use of both Coastal and inland waters for capture and culture fisheries. (Para 3.1.27.1)

24. A Committee may be set up to prepare proposals for Aquarian Reforms on the lines of land reforms. (Para 3.1.27.2)
25. ICAR centres for the North-East in Barapani should undertake a major programme of seed and brood stock production for species suitable for the North-East, particularly ornamental fish. (Para 3.1.28.7)

26. A coordination council consisting of coastal states and Govt. of India should be set up to review issues relating to better exploitation of EEZ. (Para 3.2.3.1)

27. States should be assisted by Govt. of India to amend their Marine Fishing Regulation Act in a time bound manner, in tune with the latest developments in sustainable utilization of marine fisheries resources. (Para 3.2.4.2)

28. Juvenile harvest should be reduced to the maximum possible extent by introduction of appropriate fishing gear including regulation of cod end net size in line with the technology from CIFT. (Para 3.2.4.5)

29. Restriction in area for resource specific fishing, prolonged seasonal closure for conservation, protection of juvenile and spawners during breeding season should be enforced more strictly by the states in consultation with the stakeholders. (Para 3.2.4.8)

30. Small trawlers should be encouraged through incentives to fish further off shore. (Para 3.2.4.10)

31. Pelagic and mid water trawling should be encouraged through incentives. (Para 3.2.4.11)

32. Research and development efforts should be aimed at developing fuel-efficient fishing craft/gear/methods as well as energy efficient hull designs. (Para 3.2.4.12)

33. Remote sensing for dissemination of information on potential fishing grounds should be undertaken more effectively through provision of communication facilities that can provide real-time information to the small-scale fishing sector. (Para 3.2.5.1)

34. Regular stakeholders consultation should be held to discuss new policy initiatives and constrains. (Para 3.2.6.2)

35. Introduction of resource specific vessels for long lining, purse seining and squid jigging should be taken up on top priority. Mechanized vessels below 20 m. length need major improvements in design for longer voyages. (Para 3.2.8.4)

36. Modern fishing vessels of 15-19 m. OAL are needed to exploit areas between 90-150 m. depths. (Para 3.2.8.4)
37. Mother vessels for on board processing and with refrigerated holds should be introduced to permit longer voyages by fishers. (Para 3.2.9.3)

38. A time bound programme should be undertaken to improve the hygiene and infrastructure facilities at the fish landing centres and fishing harbours including establishment of Aqua shops etc. (Para 3.2.12.2)

39. New minor fishery harbours and fish landing centres should be constructed in accordance with the Master Plan to comfortably accommodate the boats in operation and also ensure hygiene standards particularly for exports. (Para 3.2.12.3)

40. A Central Fishery Harbour Development Authority for composite planning and efficient management of all fish harbours and landing centres should be set up. (Para 3.2.12.6)

41. States must liberalize their leasing polices for promoting mariculture. (Para 3.2.13.2)

42. An All India Coordinated Research Project on Mariculture should be set up for transfer of technology and demonstration to tap the eminence opportunity available in the coastal area for mariculture. (Para 3.2.13.3)

43. States must also formulate/liberalize leasing policies to encourage establishment and the use of Artificial Fish Habitats (AHD) for higher yield of oceanic tuna and Artificial Reefs to provide shelter to fish for breeding and feeding etc. (Para 3.2.15.1 and 3.2.15.2)

44. An All India Master Plan for HRD should be prepared and Fish for All training centres on the pattern of KVKs should be set up for capacity building of fishers. (Para 3.2.18.2)

45. A comprehensive legislation to regulate Indian Fishing Vessels in our EEZ should be promulgated. It should prohibit transfer of catch on high seas and provide further catch to be unloaded only on Indian soil where sufficient spare capacity exists for processing. (Para 3.2.19.1)

46. A separate Department of Fisheries under the Ministry of Agriculture should be set up in the Government of India. (Para 3.2.21.1)

47. State wise Fresh Water Aquaculture Development Plan prepared by CIFA, Bhubaneswar under ICAR, should be discussed with concerned states by DAHDF to identify constraints and ensure speedy implementation with appropriate inputs. (Para 3.2.22.1)
1. A National Hill Coordinating Centre should be established to integrate all programmes of the Govt. of India on Hill Agriculture. The Centre may be chaired by the Union Minister for Agriculture and closely linked with other concerned Ministries and the National Development Council.

2. A National Hill Agriculture and Livelihood Development Fund should be created for judicious implementation of Hill Policy.

3. The existing North Eastern Council and Western Ghat, Eastern Ghat and Deccan Plateau Development Programmes should be overhauled.

4. A Hill Farmers’ Council for Sustainable Food Security should be established to coordinate various ongoing programmes related to food security.

5. The Land Use Boards should be restructured to be able to advise farmers on agro-economical, ecological and market opportunities.

6. A National Research Centre on Glacierology should be established for collection, storage and dissemination of information on status of seasonal/perennial snow and ice and for research leading to systems for early, medium and long term warnings.

7. Implement the recommendations of the Swaminathan Committee recently made for strengthening R&TD and human resources development and deployment in NER.

8. The National Horticulture Mission should allocate adequate funds to hill States to establish mother nurseries and progeny orchards of identified varieties. It should give highest priority to value addition, processing, prevention of post-harvest losses and marketing.

9. Seed Banks should be established and preferably operated by SHGs and WSHGs to ensure regular flow of quality planting material.

10. Separate Regional Master Plans for Market Development in NER and NWR should be prepared.

11. GOI should assist banks to cover undue risk in hill agriculture.
12. All agricultural development programmes should be engendered. The indigenous and traditional knowledge uniquely held by female farmers of the hills not only should be protected but also duly rewarded.

CHAPTER 4.2: ARID AGRO-ECOSYSTEMS

1. Arid region be separated from semi arid regions of the country for an exclusive policy for drought proofing, land management and livelihood security.

2. Various ongoing Central and State Plans in the region should be coordinated by the proposed MoA-hosted National Authority for Dryland Farming Areas (NADFA). A National Committee on Sustainable Land Management (SLM) in Arid Agro Ecosystem under NADFA should be constituted to monitor the outcome of various programmes in the region.

3. Arid Zone States should constitute State level Committees, which conjointly with the National Committee should ensure timely flow of the earmarked funds through the District Sustainable Land Management Consortium to Panchayati Raj Institutions.

4. During the next seven years, both Central and State Governments should at least double their investments in arid zones in particular and fifteen percent of the development budget should be allocated to on-farm strategic research.

5. Fodder, feed, food, grain, seed and water banks should be established at strategic points and preferably operated by SHGs.

6. Various water-related development programmes should be coordinated under one umbrella and synergised under the District SLM Consortium.

7. Each KVK should be augmented with a post-harvest technology unit and may be redesignated as Krishi and Udyog Vigyan Kendra (KUVK).

8. Suratgarh Farm (Rajasthan) should be developed as an *ex situ* arid zone livestock germplasm repository.

9. The ICAR should establish a cold arid regional sub-station at Ladakh to generate technologies and develop new strategies for capturing the opportunities of the region.
CHAPTER 4.3: COASTAL ZONE AGRICULTURE

1. Initiate Programme on “Sea Water Farming for Coastal Area Prosperity: Establishment of agro-aqua farms in about 50,000 ha in the States of Gujarat (Kutch), Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal, as well as in Andaman and Nicobar and Lakshadweep Islands. Coastal wastelands could be identified for this purpose.

2. Establish Women’s Aquaculture Estates along the coast through Women’s Development Corporations and financial institutions for the purpose of assisting dalit and fisherwomen to take to sustainable and profitable aquaculture.

3. There is need for a Coastal Systems Research Programme (CSR) on the lines of Farming Systems Research Programme carried out in inland areas. We recommend that ICAR may initiate an All India Co-ordinated Research Programme on coastal agriculture jointly with CSIR.

4. A National Board for Sea Water Farming (agriculture will cover crop and animal husbandry, fisheries, forestry and agro-forestry) may be set up under the Chairmanship of Minister for Agriculture and Food with the Ministers in charge of Environment and Forests, Science & Technology, Ocean Development, Water Resources and Commerce and senior representatives from all the Coastal States and Andaman & Nicobar and Lakshadweep Islands as Members.

CHAPTER 4.4: MISSION FOR THE PROSPERITY OF SUGARCANE FARMERS

1. A Technology Mission on Sugarcane (TMS) is suggested for 5 years for improving the productivity and quality of sugarcane so as to have enough sugarcane to produce annually 25 million ton of sugar without any increase in the area under the crop.
2. The TMS may be placed under the exclusive charge of a senior officer of the Govt. of India to be designated as ‘Mission Director’.

3. In the major sugarcane producing States, the Governments may designate a State level ‘Mission Director’ to act as ‘nodal officer’.

4. A High Level Committee of 15 members with representatives from the Government of India, States Government [on rotational basis] banks [rotational basis] Research Institutions, NABARD, RBI, Industry and Farmers under the Chairmanship of the Hon’ble Union Agriculture Minister to oversee the programme.

5. Similar Committees in the ten major sugarcane producing States be constituted.

CHAPTER 4.5: CONSERVATION, CULTIVATION AND MARKETING OF MEDICINAL PLANTS

1. Set up National Mission on Medicinal and Aromatic Plants. To start with, it maybe a Mini Mission under the National Horticulture Mission. The Mission should have a Policy Guidance Committee (PGC), an apex level body comprising the Ministers of Agriculture, Health, Environment & Forests, Commerce and Science & Technology, to give direction. The PGC could guide the restructuring of the National Medicinal Plants Board (NMPB) on the lines of NDDB.

2. Medicinal Plants Growers’ Associations each covering about 100 ha could be formed on the model of SHGs

3. Pricing: The Commission on Agricultural Costs and Prices (CACP) of the Ministry of Agriculture, in close consultation with the Ministry of Environment and Forests, and Department of AYUSH of the Ministry of Health, particularly the NMPB, and Ministry of Commerce, should address the problem of pricing.

4. Herbal Biovalleys may be developed on the model of the Silicon Valley for providing the infrastructure needed for the conservation and sustainable use of medicinal plants. A Project Design Team may be immediately constituted with members drawn from the
NMPB, NBDB, NHM, NABARD and APEDA, to prepare a Business Plan for the world’s first Herbal Biovalley in Kerala as recommended by the Kerala Commission on WTO Concerns in Agriculture, and at other suitable locations in Western and Eastern Ghats, and western, central, eastern, Himalayas and in the N E Region.

CHAPTER 4.6: ORGANIC FARMING

1. Promote formation of Small Farmers’ **Organic Agriculture Estates and Organic Farmers’ Clubs**

2. Organize a **National Federation of Organic Farmers’ Associations** on the pattern of IFOAM.

3. **Organic Farming Zones** can be promoted under the National Horticulture Mission for fruits, vegetables, tea, spices and medicinal plants, so that certification and quality control become easy.

4. Develop a national strategy for organic farming, specifying regions, crops and seasons, ideal for raising crops through organic farming techniques.

CHAPTER 4.7: BIO-FUELS

1. A well-defined **Biofuel policy** based on science and economics needs to be developed jointly by the Union Planning Commission, Ministries of Agriculture, Rural Development, Petroleum, Non-Conventional Energy Sources and Science & Technology. ICAR and CSIR will have to be actively associated.

2. **Set up a National Biofuel Board.** The Board may have the following composition:
   - Chairperson : An eminent professional in the area of biofuels
   - Members : Member (Agriculture) incharge of feedstock production
   - Member (Processing and quality control)
   - Member (Marketing, industry-farmer linkages through contract purchase etc.)
   - Member (Centre – State coordination, linkages with private sector, global technology watch)
A Board of the above kind may function like the Atomic Energy Commission with specific targets, autonomy and accountability.

CHAPTER 5: AGRICULTURAL MARKET REFORMS

1. The APMC Act in different States/Union Territories needs to be amended on the lines of the draft of the amended. APMC Act circulated by the Government of India. It would encourage private sector investment in development of agricultural marketing.

2. Need for review of the Essential Commodity Act and other Acts/Orders concerning storing, marketing and processing etc of the agricultural commodities.

3. Improve the marketing infrastructure and bring about more transparency in auction and other marketing related matters in the regulated matters.

4. The role of the Agricultural Produce Marketing Committees and the State Agricultural Marketing Boards to change from regulation to development and promotion of markets for the local products and better marketing practices.

5. Restructure the Land Use Boards and provide technical support to then to give pro-active advice to the farmers based on meteorological, marketing and managerial information on matters concerning choice of crops/varieties/timing/marketing etc.

6. Establish commodity based farmer’s organisation to develop market orientation among the farmers and articulate farmer’s issues on commodity basis.

7. Develop a farmer centric ‘Code of Conduct’ for contract farming and encourage farmer’s groups/organisations to deal with the purchaser/processor.

Reduce the post harvest losses by training, development of appropriate equipments, facilities and also tightening of the supply chain. Encourage farmer’s groups/cooperative societies to involve in marketing of agricultural produce.
CHAPTER 1
FROM CRISIS TO CONFIDENCE

1.1.0 The Setting

1.1.1 The first report of the NCF was presented to the Government in December 2004. We are indebted to the Government of India as well as to several State Governments for taking prompt action on some of our recommendations. The Union Planning Commission has made an in-depth appraisal of the progress made in agriculture and allied sectors as part of the Mid-term appraisal of Tenth Five Year Plan (2002-2007). The findings were discussed at the 51st meeting of the National Development Council (NDC) on 27-28 June, 2005. It will be appropriate to begin this second report of NCF with a few quotations from the points made by the Prime Minister, the Union Minister for Agriculture and the Deputy Chairman of the Union Planning Commission at the NDC meeting.

1.2.0 Points made at the NDC meeting

Dr. Manmohan Singh, Prime Minister:

1.2.1 “A particularly disturbing aspect of our performance over the past several years is that agricultural growth has decelerated after the mid-1990’s. Agriculture had grown at 3.2% from 1980 to 1996. It decelerated to 2.1% during the Ninth Plan. The cornerstone of the Tenth Plan strategy was a reversal of the declining trend in the growth rate of agriculture and with a target for agricultural growth at 4%. Unfortunately, actual performance of agriculture appears to have deteriorated even further and will possibly not exceed 1.5% during the first 3 years of the Plan…… Correcting this must be accorded the highest priority……. We must have the ambition to double our agricultural production in ten years.”

1.2.2 Shri. Sharad Pawar, Union Minister of Agriculture, Food & Civil Supplies, Consumer Affairs and Public Distribution:

“The tragic incidents of farmers’ suicides in some of the States have been a matter of serious concern……. crop losses, consecutive failure of monsoon, recurrent
droughts, mounting debts, monocropping, land tenancy, etc., seem to be some of the main causes…… 76% of the victims were dependant on rainfed agriculture and 78% were small and marginal farmers…… 76% and 82% of the victim households had borrowed from non-institutional sources in 2000-01 and 2002-03 respectively. The interest rates charged on such debts ranged from 24 to 36%, as compared to 9-12% on institutional credit.”

1.2.3 “The livestock sector is extremely important for providing supplemental income to the farmers. Studies have shown that farmers’ suicide is practically non-existant in areas where the farmers have opportunity to earn income by activities like dairying……. But the fact remains that our cattle productivity is one of the lowest in the world.”

1.2.4 “Agriculture sector is covered in the State List of the Seventh Schedule to the Constitution. Hence, it is the primary responsibility of the State Governments to develop and promote agriculture and increase its production and productivity….. The share of agriculture and allied activities in the total allocation of all State/ UTs taken together is a meagre 6.46% for the Tenth Five Year Plan and 5.62% for the Annual Plan of 2003-04.”

1.2.5 Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission:

“Agricultural growth has decelerated from 3.2% in the period 1980-81 to 1995-96 to an average of below 2% subsequently….. Employment generation in the economy is not upto expectations. Organised sector employment has fallen in absolute terms in the last three years……. The situation regarding groundwater use is also very disturbing. There is excessive drawal of groundwater leading to an alarming lowering of the water table in many areas….. Rainfed areas account for two-thirds of the cultivable area at present and it is necessary to develop a coherent strategy for water conservation and management for these areas.”

1.2.6 Thus, our agriculture is in a state of crisis. The rate of growth in food production has fallen below population growth rate. To achieve a 4% growth rate in agriculture, we must aim at a 8% growth rate in horticulture and animal husbandry. How are we going to achieve these goals? This calls for a higher investment in irrigation, animal husbandry, fisheries, post-harvest technology, rural energy supply and communication. The investment in agriculture has stagnated at 1.3% of GNP during the last three Five Year Plans.
1.3.0 The Agrarian Crisis: Remedies

1.3.1 The Prime Minister and Minister for Agriculture and Food have both suggested several measures to overcome the agrarian crisis. The Prime Minister has emphasized the need for increasing investments in the entire chain of activities related to agriculture and for promoting water efficient technologies. He has called for a sharper focus on strategic research and extension for overcoming the current technology fatigue.

1.3.2 The Agriculture and Food Minister has advocated a greater focus on the development of marketing infrastructure and the introduction of marketing laws conducive to direct marketing and contract farming. He has also pleaded for making the National Horticulture Mission which has a Plan outlay of Rs. 2300 crores during the remaining part of the Tenth Plan period, a success.

1.3.3 The agricultural crisis should be viewed not just in terms of growth rates. If we place faces behind figures, over 400 million children, women and men belonging to families with small and marginal holdings, as well as landless labour families, are in deep distress. This explains why we are off-track in achieving the UN Millennium Development Goals in the areas of reducing poverty induced hunger or under-nutrition, infant and maternal mortality rates and control of major diseases (Table - 1). According to a survey carried out by NSSO, on behalf of the Ministry of Agriculture, 40% of the 51,770 farm households surveyed said that they would quit agriculture, given a chance. No wonder, the mass media have started focusing attention on hunger and farmers’ distress hotspots. For example, the July 4, 2005 issue of a national magazine (Outlook) contains a cover page article on “The death of the Indian Farmer”, to highlight the fact that “trapped in a vicious cycle of crop failure, high debt and penury, the Indian farmers’ future is an endless night.”
## TABLE - 1

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Year</th>
<th>Value</th>
<th>On track Value</th>
<th>MDG target value</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>Proportion of population below poverty line (%)</td>
<td>1999-2000</td>
<td>26.1</td>
<td>30</td>
<td>18.75</td>
<td>On track</td>
</tr>
<tr>
<td>Undernourished people as % of total population</td>
<td>1999-2000</td>
<td>53</td>
<td>49.8</td>
<td>31.1</td>
<td>Off track</td>
</tr>
<tr>
<td>Proportion of undernourished children</td>
<td>1998</td>
<td>47</td>
<td>46.1</td>
<td>27.4</td>
<td>Off track</td>
</tr>
<tr>
<td>Literacy rate of 15-24 years old</td>
<td>2001</td>
<td>73.3</td>
<td>N.A.</td>
<td>None</td>
<td>N.A</td>
</tr>
<tr>
<td>Ratio of girls to boys in primary education</td>
<td>2000</td>
<td>0.77</td>
<td>0.83</td>
<td>1</td>
<td>Off track</td>
</tr>
<tr>
<td>Ratio of girls to boys in secondary education</td>
<td>2001</td>
<td>0.68</td>
<td>0.79</td>
<td>1</td>
<td>Off track</td>
</tr>
<tr>
<td>Under five mortality rate (per 1000 live births)</td>
<td>2001</td>
<td>93</td>
<td>87</td>
<td>41</td>
<td>Off track</td>
</tr>
<tr>
<td>Infant mortality rate (per 1000 live births)</td>
<td>2001</td>
<td>66</td>
<td>56.7</td>
<td>27</td>
<td>Off track</td>
</tr>
<tr>
<td>Maternal mortality ratio (per 100,000 live births)</td>
<td>1998</td>
<td>407</td>
<td>332</td>
<td>129</td>
<td>Off track</td>
</tr>
<tr>
<td>Population with sustainable access to an improved water source, rural (%)</td>
<td>2000</td>
<td>79</td>
<td>69</td>
<td>80.5</td>
<td>On track</td>
</tr>
<tr>
<td>Population with sustainable access to an improved water source, urban (%)</td>
<td>2000</td>
<td>95</td>
<td>90</td>
<td>94</td>
<td>On track</td>
</tr>
<tr>
<td>Population with access to sanitation urban (%)</td>
<td>2000</td>
<td>61</td>
<td>55</td>
<td>72</td>
<td>On track</td>
</tr>
<tr>
<td>Population with access to sanitation rural (%)</td>
<td>2001</td>
<td>21.91</td>
<td>39.3</td>
<td>72</td>
<td>Off track</td>
</tr>
</tbody>
</table>

Source: Mid-term Appraisal of Tenth Five Year Plan (2002-2007), GoI, Planning Commission, June 2005

### 1.4.0 From Crisis to Confidence

1.4.1 How can we once again generate confidence in our agricultural capability? How can we convert despair into hope in farmers’ homes? Several solutions had been
offered in our first report and it may be appropriate to reiterate their importance
and urgency, since they are yet to be implemented. We cannot afford to relax in the
field of agriculture, since apart from its deep human and livelihood implications,
agricultural decline will erode national sovereignty in the area of foreign policy.
Accelerated agricultural progress will confer multiple benefits – nutritional, economic,
ecological, social and political.

1.4.2 Under WTO regulations, extending essential and life-saving services to resource
poor farmers will not be considered trade distorting. The following steps, recommended
in our first report, need to be implemented without further delay:

i) **Water for Agriculture:**
Implement a Million Wells Recharge programme, make water harvesting
mandatory and restore water bodies.

ii) **Soil Health Enhancement:**
Establish a **Network of advanced soil testing laboratories** capable of testing
large numbers of soil samples for 16 macro and micronutrients and issue a **Soil
Health Card** to every farm family. Remove the hidden hunger of soils by
providing the necessary micro-nutrients. Micro-nutrient deficiencies are
widespread in all our soil types and as a single step, the amelioration of soil
hunger makes the largest contribution to productivity improvement.

iii) **Bridging the widening gap between scientific know-how and field level
do-how:**
Establish without any further delay about 50,000 Farm Schools for the purpose of
farmer-to-farmer learning. The Farm Schools should be established in the fields of
farmer achievers who are actually enhancing productivity and profitability in
their farms through scientific and sustainable agriculture. Priority may be given in
the areas of horticulture, crop-livestock, mixed farming, organic farming, agro-
forestry and aquaculture for establishing Farm Schools. The establishment of such
Farm Schools will add the dimension of **engagement with farm families**, to
extension.
iv) **Capacity building in post-harvest technology:**
This is an urgent task, particularly with the initiation of a National Horticulture Mission. **All existing KVKs should be equipped with facilities for training in post harvest technology as soon as possible.** Capacity building in post harvest technology, and imparting quality literacy (*Codex alimentarius* standards of food safety) are absolutely essential for realizing the goal of enhancing the productivity and quality of horticulture crops.

v) **Dryland Farming:**
Large scale demonstrations may be initiated with hybrid **Arhar** (*Cajanus Cajan*), to initiate a productivity revolution in pulses. Application of micronutrients, and introduction of new implements are other urgent tasks.

vi) **Horticulture:**
Organise **Small Holders’ Horticulture Estates**, to provide the power of scale to small producers at the production and post-harvest phases of the horticulture enterprises; increase investment on post-harvest technology and quality literacy; organize **horticulture seed villages** to produce and market good quality seeds and planting material and to generate new opportunities for skilled employment for rural women.

vii) **Cotton:**
Streamline Mission Management and organise Small Holders’ Cotton Estates. Replicate Maharashtra’s organic cotton experience, wherever feasible. Increase import duty on cotton by 30% as recommended in our first report.

viii) **Livestock and Livelihoods:**
The Union Minister for Agriculture and Food has rightly emphasized in his address to the NDC the importance of livestock in ensuring minimum income and nutrition security to small farm families. Breed, feed and health management hold the key to enhancing livestock productivity. Breed improvement in a slow process, except in poultry. Improved nutrition will help to increase milk-yield by at least 50%. Fodder and feed are the major constraints in improving productivity. Hence, a **Livestock Food Corporation of India** may be organized for the purpose of promoting the growth of Fodder and Feed Self-Help Groups (SHGs).
and Fodder and Feed Banks set-up all over the country by local SHGs with financial support through NABARD and financial institutions. The Livestock Food Corporation should not be organized on the lines of FCI, but should be a promotional, facilitating and mentoring organization. If innovative steps for increasing the production of good quality fodder and feed are not taken, farm animal productivity will go down further. To make a significant impact on poverty reduction, our animal husbandry programmes should be pro-poor and pro-women. Since good grazing lands hardly exist now, we have to rely on stall-fed livestock enterprises. The proposed Livestock Food Corporation can also promote the fortification of all cellulosic biomass like rice straw. Its major aim should be to ensure fodder and feed security in all parts of the country. At the same time, all Central and State government farms should be maintained for fodder and feed production under the umbrella of the Livestock Food Corporation of India. They should not be handed over to private parties for non-agricultural uses.

ix) Harnessing Gram Panchayats and Gram Sabhas for spreading sustainable agricultural practices and quality and trade literacy:
The Eleventh Schedule (Article 243G) of the Constitution 73rd Amendment Act 1992 lists “agriculture, including agricultural extension” as the first among 29 items entrusted to Panchayats for attention and action. There are nearly 240,000 elected Panchayats and local bodies in the country. There are also more than one million elected women members of the Panchayats. If Panchayats are empowered technically, financially and legally to assume these responsibilities, they could become catalysts of accelerated agricultural progress, particularly in the areas of sustainable natural resources management and productivity enhancement. Atleast one male and one female member of each Panchayat could be trained in integrated pest management, integrated nutrient supply and scientific water management, so that they could promote the group endeavour needed for success among farm families.

x) Restructuring the management of Technology Missions in order to enable them to respond to farmers’ needs in an integrated manner:
a) In our first report, we had recommended that there should be a convergence of appropriate Technology Missions around a Watershed or the command area of an irrigation project. This is essential to derive maximum benefit in terms of yield and income from the available water resources.

b) A Technology Mission is one, which is technology rich, and which is characterized by well defined outcome indicators and monitoring tools. It is also characterized by an end-to-end approach, covering all steps in the cultivation-consumption chain. The Mission Director should be an eminent professional who is likely to occupy the position for at least 5 years and who will be accountable for the success of the Mission. Unfortunately, the Farm Technology Missions are tending to become subsidy rich and technology poor. Accountability is also lacking, with the result that in several important crops like pulses and oilseeds, home production is stagnating and imports are increasing. This is one of the causes for the expanding farmers’ distress in dry farming areas. The smaller the farm, the greater is the need for productivity improvement, so that the farm family can have additional marketable surplus.

c) Enhancement of small farm productivity coupled with assured and remunerative marketing opportunities is the most effective means of reducing rural poverty. Fortunately, there is much scope for enhancing productivity even with the technologies currently on the shelf, provided market linkages can be tied up. This is where farmer-centric cooperative group and contract marketing can help. It should be emphasized that agricultural decline is not just the result of supply side factors related to input use and extension, but also due to a slow growth in demand. The real per capita food consumption decline is absolute in the case of cereals, pulses and edible oils. Since small and marginal farmers constitute a substantial proportion of India’s population, consumption will go up, if such farm families have access to more income.

xi) Credit supply and reform:

At the macro level, in 2004-05, the agriculture credit of Rs 1,15,000 crores made available exceeded the target of Rs. 1,10,000 crores, according to the Banking Division of the Union Ministry of Finance. It is not so much lack of credit availability but the
interest rate at which loans are given to resource poor farmers that is the major problem today. If marketing is also not pro-small farmer, the capacity to repay loans gets diminished. **Hence credit reform should include not only enhancement of the total amount available for farm loans, but also a reduction in interest rates and linkage with market.**

### 1.5.0 Immediate Steps to avoid the tragedy of farmers’ suicides

1.5.1 The following steps have been suggested by experts and farmers’ associations working in this area:

**i) Credit and insurance:**

a) Repeal the Public Demand Recovery Act, enacted by the British between 1904 and 1912, under which farmers could be jailed for defaulting the State for a paltry sum.

b) Create a corpus (on the line of calamity funds) for assisting farmers affected by crop losses.

c) Reduce the rate of interest for crop loans to 4% simple, with Government support, instead of compound rate of interest for arrears. Amendments to the Banking Act in the 1980s, has enabled banks to charge compound interest for bank arrears. This multiplies the farmers’ outstanding dues thereby driving them to despair, particularly under conditions where pro-small farmer marketing arrangements do not exist.

d) The more the poverty levels, the higher appears to be the rate of interest. In the Kalahandi belt of Orissa, known for endemic hunger and starvation, farmers receive loans from private money-lenders at a stupendous interest rate of 460 per cent. In neighbouring Madhya Pradesh, the rate of interest varies from 160 per cent to 250 per cent and in Jharkand, tribals in Palamau district pay back at a rate of 130 percent. These poverty stricken areas should receive top priority for credit access.

e) Interest on loans in areas hit by drought and floods and for crops under heavy pest infestation, needs to be waived.
f) Ensure transparency at the block level for proper credit disbursal by involving panchayats, farmers’ organizations, other civil society organisations and district administration. The credit disbursal system is ridden with corruption; it is reported that in Bihar, the block office often siphons off about 20% from every loan sanctioned – the situation may be somewhat similar in other states also and deserves urgent verification and correction.

g) Reduce crop insurance premium to increase cover. At the same time, crop insurance cover needs to be immediately expanded to cover the entire country and all crops.

h) Announce a moratorium on debt recovery including loans from non-institutional sources in distress hotspots, till reasonable profit margins are recorded; stagger debt recovery in easy installments. For this purpose, liquidity support will have to be provided for localized banks like RRBs and District Central Cooperative Banks.

i) At present credit is generally available only for improved technologies like hybrid crops, crossbred cows, etc. There is a need to de-link the availability of credit from technology. Credit should also be available if the farmer is adopting sustainable farming practices including the upkeep of traditional breeds of cattle. NABARD could develop a suitable project for low external input sustainable agriculture and aquaculture (LEISA).

ii) Irrigation and Cropping Pattern:

a) Regulate cultivation of water intensive cash crops in “dark and grey zones”. All new crop varieties being introduced in the country from any source should be assessed for their water requirement.

b) Agronomists should present their data not just on the basis of productivity per hectare but on the basis of net income per unit of water.

c) Intensify programmes for the rejuvenation of traditional water harvesting structures and creation of new ones and implement the recommendations contained in the first report of NCF.
d) Introduce measures to prevent further exploitation of groundwater in the dark zone, whether by public or private parties.

**iii) Inputs:**

a) Introduce appropriate legislation to regulate and deter the sale of spurious seeds and chemicals.

b) Marketing of inputs through retail shops may be assigned to registered agricultural graduates. Like the chemist shops, the agri-input shops could also be run exclusively by agriculture graduates. Women agricultural graduates could be encouraged and helped to start such Agri-input shops.

c) Promote community-based and managed seed production and marketing units at the village level and organize seed villages for this purpose.

d) Promote integrated pest management and integrated plant nutrient management systems.

**iv) Agriculture Marketing and Prices:**

a) Implement MSP for coarse cereals and pulses, which are the primary crops in rainfed drylands across the country. MSP as well as procurement need to be strengthened in the suicide hotspot areas of Andhra Pradesh, Karnataka, Kerala and Maharashtra.

b) Create a corpus for stabilizing price fluctuations.

c) Introduce quantitative restrictions on imports of farm commodities which constitute the backbone of the livelihood security system in dry farming areas.

1.5.2 The suicides of farmers are a symptom of a larger process, a reflection of a far wider rural distress. Thousands of households that have not seen suicides are also in the distress zone and hence should receive urgent attention.

1.5.3 Based on the above suggestions, it would be prudent to introduce a **Farmers’ Livelihood Security Compact**.

1.5.4 The Farmers’ Livelihood Security Compact could consist of the following integrated package of measures:

1.5.4.1 **Farmers’ Voices: Farm men and women** have plenty to say. Yet, information from their side hardly seems to be heard with any degree of seriousness by the authorities
who should be listening. If we do not listen to them, the suicides will not stop. There must be regular interaction between relevant authorities and small farmers as a first step. **State level Farmers’ Commission** could be set up for the purpose of ensuring dynamic government response to farmers’ problems.

1.5.4.2 **Census of Suicides**: It would be prudent to take note of field realities, which force farmers to end their lives. Reliable statistics will help to measure the impact of redressal measures.

1.5.4.3 **Urgent stepping-up of credit**: Inspite of Government pronouncements, credit is, becoming increasingly difficult to access. Indeed, official policies and agencies at all levels are making access to credit more difficult. According to one expert, the Cotton Federation in Vidharbha, which was set up to aid small farmers, *acts instead as a loan recovery arm of the banks*. So farmers who have had a bad year in 2004 may not go to the Federation with their produce in 2005 even if they have a good harvest. The Federation would cut their bank loan amounts from the meagre payouts. Which means the farmers would turn to private traders and will not be able to access the minimum support price. Many of the Vidharbha suicides were of farmers who had lost hope in the Federation and turned to private traders.

1.5.4.4 If we cannot urgently address the problem of credit, we can forget about even slowing down the suicides, let alone stopping them. A **paradigm shift from microfinance to Livelihood Finance is called for**. So serious is the credit crisis that in a few instances small moneylenders have also taken their lives. This is because their clients have all unavoidably defaulted. There is also an incredible amount of fiddling with what credit for agriculture means. So-called Grameen banks are giving loans not for agricultural activities but for constructing buildings of private hospitals, private colleges, and even company showrooms. This is within their largely rural districts, and can be passed off as rural credit. There is need to check the break-up of the loans given by Grameen banks.

1.5.4.5 **Debt survey**: There is an urgent need for a proper All-India Debt Survey conducted on very different terms. The survey should take into account newer forms of credit and indebtedness and newer forms of bondage.
1.5.4.6 **Debt waiver:** For the smallest and the weakest, a debt waiver would bring some immediate relief. The amount that is to be the cut-off point could be worked out in consultation with Panchayats and farmers’ representatives in the distress hotspot areas.

1.5.4.7 **Insurance revival:** Owing to no fault of their own, lakhs of farmers have seen their insurance policies lapse after the initial two payments. There are provisions in the insurance laws that allow LIC to revive the lapsed policies. Indeed, it would be in the interest of LIC to do so. If done, in Andhra alone, this would place Rs. 1,000 crore back in the farmers’ accounts and give many a sense of confidence.

1.5.4.8 **Parivar Bima Policy:** The integrated family insurance policy recommended by NCF in its first report deserves to be examined and introduced, to begin with, in dry farming areas. The example of Assam in this respect is worthy of being followed by other states.

1.5.4.9 **Urgent need for employment:** The slow and halting march of the employment guarantee scheme and food-for-work programmes is a matter of utmost concern. Not only is distress mounting in rural households, migrations are increasing. In Kerala, famous for out-migration, Wayanad was the one district that saw little of it and, in fact, had considerable in-migration. All that has changed with the agrarian crisis. From districts like Mahbubnagar in Andhra Pradesh, migrants go in lakhs seeking work in Mumbai and its surrounding regions. Many go to astonishingly far-off places in other parts of the country, driven by hunger and an absence of work. Indeed, the employment guarantee in its present version will not even begin to meet this problem. A radical approach to creating far more days of work is crucial at this point. The proposal to bring an additional 10 million ha under assured irrigation and the other components of the Bharat Nirman programme would help to enlarge employment opportunities in villages.

1.5.4.10 **Policies for Irrigation Water:** Water conservation, equity and fairness and public good will have to be the basis of water policies. Privatization should not work against the interests of small and marginal farmers. In the small town of Hindupur, in AP, residents are spending an estimated Rs. 8 crores a year on drinking water. Farmers meanwhile, pay up to Rs. 12,000 for a single ‘wetting’ of their water-starved fields. Irrigation policies need to be viewed in a holistic manner and made pro-poor.
1.5.4.11 **Revising import policies:** In the context of the Kerala suicides, there is an urgent need for a revision of existing rules. Inferior quality pepper is entering the state in thousands of tonnes and, after being mixed with Malabar pepper, is then being exported to overseas markets as Indian pepper. This is destroying the market for genuine Malabar pepper - the best (premium quality) in the world. And many suicides are indeed linked to the crash in the prices of pepper and coffee. The government order of December 2004 stopped such imports from most countries except Sri Lanka. This loophole is being systematically exploited ever since. Low-grade pepper from places like Vietnam and Indonesia now first goes to Sri Lanka (*where it enters with no duties*). All this then enters India as “Sri Lankan pepper” when it is in fact nothing of the sort. The measures of the Kerala government to meet this crisis involve policing farms in Wayanad, while it is the import policy that needs review.

1.5.4.12 **Addressing the problem of cotton:** Some swift action on import duties is also a must in the case of Vidharbha’s poor cotton farmers. Nearly 30 lakh people are dependent on that crop for their livelihoods. With great difficulty, they managed to have the import duty on cotton raised from five per cent to ten per cent. In contrast, the duty in the case of import of sugar is 60%. The cotton growers head the list of farmers who have committed suicide in Maharashtra and hence deserve to be treated on the lines of the sugarcane farmer. The estimated purchase of cotton in Maharashtra during this year is 202 lakh quintals at a cost of Rs. 4600 crores. However, the amount paid was only Rs 750 crores. Since cotton farmers did not get their full payment, they were in distress. Monopoly intervention in cotton purchase by State Governments needs careful review. Also, in our first report we had recommended increasing import duty on cotton to 30%. This needs to be implemented immediately.

1.5.4.13 **Ending extortion in tenancy rates:** In Andhra, quick moves need to be made to end extortionist rates of tenancy and lease. Many small farmers, in coastal AP for instance, are crushed by having to part with over 80 per cent of their produce as rent. **There is an urgent need to implement land reform measures. Some of these already exist and need to be enforced.**
1.5.4.14 **Investment in agriculture:** The misery of farmers cannot be halted if urgent steps are not taken to increase investment in agriculture to a far greater level than it is now. The agrarian crisis is a component of a far wider and deeper rural distress. **Even if agriculture’s share of GDP has dipped, its centrality to life is such that every section and sector do badly when agriculture does badly.** Suicides of farmers are followed by hunger deaths, for instance, amongst carpenters and weavers as in the case of Andhra Pradesh, who have lost both their market (with the falling purchasing power of their clients) and also their meagre subsidies.

1.5.4.15 **Access to affordable inputs is crucial:** No less important than listening to the farmers is to undo the extraordinary damage that harmful policies have inflicted on them.

   i) Input prices have simply shot up and are still escalating. It is possible today that a farmer in Telangana owning eight acres of paddy land may still be below the official poverty line. The government must urgently intervene to ensure that seed and other inputs reach farmers at affordable costs and at the right time and place. Resource poor farm families should not be left to the mercy of input dealers who have emerged as the new moneylenders of the countryside.

   ii) Quality control is becoming increasingly important. For example, in the district of Yavatmal in Maharashtra, 1,200 shops have sprung up selling seed and other inputs. There is one quality control inspector to oversee the lot. This is a region where re-sowing has frequently occurred, not merely due to poor rainfall but also due to sub-standard inputs like poor quality seed. The maximum punishment for selling fake seed (except where new laws have been passed) is a meagre Rs. 500.

   iii) **Appropriate regulation an urgent must:** Control has also to be exercised over false and exaggerated claims for inputs. It is frightening that desperate farmers are going in for unproven and poorly tested inputs on a large scale in sheer desperation. This being done often will increase credit obtained from moneylenders. Quality control is especially urgent in the case of bio-fertilizers and bio-pesticides.

   iv) The setting of standards means the re-introduction of firm regulation where required. Companies have drastically lowered the minimum germination rate they assure farmers. In the case of seed, this has fallen to as low as 60 per cent. This
means a village buying 1000 bags of seed pays for that number, but gets only 600 in effect. Such unscrupulous groups, companies and individuals pushing such practices must be brought to book and accountability must be ensured.

1.5.4.16 Overhauling farmers’ markets: Swift action is required to overhaul the ryuthu bazars or farmers’ markets. Most of these are presently controlled not by farmers but by traders, from whose control they must be released. Even the “farmers’ markets” are now heavily loaded against the small producers. Cartels and trader networks manipulate these and rig prices systematically. Amendments to APMA, as suggested by the Union Agriculture Ministry, need to be carried out by State Governments as soon as possible. Several State Governments have already taken action to reform the agricultural marketing system. There is also need for introducing focused Market Intervention Scheme.

1.5.4.17 Extension work: Several states have been systematically withdrawing from extension work. Few things could be more problematic, at a time when the farmer is desperately and urgently in need of sound advice and expertise on a range of issues.

i) The vital role of the Agriculture Extension Officer must be recognised and the system revived and strengthened. At the same time, Farm Schools should be established at the grassroot level.

ii) Quite a few farmers took their lives after crop failures, which in some cases could have been avoided by timely advice and technical assistance. There is also a tendency among some resource poor farmers to take to high cost technology without the capacity to incur losses due to factors beyond their control. In this context, it is also important to re-state the role of Agricultural universities. In some cases, major input dealers sit on the governing bodies of such universities and this often leads to major conflict of interests. Linkages between agricultural universities and farm communities must be completely restructured and strengthened.

iii) Agricultural and Animal Sciences Universities could form Hope Generation Teams (like NSS) of young male and female students who could stay in the distress villages during vacations and extend both technical and psychological support. The universities must be accountable to the farming community and not to private interests. The needs and demands of the community must be the first priority of such
bodies. The universities must also undertake a serious study of existing and emerging cropping patterns in their regions. The peripatetic hope generation teams could be a timely response to the crisis situation.

1.5.5 Basic services: Ultimately, steps to prevent farmers’ suicides cannot be divorced from steps to end the larger rural distress. That in turn cannot be de-linked from our overall policy framework. The distress sweeping rural India flows from the gradual collapse of public services. For instance, almost all the suicide and otherwise crisis-hit households record high health expenditures. Indeed, that is emerging as the second-fastest growing component of rural family debt. Yet the privatisation of basic services will only worsen this situation. There are documented instances of farmers mortgaging all their land in order to raise private loans to pay off health bills. There is urgent need for both affordable health insurance, as recommended in the first report of NCF and the revitalization of primary health care centres.

1.5.6 Likewise, the commercialisation of education is taking its toll on students from poor farm families in even the most educated state of them all - Kerala, particularly in crisis-hit Wayanad district. In rural Andhra, there are school students who have simply stopped going because their parents cannot afford the bus fare. The privatisation of utilities or the massive hikes in rates has also been a factor in farmers’ distress. In Andhra, the state shut down the irrigation development corporation in 1997. This was, predictably followed by a huge rush for private borewells. For an overwhelming number of those in distress in Andhra, their crisis was linked with water and borewells. There were years when spending on borewells was the major cause of debt.

1.5.7 Knowledge Empowerment: In addition to the above steps, there is need for establishing Village Knowledge Centres (VKCs) in the farmers’ distress hotspots. These VKCs could be linked to a Block level Village Resource Centre (VRC) with the help of the Indian Space Research Organisation (ISRO). This will enable tele-conferencing and thereby facilitate immediate attention to distress calls. The VRC-VKC grid could provide dynamic and demand driven information on all aspects of agricultural and non-farm livelihoods. These centres of hope in areas where rural families had lost hope should be operated to the extent feasible, by the wives or children of the farmers who had unfortunately taken their lives. This will help to impart realism and a right sense of
priorities in the creation of content. Training and capacity building in the operation of such centers need to be done in local languages. ISRO has agreed to help in organizing such Knowledge Centres in the distress hotspot areas of Mahbubnagar, Wayanad, Vidharba and Karnataka in association with M S Swaminathan Research Foundation, Chennai.

1.6.0 Enlarging the export of farm commodities:

1.6.1 Safeguarding our position in Basmati rice exports:

In its report on agricultural biotechnology, the Swaminathan Committee had recommended that no genetically modified rice should be released in the name of basmati, since many countries including Europe have not approved the sale of genetically modified foodgrains. The Agricultural and Processed Food Products Export Development Authority (APEDA) and the All India Rice Exporters’ Association have brought to our attention another serious threat to our basmati rice exports.

While questioning the Rice Tec Patent in the United States, the characteristics of Indian Basmati were defined on the basis of the following three criteria.

a) A set of physical parameters such as length, breadth, elongation ratio and slenderness ratio.

b) Linkage to the original land races that trace back their history to poems of Heer-Ranjha and 18th century documentation.

c) Grown in geographically well-defined areas

1.6.2 Based on the above, the Ministry of Commerce notified Basmati standards under the E1A on 23 January 2001. Inspite of such clarification, several high yielding semi-dwarf stature aromatic rices are being released by research institutions under the name Basmati. Such a dilution of the pristine properties of traditional Indian Basmati, is now seriously threatening our export earnings from Basmati rices. Also, the “dwarf basmati” grains are being used for adulteration with traditional basmati varieties.

1.6.3 Research on new aromatic long grains should be encouraged but such varieties should be marketed under appropriate names and should not be called basmati. Basmati is not the only premium rice. Hence, new long grain, aromatic rices can stand on their own in the international markets without be termed basmati. It would
be in the interests of both farmers and the country, that we maintain the Indian basmati varieties, which are valued very highly in the international market, in their pristine purity. Otherwise, Pakistan basmati will eclipse the numerous strains being marketed from India, carrying the name basmati in the international market.

1.6.4 Therefore, the Ministry of Agriculture and ICAR should evolve a policy for ensuring that the appellate basmati is used only for traditional fine grain aromatic rices of great antiquity and of a specific geographic origin. The new high yielding fine grain aromatic rices can be given other appropriate names, since they have a good market potential without being called basmati. They can stand on their own merit, without diluting the historic halo, which surrounds the traditional Indian basmati rice.

1.6.5 We would urge that the following points may be kept in view in the area of nomenclature:

   i) The dilution of Basmati definition is not in the interests of either Basmati or the new varieties.
   ii) All long grain aromatic strains should not be called basmati.

1.6.6 In our first report, we had emphasized the urgent need for strengthening our infrastructure for sanitary and phytosanitary measures and for launching a trade and quality literacy movement among farm families. APEDA may be enabled to help Agricultural Universities organize a 1 Credit Course (12 lectures) for all Agricultural and Home Science College students on external trade opportunities and on methods of sustaining and expanding our agricultural exports.

1.6.7 There is need to explain the features of Codex alimentarius standards of food safety in villages. This can be done through the proposed grid of Village Knowledge Centres. Now that the Doha round of negotiations in agricultural trade are nearing completion, we should lose no further time in helping our farm families to become quality conscious, with reference to both home and external markets. Our agricultural competitiveness in the external market can be improved only if we help farm families to increase both productivity and quality of crops in demand in the global market.

1.7.0 Beyond Tsunami: Agronomic Rehabilitation of Tsunami affected coastal agriculture:

1.7.1 In the first report of NCF, detailed suggestions had been offered for the psychological, ecological and livelihood rehabilitation of tsunami affected coastal areas
in Tamil Nadu, Kerala, Pondicherry and the Andaman and Nicobar Islands. The main instrument for ecological rehabilitation is the establishment of bioshields, while the biovillage model of sustainable on-farm and off-farm livelihoods is the most effective pathway of ensuring work and income security. In several places, the seawater had entered prime agricultural land adjoining the coast, rendering both soil and water saline. About 6,000 ha of farmland are estimated to be affected in Tamil Nadu and Pondicherry. Ad hoc recommendations were being given to the affected farmers by both NGOs and government departments. **In particular, the indiscriminate application of gypsum was being recommended.**

1.7.2 NCF therefore organized a Travelling Workshop by a Team of Scientists drawn from the Central Soil Salinity Research Institute, Karnal, the Central Salt and Marine Chemicals Research Institute, Bhavnagar, the National Institute of Oceanography, Goa, the National Bureau of Soil Survey and Land Use Planning of ICAR, IARI, ICRISAT, the Tamil Nadu Agricultural University and MSSRF, from 16-18 July, 2005. Based on their advice, the following recommendations are made for the use of extension and research workers engaged in helping farmers in tsunami-affected areas to restore the health and productivity of their soils. **It is recommended that these recommendations based on the best possible technical expertise available in the country may be communicated to the concerned State Governments and the Andaman and Nicobar Islands administration by Secretary, Agriculture.**

1.7.3 **Recommendations of the Travelling Workshop**

1.7.3.1 Tsunami waves caused extensive damage to the basic agricultural resources like soil and water as well as to standing crops like paddy, groundnut, etc in some of the regions of Tamil Nadu and Pondicherry. Across the affected areas, the intensity as well as type of the damage vary. Since the devastating incident took place, the Department of Agriculture, Tamil Nadu along with concerned research institutes and NGOs have been involved in rehabilitating the affected farmland.

1.7.3.2 To understand the multi-dimensional nature of the problem and to develop science-based soil health rehabilitation packages. The participants of the workshop visited around nine villages (spot measurements for pH and EC were conducted and
discussions with farmers were held) in Nagapattinam and Cuddalore districts on 16\textsuperscript{th} and 17\textsuperscript{th} July 2005. On 18\textsuperscript{th} the team met at Chennai, discussed their field observations and arrived at the following recommendations:

1.7.3.3 Soil Health Restoration

Tsunami waves caused three kinds of damages to soil. These are:

a) Deposition of slushy grayish brown clay,
b) Deposition of sand, and
c) Sea water intrusion, which receded (within 3 hrs to one week from the field) leaving salts in the field

a) Deposition of slushy grayish brown clay deposit

This kind of damage was noticed exclusively in the southern parts of Nagapattinam district where the clay deposit thickness varied from 5 cm to 30 cms height. After drying it was 2mm to 50mm thick. The chemical analysis of the deposited material showed that it is rich in organic matter (0.6 – 1.2\%), having good water holding capacity and cation exchange capacity with an Exchangeable Sodium Percentage of 55\%. During the field visit (16\textsuperscript{th} July 2005), the pH and Electrical Conductivity (EC) of the sediments, which were scrapped and heaped in the field were found to be nearly 8.6 and 12.7 ds m\textsuperscript{-1} respectively.

Problems caused by clay surface deposits: Crust formation leading to physical barrier for aeration and germination; High amount of salts leading to the development of salinity; Danger of toxic material (heavy metals)

Management of clay deposits: The deposit can be mixed with soil by ploughing and it will improve soil texture, especially of the surface soil, water holding capacity and soil fertility. The incorporation of deposited material will not act as physical barrier since it cracks on drying and after mixing. The higher amount of salts will get leached down after the rainy season and thus it will not be a permanent source of salts, which could affect adversely the root growth. The deposit was scrapped and kept by some farmers in the field itself as heaps. It should be spread and incorporated into the soil to avoid the development of acute localized salinity.
b) **Management of soils with sand deposition**

This kind of damage was noticed in the mid and northern villages of Nagapattinam districts and southern regions of Cuddalore district. The thickness of the deposit varied from 2 – 5 cms. The deposit was scrapped and heaped in the field itself by some farmers. The analysis on 16\(^{th}\) and 17\(^{th}\) July 2005 showed a pH of nearly 6.5 and an EC of 8.3 ds M\(^{-1}\).

**Management of Sandy soils:** The sand deposit need not be scrapped, but may be ploughed back in the field itself. Wherever the material has been collected and left in the field as small heaps, it should be spread again in the field and mixed with the soil. Leaving the deposits as heaps in the field will aggravate local salinity.

c) **Seawater inundation**

This kind of damage was noticed in a few areas of Nagapattinam and Cuddalore districts. The seawater entered the field directly as well as through backwater canals. The water receded within a few hours (quickly) in some areas, and after five to seven days (slowly) in some other farms. Soil analysis shows that the soils have become salinised and not sodic and the soluble salts are dominated by Cl and SO\(_4\) and not by CO\(_3\) and bicarbonates. Hence, during leaching the pH will not go up, ESP and EC will decrease simultaneously during the reclamation process. Different soil depth analyses indicate that the top 0-2 cm depth soil has an EC of 25-120 ds m\(^{-1}\) with a pH of 7.2 - 8.2.Hence leaching with sufficient amount of canal water or rainfall will help to overcome the problem. Normally, rainfall should be heavy in this region during the Northeast Monsoon season (October-December).

**Use of gypsum:** A blanket application of gypsum for reclamation in the entire affected areas should be avoided. Gypsum application should be location specific i.e. where the pH is >8.5, ESP>15 and in cases where during reclamation the pH increases. It should be followed purely on the basis of soil test results.

The gypsum already supplied to the farmers at the rate of 500 kg per hectare could be used as a fertilizer to meet the calcium and sulphur nutrition needs of oil seed
crops like gingelly (seasame) and groundnut. In such cases the recommended dose would be around 100 to 200 kg/ha.

**Use of Organic Manure:** The soils are sandy in texture, and have low amounts of organic carbon. Farmers should be encouraged to go in for green manuring in addition to the judicious application of FYM, compost and biofertilizers.

**Restoration of water ponds inundated with seawater and deposits:** Most of the small water ponds located in the fields which are the source of irrigation for the second and third crop, were severely affected and at present the water is saline.

1.7.3.4 Agricultural Departments and farmers should be advised to take the following measures:

i) Physical removal of contaminated water through tankers and connected pipelines thus paving way to receive monsoon rains

ii) Surface leaching through rainfall and canal water

iii) Promoting rain water harvesting in household and farm ponds

iv) Desilting and interlinking drainage channels to facilitate the easy flow of water.

1.7.3.5 Desirable Cropping Systems:

The following crops and varieties are suggested for the forthcoming season in Tamil Nadu and Pondicherry:

a) Salt-tolerant crops/varieties have to be grown in the first year and the first crop should be preferably rice

b) Rice – TRY 1, TRY (R) 2, CO 47, ADT 43 and ADT 36

c) Ragi – TRY 1, Sunflower – CO4, Groundnut – VRI 2

d) Green gram (K 851, Pusa bold)

e) Brinjal (PLR 1, AU 1), Cluster bean (Pusa Now bahar)

f) Jack fruit (Palur 1), Pomegranate (Ganesh), Sapota (PKM 1)

g) Cashew (VRI 2 & 3), Amla (BSR 1) and Tamarind (PKM 1)

1.7.3.6 Specific agronomic practices for Rice

a) Aged seedlings (one week more than normal age) may be planted

b) Higher number (4-6 Nos.) of seedlings per hill may be planted

c) 25% extra N as basal dose may be added
d) Higher dose (40 kg/ha) of zinc sulphate has to be applied

e) At panicle initiation and 15 days after, foliar spraying of DAP 2% along with 1% urea and 1% potash may be done for increasing the yield

f) Soil testing based P application or apply 15 kg P/ha as maintainer dose

g) Sowing sprouted seeds (3 days) under delayed canal water availability or excess rainfall

1.7.3.7 **Application of FYM and Micro nutrients:** 12.5 t/ha may be applied for all the crops

1.7.3.8 **Promote integrated farming systems** involving crop-animal combination with suitable animal breeds and allied enterprises

1.7.3.9 **Crop diversification:** Promotion of horticulture and tree crops and value addition to the produce will help to increase income and employment. It would be in the interest of farmers to accord high priority to horticulture.

1.7.3.10 **Multiple Livelihoods:** There is a need to promote additional on-farm and non-farm enterprises like the preparation of coconut based value added products, apiculture, dairying, small growers poultry estates, cashew processing, production of bio-fertilizers and bio-pesticides. This would promote multiple employment opportunities not only to the majority of small and marginal farmers but also to the landless labourers who form a sizable part of the local population and who have lost their livelihood opportunities.

1.7.3.11 **Demonstrations of Agronomic Rehabilitation Practices:** It is suggested that a special demonstration cum field verification programme may be organised in tsunami affected agricultural areas based on an integrated crop-livestock farming system. The demonstrations may cover about 200 ha each and address the following major problems:

   i) Fields affected by clay deposits

   ii) Fields affected by sand deposits

   iii) Areas affected by seawater inundation

   There could be a combination of the above 3 forms of soil health hazards in some areas.

1.7.3.12 **The “Beyond Tsunami” Agricultural Rehabilitation Demonstration programme may include the following components:**

   i) **Soil health restoration**
ii) Water management and sea water replacement

iii) Crop and varietal choice

iv) Introduction of livestock farming for supplementary nutrition and income

v) Producer-oriented marketing

vi) Training and capacity building

vii) Monitoring at benchmark sites of the impact of the rehabilitation measures

1.7.3.13 The Tamil Nadu Agricultural University and the State Department of Agriculture could initiate these demonstration cum training programmes with technical help from CSSRI, Karnal, CSMCRI, Bhavnagar, NBSSLUP, Bangalore and ICRISAT, Hyderabad. **Funds for the Demonstration cum Training programme may be provided from the Tsunami Relief Allocation at the rate of Rs. 20 Lakhs per demonstration, each covering an area of 200 ha. In all about 15 such demonstrations may be organized in the affected states and in Andaman and Nicobar Islands at a cost of Rs. 3.00 crores.** This will have to be done immediately, if the problems of the tsunami affected farmers are to be solved and their livelihoods revived.

1.8.0 Indo-US Collaboration in Agronomic Rehabilitation Strategy:

1.8.1 Earlier this year in the USA, a group of scientists, professional, and technical experts came together to address the contaminated areas that had little hope of recovery. This group of professionals became the **GreenLine Group.** The group includes experts in sodium remediation, composting, organic farming, water treatment and other measures to restore the muddy rice fields and river delta areas in India that have very high levels of contamination from sea water.

1.8.2 **GreenLine Group** has offered to work closely with scientists in India and seeks a site in Tamil Nadu where they can help to start the first phase programme on 100 hectare of farm land. This first phase will be used to adjust the practices and procedures to the region and establish a teaching center which will be used for education and training to scale up the programme to other areas and regions.

1.8.3 This programme will utilize many proven technologies used throughout the United States. Plans are in place to restore the damaged lands and soil, but also to improve the soil quality, water quality, and increase farm and aquaculture production in
these areas. Additionally, several key universities, including Texas A&M, Pennsylvania State, and Texas Tech, will contribute scientists and graduate students to this first phase two year programme. This can become an important programme to promote sharing of knowledge and technology.

1.8.4 The impact of this programme on the farmers of this region can be realized in as little as six months, by restoring farming activity. The timing of this project is critical to launch at the beginning of the October monsoon season. The US Team will meet its own expenses. We suggest that Rs.1 crore may be allotted for this collaborative programme from the Prime Minister’s Relief Fund, which will be implemented by MSSRF, ICRISAT and the GreenLine Group.

1.9.0 Mission 2007 – Every Village a Knowledge Centre

1.9.1 In its first report, NCF stressed the need for knowledge connectivity in rural India, since for enhancing our agricultural efficiency and competitiveness, farm families need urgently the right information at the right place and at the right time. We envisaged that knowledge connectivity should be a key component of Bharat Nirman designed to provide a New Deal for Rural India. The NCF proposal received support in the union budget for 2005-06.

1.9.2 Shri P Chidambaram, Union Finance Minister, made the following announcement concerning Mission 2007 in his budget speech on 28 February 2005 “The National Commission on Farmers has recommended the establishment of Rural Knowledge Centres all over the country using modern information and communication technology (ICT). Mission 2007 is a national initiative launched by an alliance comprising nearly 80 organisations including civil society organizations. Their goal is to set up a Knowledge Centre in every village by the 60th anniversary of Independence Day. Government supports the goal, and I am glad to announce that Government has decided to join the alliance and route its support through NABARD. I propose to allow NABARD to provide Rs. 100 crore out of RIDF (i.e. Rural Infrastructure Development Fund).”

1.9.3 In order to impart the needed momentum to the rural knowledge revolution, NCF organized in collaboration with NABARD a discussion in Mumbai in April 2005 to prepare a road map for organizing ICT-SHGs (Self Help Groups), to begin with in 10
states, where the infrastructure for the rural ICT revolution exists. NABARD will provide Rs. 1 lakh each to 10,000 ICT-SHGs during 2005-06.

1.9.4 NCF also helped to organize the second convention of the National Alliance for Mission 2007: Every Village a Knowledge Centre at New Delhi on 11-12 July 2005. The convention was addressed by the President of India, Union Ministers for Finance and Panchayat Raj and the Chief Ministers of Rajasthan and Delhi, in addition to leading experts.

1.9.5 Based on the discussions held at the National Convention, NCF recommends for the consideration of the Government of India the following 5 action points.

**Action Point 1:** The Government of India should include in the *Bharat Nirman programme* the establishment of Village Knowledge Centres (VKCs) in each of the about 237,000 Panchayats in the country. VKCs also need to be established in the local bodies in the North East region. Apart from providing generic and dynamic information in areas relevant to rural livelihoods and agricultural marketing the VKCs can help to provide meaning and content to the *Right to Information Act 2005*.

**Action Point 2:** *Convergence and Synergy among public and private sector initiatives:* There is need for convergence and synergy among the numerous initiatives of Central and State Governments in the area of ICT for governance and development. The following are some of the major initiatives.

i) National e-governance plan (NeGP) announced in October 2004 and the technical and financial support proposed to be extended to the State Wide Area Network (SWAN). Additional Central assistance is proposed to be extended to all the states for initiating NeGP.

ii) A well articulated Broadband Policy announced in December 2004, followed by a notification on 28 January 2005 on de-licensing of the use of wireless equipment in band 2.4 GHz to 2.4835 GHz between 1 and 4 watt power.

iii) Notification on de-licensing of indoor use of low powered wireless equipment including Radio Local Area Networks in the frequency band 5.150 to 5.875 GHz with the maximum effective isotropic radiated power, using the built-in or indoor antenna.
iv) Commitment of the Government of India to set up 100,000 VKCs by 2007 through the Ministry of Communication and Information Technology.

v) Announcement of financial support for content development to the Northeastern states for the creation and operation of 487 Community Information Centres (CICs)

vi) Decision of the Union Planning Commission to re-establish the DISNIC – PLAN project, with institutional linkages to grassroot organizations and covering all the districts indentified for Employment Guarantee through NIC.

vii) Commitment of the Ministry for Panchayati Raj for providing facilities to house VKCs

viii) Enactment of the Right to Information Act 2005

ix) Setting up of a National Knowledge Commission under the chairmanship of Dr Sam Pitroda

x) Numerous initiatives in the private NGO and public sectors such as e-chaupal of ITC, VKCs and Village Resource Centres of MSSRF and ISRO, and Unlimited Potential Capacity building programme of Microsoft.

The National Alliance for Mission 2007 could help in promoting interaction and synergy among all these important initiatives in the public and private sectors.

**Action Point 3: Connectivity and Content: National Digital Gateways:** A Connectivity and Content Consortia involving all relevant government, academic and private sector institutions need to be set up in every district of the country. They can be organized under atleast 4 National Digital Gateways relating to fields such as agriculture and agribusiness, education, health and livelihoods. These national gateways should focus and respond to the needs of the rural families, by collecting, processing, packaging and disseminating demand driven information in **multi-lingual and multi-media formats.** This will help to overcome language and literacy barriers.

Scientists from ICRISAT, IIT Kanpur and MSSRF have proposed that standard thesaurus such as AGROVOC of the FAO should be considered the basis for design of agricultural information portals in India in multiple Indian languages. The AGROVOC also permits addition of new terms that are specific to local cultural practices. Using semantic web technology, context specific searches can be carried out. A standards-based
contents design process can then emerge. Conversion of AGROVOC into a number of Indian languages will make the proposed national gateway for online agricultural information in India a reality. Other agricultural research institutions should get involved in the exercise to hasten the process of conversion into different languages.

1.10.7 The National e-governance Plan (NeGP) envisages the setting up of over 100,000 Community Service Centres. This will help to ensure that all the Central and State e-governance services are available on the Internet and through VKCs.

**Action Point 4: Capacity Building:** The rural families should have a sense of ownership of VKCs. The Gram Sabhas could provide guidance on priorities in information needs. Ultimately, at least 1 woman and 1 man will have to be trained in each village as Master Trainers. The Jamsetji Tata National Virtual Academy for Rural Prosperity could be developed as the umbrella organization for capacity building. The rural women and men elected as Fellows of NVA could help to manage VKCs and in providing the needed information at the right time. They will also train other rural women and men in computer techniques and in adding value to information so as to convert generic into location-specific information.

**A Consortium of Capacity Building Institutions** will have to be organized for each language of communication. We recommend that the Ministries of Rural Development and Panchayati Raj provide Rs. 50 crores each for such training and capacity building activities during 2005-06. Members of the Capacity Building Consortia could also undertake mentoring services until the time the VKCs become self-reliant. **The Union Ministry of Agriculture may also provide Rs. 50 crores annually during the next 3 years for content creation and capacity building in the areas of crop and animal husbandry, fisheries, forestry, agro-processing and marketing and for imparting quality trade and genetic literacy.** The various Farm Technology Missions could work with VKCs in spreading information relevant to the improvement of productivity and profitability.

**Action Point 5: Organisation and Management:** This is a crucial component of Mission 2007. The greatest challenge will be in the area of organization and management. Organisation of VKCs can be undertaken by multiple agencies such as the following:
i) **Gram Panchayat Centred VKCs** under the Bharat Nirman programme, with guidance and oversight from Gram Sabhas.

ii) Community Centred and managed VKCs through ICT-SHG with support through NABARD.

iii) Commercial ICT-Kiosk models promoted by business and industry, NGOs and academic institutions.

1.9.6 All methods of organization should be based on the principles of gender sensitivity, social inclusion and antyodaya, so that the rural digital divide does not become one more factor in enlarging the rich-poor and gender divides.

1.9.7 The Village Knowledge Centre will be an important step in Government’s plan to reach out to 200 million subscribers with connectivity and providing over 4,000 community radio stations. We also recommend that a single window, time-bound licensing policy be implemented for providing one ham radio per Panchayat in all the 237,000 local bodies in the country.

1.9.8 The frequencies that are foreseen internationally for new technologies such as Wi Max should be vacated at an early date, so that there could be massive savings in communication costs. Also, we recommend that Government should remove the service tax (10.2%) currently levied on Internet Bandwidth in villages. As a single step, this will help to remove an important barrier in extending ICT services to rural areas.

1.9.9 **Synergising the Common Service Centres (CSC) of Department of Information Technology (DIT) with Mission 2007:** The recently announced DIT scheme for setting up 100,000 CSCs in rural areas emphasises entrepreneurship and revenue generation as its prime objectives. As per the guidelines, the DIT scheme appears to preclude a number of professional and non-governmental organizations and community-based SHGs who may not have so far implemented Knowledge Centres but would do so given an opportunity. The CSCs to succeed, should be inclusive, pro-poor and pro-women and should provide the necessary forward and backward linkages to the farmers, especially to the poor farmers, with value-added, locale-specific knowledge. It is important to ensure that farming communities run the CSCs with support from their Panchayats. The NCF recommends that the DIT scheme for Common Service Centres is brought under the umbrella of Mission 2007 and implemented as a part of Bharat Nirman. A monitoring
agency with strong civil society participation may be set up to ensure that the CSC scheme attains the national objectives.

1.9.10 Finance and Policy Support: NCF urges Government to make knowledge connectivity the backbone of other forms of rural connectivity. **We have an uncommon opportunity to take the digital revolution to rural India. What we need is a coherent and interactive package of public policies, and not too many fragmented and isolated initiatives and policies.** Since farm families constitute the vast majority of the rural population, we urge the Ministry of Agriculture to facilitate a Rural and Agricultural Knowledge Revolution through a coordinated action plan.

1.9.11 The Telecom Regulatory Authority of India (TRAI) has proposed the concept of **Rural Service Provider (RSP).** The BSNL/MTNL’s fibre optic network covers over 600,000 kms and nearly 97% of the optic fibre remains unlit dark fibre. **This is a huge unused national resource of inestimable value for Bharat Nirman.**

1.9.12 The RSP license should allow for the provision of telephone, internet and radio services exclusively for the rural areas with no license fee levied until 2010. The RSPs should be allowed to use any technology that may be appropriate to provide the rural families with the needed services. They may be allowed to connect with the **Taluka** headquarters through any national network on the revenue sharing bands. Long distance connectivity may also be provided free of cost to RSPs until 2010. As recommended by TRAI, the costs could be met from the USO fund. Wherever feasible, unused optic fibre bandwidth may be procured from this purpose, supplemented by bandwidth from VSAT and DTH service providers to cater to the needs of data broadcasting and reaching the unreached.

1.9.13 The process of obtaining the RSP license should be simple and transparent. We recommend that the Ministries of Agriculture, Rural Development, Panchayati Raj, Communication and Information Technology and Home may jointly develop a simple set of procedures.

1.9.14 A total of about Rs.3000 crores of public investment may be needed during the next 3 years for making the ‘Every Village a Knowledge Centre’ concept a reality. We suggest that investment in the VKC programme should come from a variety of
government sources including the USO fund and the vast resources being set apart for Bharat Nirman. **Until 2010, the aim should be the knowledge and skill empowerment of rural women and men with public funds.** We are confident that the rural knowledge managers (ICT- SHGs) and the Fellows of the Jamsetji Tata National Virtual Academy will develop during the next 5 years the capacity to earn adequate funds, through facilitating the outsourcing of appropriate government and private sector activities from the urban to rural areas.

1.10. 0 Producer Oriented Assured and Remunerative Marketing: Role of Commodity Futures Markets

1.10.1 **Opportunities for assured and remunerative marketing hold the key to sustaining farmers’ interest in increasing productivity.** As already emphasized, we should increase rural non-farm income, so that the purchasing power of the rural poor goes up. Only then will home consumption show improvement. In early 2003, the Government of India liberalized procedures for the establishment of commodity future markets. As a result, this market is expanding at a fast pace. The trade turnover in the commodity exchanges touched Rs. 5,70,000 crores during 2004-05. The time has come to ensure the healthy and regulated growth of this market and make small farmers benefit from the development of this market. If spot and futures prices of farm commodities are available to farmers as well as to the agro-and food processing industries through VKCs, agriculture as a whole will benefit. We should make available to farmers dependable data on market prices, so as to enable them to take decision on the crops to be sown and on post-harvest sale of commodities. The APMC yards across the country are now being networked electronically by the Multi-Commodity Exchange of India (MCX), Mumbai. The National Commodities and Derivative Exchange (NCDEX), operates online trading through nearly 6000 terminals covering 33 agricultural commodities. 430 cities and towns across the country were covered be the exchange in Dec 2004. **It will be very useful if the Village Knowledge Centres are linked to NCDEX and MCX so that they can disseminate spot and futures price data among farmers.** It is also now possible to transmit such data on cell phones. We recommend that the Ministry of Agriculture may take speedy steps to bring this about.
1.11.0 Change in Mindset with reference to the role of the Ministry of Agriculture, Government of India

1.11.1 Several farmers’ organizations have suggested that the Ministry of Agriculture should be renamed as Ministry of Agriculture and Farmers’ Welfare.

1.11.2 We recommend the serious consideration of this suggestion since farmers’ well-being should be the main goal of the Ministry. This will also help to link faces with figures.

1.12.0 NDC Committee on Agriculture

1.12.1 We are happy that a NDC Committee on Agriculture has been set-up under the Chairmanship of Shri Sharad Pawar. We request that the suggestions contained in this Report as well as the earlier one may kindly be examined by the NDC Committee so that appropriate action can be taken concurrently at the Central and State levels.

1.12.2 The NDC Committee on Agriculture could also give consideration to the following

i) Mobilising financial resources from -
   a) Central Government
   b) State Governments
   c) Financial institutions
   d) Bilateral and Multilateral donor institutions

1.12.3 The order of additional investment needed for infrastructure development (production and post-harvest), capacity building and research and extension as well as the order of additional resources needed for doubling food production by 2010 will have to be calculated

ii) Indo-US Collaboration
   Some of the priority areas should be -
   a) Proactive land use advice based on reliable weather forecasts
   b) Assessment of soil micro-nutrient requirements using nano-technology
   c) Precision agriculture, to reduce cost of production and enhance income
CHAPTER 2
FOOD FOR ALL

2.1.0 Medium Term Strategy for Food and Nutrition Security with a view to move towards the goal of universal food security over time

2.1.1 The Mid-term appraisal of the Tenth Plan reveals that we are lagging behind in achieving the Millennium Development Goal of halving hunger by 2015. Under-nutrition and mal-nutrition are still widespread. Maternal and foetal under-nutrition is resulting in the birth of babies with low birth weight. This has serious consequences for the future intellectual capital of India. Therefore building a sustainable food and nutrition security system is an urgent task.

2.2.0 Food and Nutrition Security

2.2.1 The concept of food and nutrition security implies that -

i) every individual has the physical, economic, social and environmental access to a balanced diet that includes the necessary macro- and micro-nutrients, safe drinking water, sanitation, environmental hygiene, primary health care and education so as to lead a healthy and productive life.

ii) food originates from efficient and environmentally benign production technologies that conserve and enhance the natural resource base of crops, farm animals, forestry, inland and marine fisheries.

(Science Academies Summit, MSSRF, 1996)

2.2.2 This comprehensive definition of food and nutrition security provides guidelines for developing an effective operational strategy for achieving the goal of freedom from hunger.

2.2.3 Hunger has three major dimensions:

i). Chronic or endemic hunger resulting from poverty-induced undernutrition.

ii). Hidden hunger arising from micro-nutrient malnutrition, caused by the deficiencies of iron, iodine, zinc and Vitamins in the diet.
iii). Transient hunger caused by seasonal fluctuations in food availability and disruptions in communication and transport arising from natural or man-made disasters.

2.2.4 A sustainable national nutrition security system should cover all these three categories of hunger. It must also address the three issues of availability, access and absorption.

i. **Availability** of food at the household level depends upon (a) food production, changes in existing food grain stocks and / or imports.

ii. **Access** to food depends on livelihoods / purchasing power.

iii. **Absorption** of food is influenced by access to clean drinking water, environmental hygiene and primary health care.

In recent years, there is cause for concern on all the three counts of food availability, food access and food absorption.

2.2.5 Food Availability

2.2.5.1 In the nineties, food grain growth rate has slowed down drastically to 1.7 % and has fallen below the population growth rate of 1.9 %, so that per head annual net food grains output has fallen by about 3.5 kg from a peak of 180 kg. in the three years ending in 1994-95 to, 176.5 kg. by the three-year period ending in 2000-01. (Utsa Patnaik, [www.macroscan.org](http://www.macroscan.org), August, 2002 )

2.2.5.2 The decline in per capita food grain availability and its unequal distribution have serious implications for food security in both rural and urban areas.

2.2.5.3 In 1999-00, the average calorie consumption of a consumption unit in urban areas was 2637 kcal/day and this is not much higher than the norm of 2100 kcal/day, set for an urban adult. It is also important to note that while there are visible signs of an enormous increase in conspicuous consumption by the urban rich, there are also signs of increasing inequality in urban areas: in 1999-00, the bottom 10 percent of urban population obtained on the average only 1890 kcal/ day. That is, nearly 28 million people in our urban areas have unacceptably low levels of calorie consumption. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

2.2.5.4 Similarly, going by the official Planning Commission estimate of the proportion of population below the poverty line of 27.09 percent in rural areas and 23.62 percent in
urban areas, a total of 260.27 million people in both rural and urban areas put together can be definitely assumed to be unable to buy sufficient food to achieve food and nutrition security. These estimates have been contested and can best be taken as the lower bounds of the estimated poor population in the country. The problem at hand is therefore of enormous dimensions. Besides, there are regional variations as well in the incidence of poverty. Across the nation, the poorest states are Orissa, followed by Bihar, Madhya Pradesh and Assam.

2.2.5.5 Though official data on poverty suggest a reduction in the percentages of population below the poverty line, there is reason for presuming that the incidence of hunger is increasing. Data on nutritional intakes suggest that income poverty is increasingly divorced from the calorie norm of 2400 kcal per consumption unit per day underlying the original official definition of poverty line. The data show that the percentage of population consuming diets providing less than 2400 kcal per capita per day is much higher now than the percentage below poverty line as estimated by the Planning Commission. Recent work by Professor V S Vyas suggests that in as many as eight major states, the proportion of the rural population accessing less than 1800 kcal/day (the level below which malnutrition can cause irreversible damage) exceeds 30 per cent. This is indeed cause for concern.

2.2.6 Food Access
2.2.6.1 Access to food grains is related to the purchasing power of the population and the nature of public distribution system that is prevalent. Purchasing power of large sections of the rural population has been weakened in recent years by the crisis in agriculture and rural livelihoods. In urban areas, the weakening of the PDS has exacerbated the problem of food insecurity.

(i) Rural Food Insecurity

Several studies have shown that the poverty is concentrated and food deprivation is acute in predominantly agricultural and rural areas with limited resources. Rain-fed agriculture is one of them. Agricultural labour and migrant labour are susceptible to hunger. In India of the 310.7 million rural workers, 103.12 million are agricultural labourers. Of these, about 48.37 million are females. Female agricultural labourers are
especially vulnerable to food insecurity on account of lower wages as well as the effects of migration.

One third of the rural work force is dependent on casual employment. This segment faces uncertainties of wage and work and is highly susceptible to food deprivation.

About 40.14 percent of the rural workers are cultivators. Of the total 124.68 million cultivators, about 40.64 million cultivators are women with inadequate resources and credit facilities. In hilly areas and rain-fed backward areas, often there are more female cultivators than male cultivators. Besides rural labourers, both agricultural and non-agricultural, small and marginal farmers also face food insecurity. Not only do they not get remunerative prices for their produce, they are also affected by the rise in retail/PDS food grain prices, being net buyers of grain.

ii) Urban Food Insecurity

It is often presumed that, since urban areas are covered by the PDS, food security is not a major issue in urban areas. This is not true. During the 1990s, the PDS has been weakened, both by repeated increases in the issue prices of food grains and by the switch to a system of targeted PDS. Besides, studies show that the bottom 10 percent of the urban population is not really helped by the prevalent system of PDS for accessing food grains. In 1999-00, average cereal consumption of bottom 10 percent of urban population was 9.55 kg/month in urban India. Of this, less than one kg/month was accessed from PDS (Food Insecurity Atlas of Urban India, MSSRF-WFP 2002).

This brings out the need to have a system of PDS that is flexible so as to ensure larger coverage. **People should be able to access grains from PDS whenever they want, wherever they want and in any quantity they want subject to a few ground rules to prevent purchase for hoarding and subsequent sale at high prices.** That is, flexibility with regard to time of purchase, place of purchase and quantity of purchase needs to be fitted in to the Public Distribution System. Accessing subsidized food grains is absolutely essential not only for the settled urban poor but also for the migrant population from villages.
As for purchasing power, the quality and quantum of employment of the population determine their income earning ability and therefore their ability to purchase food grains in the market. Casual employment normally fetches an income that is low and irregular; regular employment on a decent wage ensures a relatively better access to food. In 1999-00, in urban India only 4 out of every 10 workers belonged to the regular wage category; among the bottom 10 percent of urban population, nearly 4 out of 10 persons are casual labourers. The nature of the employment problem varies across different size classes of towns. Proportion of casual labour among males as well as females is much higher in small towns compared to the metropolitan cities or big towns. Similarly, the proportion of workers in regular employment is much lower in small towns compared to bigger towns. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

Given the magnitude of the employment problem in urban India, particularly in the small towns, there is a strong case for a National Urban Employment Guarantee Programme.

2.2.7 Food Absorption

2.2.7.1 Biological absorption of food in the body is related to the consumption of clean drinking water as well as environmental hygiene.

The situation on this front is serious in India. For instance, in urban areas -

a) Slums that have inadequate facilities of sanitation and drinking water, provide shelter to nearly 22% of urban population in the country. In the early nineties, one third of slums did not have any drinking water facility and nearly half the slums did not have toilet facilities.

b) Access to basic amenities - safe drinking water, toilets, electricity, are much lower for households living in small towns.

c) In 1998-99, 15.4% of children were severely stunted and 11.6% were severely underweight.

d) While there are wide variations in the nature and extent of the problem of food insecurity across urban areas, small towns are especially vulnerable.

2.2.8.2.1 A National Food Security System should therefore give concurrent attention to the landless poor in villages and to casual and migrant labour families in urban areas, particularly in small towns.
2.3.0 Hunger-Free India: Components of Action Plan

A six-point Action Plan is suggested below for achieving the goal of Hunger-Free India.

2.3.1 Reform of the Delivery System: Restructure the delivery systems relating to all nutrition support programmes on a life cycle basis, starting with pregnant women and 0-2 infants and ending with old and infirm persons. An illustrative list of the programmes, which will benefit from a life-cycle based delivery system is given in Table 1. Elected Panchayats and local bodies should be involved in restructuring the delivery system.

Table 1: Current Status of Interventions

<table>
<thead>
<tr>
<th>S.No</th>
<th>Stage of Life Cycle</th>
<th>Intervention / Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pregnant Mothers</td>
<td>Food for Nutrition to avoid maternal and foetal mal- and under-nutrition resulting in LBW children</td>
</tr>
<tr>
<td>2.</td>
<td>Nursing Mothers</td>
<td>Support needed for breast feeding, for at least six months</td>
</tr>
<tr>
<td>3.</td>
<td>Infants (0-2 years)</td>
<td>Not being reached by ICDS</td>
</tr>
<tr>
<td>4.</td>
<td>Pre-School Children (2-6 years)</td>
<td>Integrated Child Development Services</td>
</tr>
<tr>
<td>5.</td>
<td>Youth going to School (6-18 years)</td>
<td>Noon Meal Programme</td>
</tr>
<tr>
<td>6.</td>
<td>Youth out of School</td>
<td>Not being attended to</td>
</tr>
<tr>
<td>7.</td>
<td>Adults (18-60 years)</td>
<td>Food for Eco-Development (Sampoorn Gramin Rozgar Yojana), PDS, TPDS, Antyodaya Anna Yojana</td>
</tr>
<tr>
<td>8.</td>
<td>Old &amp; Infirm Persons</td>
<td>Annapoorna and Food for Nutrition Programmes</td>
</tr>
<tr>
<td>9.</td>
<td>Emergencies</td>
<td>Food during natural calamities</td>
</tr>
</tbody>
</table>

2.3.2 Community food security systems: Promote the establishment of Community Grain and Water Banks, involving Panchayats and local bodies. This programme should be based on the principle “store grain and water everywhere”.

2.3.2.1 The Community Grain / Food Bank system will help to widen the food security base by including a wide range of millets, grain legumes and tubers. While these can be operated by the nearly 240,000 Panchayats and Urban Local Bodies in the country, using flexible implementation mechanisms suited to local needs, the programme
should financially supported and regulated by the state to ensure social inclusion and sustainability.

2.3.2.2 The Community Foodgrain Bank (CFB) is a decentralized system of storage and management of food at the village level by the community to address the problems of difficulty in physical access to food due to natural calamities, seasonal imbalances and lack of purchasing power.

2.3.2.3 **Steps Involved in Setting up CFBs:**

i) **Foodgrain Corpus:** The calculation of amount of foodgrain required to be stocked is as follows:

The Indian Council of Medical Research (ICMR) norm of per capita per day cereal requirement by an adult is 420 grams. A family of 5 will therefore require 2100 gms per day, say 2 kg/day (assuming children in the household whose requirement will be slightly less). Extrapolating, the monthly requirement for a family is 60 kg and for a village with 100 households, the monthly requirement of foodgrains is 6 tons.

The ICMR norm for pulses is 40 gms per capita per day. For a family of five, this amounts to 200 gms per day and 6 kg per month. The monthly requirement of pulses for a village with 100 households is 600 kg.

The amount to be stocked has to be calculated on the basis of population needing assistance and period for which it is to be provided.

ii) **Storage Structure:** Storage is an important aspect needing attention. The storage space / structure will be determined by the amount to be stocked. It should be all weather resistant, located in a common place and accessible to all. The extant Community Grain Bank scheme of the Government of India unfortunately does not pay much attention to storage.

The requisite expertise for building the infrastructure for grain storage is available with the Indian Grain Storage and Management Research Institute of the Department of Food, as well as with Tata Steel Rural Development Society (TSRDS). The TSRDS has developed steel silos made of pre-fabricated steel that can be placed in the open and can withstand all weather conditions. These range in capacity from 1 m.t to 13 m.t. With guidance, they can be built locally by local self-help groups thereby generating employment.
iii) **Operation and Management:**

The initial corpus of foodgrains (rice and pulses to start with) is to be given free, based on the requirement. Subsequently, the mechanism should evolve into a community-managed bank wherein the members can borrow the cereals/pulses and develop a system of repayment in kind after a specified period at a pre-decided rate of interest, also in kind.

The system works like this:

a. Those in need of foodgrain can borrow foodgrain from the CFB. The eligible quantity will be determined with the ICMR benchmark as the norm.

b. The management of the CFB should be by the community. A food bank management committee of five to seven members, with at least 3 - 4 women, should be formed to monitor the operations. The village Panchayat will also be represented.

c. The period of loan, rate of interest all have to be decided by the committee in consultation with the entire village

d. Registers to be maintained: Stock Register, Lending and Repayment (Principal + Interest) Register, Individual Passbooks of Grain Borrowed and Repaid

2.3.2.4 Capacity building of the community to manage the CFB is very crucial. Sustainability of the mechanism hinges on ensuring livelihood security of the people.

2.3.2.5 Promote the growth of **community water security systems** based on a 5-pronged strategy consisting of:

i. **Augment supplies** through mandatory water harvesting and conservation

ii. **Give attention to demand management** by eliminating all sources of unsustainable use of water and promoting “more crop per drop” methodologies of crop cultivation

iii. **Harness new technologies** relating to improving domestic water use efficiency, desalination of sea water, breeding of drought and salinity tolerant crop varieties, bioremediation, etc.
iv. To begin with, each district in the country could develop a sustainable water security system. Community action should however start at the village level.

v. Promote seawater farming through integrated agro-forestry and aquaculture production systems in coastal areas.

vi. Pay attention to water quality. The quality of drinking water is deteriorating due to pesticide and bacterial contamination in ground water. Equal attention should be paid to the improvement of drinking water quality and the augmentation of water supplies. Bioremediation techniques will have to be used for removing arsenic and heavy metals from tube well water.

**Box 1**

**Community Food Banks in Orissa: A Success Story**

Community Food Banks, set up as models by the M S Swaminathan Research Foundation (MSSRF) with support from the World Food Programme (WFP), are in operation in eight tribal villages in the Koraput-Kalahandi region of Orissa. These villages vary in size from a hamlet with 9 households and a population of 54, chosen because of its difficult access, and a village of 127 households with a population of 529. Starting in 2002, the foodgrain corpus in all the project villages has increased by over 100 percent through repayments and voluntary addition to the stock by the community. There is no default. The Food Banks are managed by Food Bank Management Committees of 5 – 7 members. 50 percent of members are women. The Committee decides on the terms of repayment, interest etc. Community Seed Banks are also in operation in all the villages.

The functioning of the community food banks has led to several other positive outcomes. Besides a decline in food scarcity and insecurity, there has been a decline in the extent of migration in search of work, dependence on moneylenders, consumption of seed during crisis, and distress sales of produce. The old, infirm and destitute in the community are receiving greater attention and care now than was the case earlier.

Self Help Groups formed in the project villages have undertaken income generation activities like mushroom cultivation, vegetable, vermicomposting, poultry and fishery. As on March 2005, total savings in the bank of the SHGs was Rs.1,09,000. The SHG members had cumulatively availed loans to the extent of Rs.2,41,000 for income generation activities. Village development committees have also been formed in all the villages. Community development activities such as promoting health and sanitation awareness, maintaining a medicinal plants garden and micro-watershed development have been taken up in some of the villages.

The Orissa experience of MSSRF-WFP initiative shows that while an universal PDS, funded and managed by the State is absolutely essential to food security, it needs to be supplemented with locally managed food security systems in areas difficult to access. It must also be mentioned that a key factor underlying the success of the Orissa initiative is the cohesive nature of the tribal societies involved with the project.

2.3.3 *Eradicate hidden hunger* caused by micronutrient deficiencies based on natural food cum food fortification approaches. For example, salt fortified with iron, iodine, minerals and vitamins, coupled with the consumption of beta-carotene rich sweet potato
or vegetables will be very helpful to fight hidden hunger. Local SHGS can be trained to make nutritious biscuits as an income earning activity. Nutritional literacy should be promoted at the school level. High priority should go to the elimination of iron deficiency anaemia among pregnant women.

2.3.4 New Deal for the Self-employed

2.3.4.1 The unemployment rate on current daily status was about 9.21 percent (34.85 million) in 2001-02 in rural areas. Unemployment among rural youth increased from 9 percent in 1993-94 to 11.10 percent among males and 10.60 percent among females in 1999-2000.

2.3.4.2 Rural employment grew at 0.67% and agricultural employment at 0.02% during 1999-2000. According to the 55th round of survey of NSSO the share of self-employed in 1999-2000 was about 53%. The share of self-employed in total employment, 58% (133 to 134 million) was in the primary sector, i.e., agriculture and allied activities.

2.3.4.3 Detailed analysis of the causes of food insecurity in rural and urban India have revealed that inadequate purchasing power due to lack of job/livelihood opportunities is now the primary cause of endemic or chronic hunger in the country. Since opportunities for employment in the organized sector are dwindling, we have to create a policy environment that enlarges opportunities for remunerative self-employment in rural India in order to avoid an era of jobless economic growth.

2.3.4.4 Agriculture, comprising crop and animal husbandry, fisheries, forestry and agro-forestry and agro-processing, is the largest private sector industry in India, providing livelihood opportunities for over 600 million women and men. There is need to intensify efforts to create more opportunities for gainful livelihood opportunities in both the farm and non-farm sectors. According to FAO, malnutrition is high in areas where a very high percentage of population depends solely on agriculture for their livelihood. One reason for the high prevalence of hunger in villages is inadequate growth in opportunities for remunerative non-farm employment.

2.3.4.5 The menu of income earning opportunities for the self-employed needs to be enlarged. This calls for a paradigm shift from micro finance to livelihood finance. NCF had recommended in its first report that all the existing Krishi Vigyan Kendras (KVKs)
should be provided with a post-harvest technology wing. In addition, there is an urgent need for at least **50 SHG capacity building and mentoring centers** in every State, to enhance the management and marketing capacities of Members of the SHGs. Such centers can be established in existing institutions like Agricultural, Rural and Women’s Universities, IITs, institutions operated by NGOs, etc. Village Knowledge Centres can provide SHGs with e-commerce facilities. Accounting software will have to be introduced. SHGs will be sustainable in the longer term only if they have backward linkages with technology and credit, and forward linkages with management and marketing. Sustainable Self-help Groups (SSHGs) will emerge only if we build the capacity of the key members (both women and men of SHGs). **The SHG Capacity Building and Mentoring Centres** may be financially supported by the Union Ministry for Rural Development. This should be an essential component of the New Deal for the Self-employed.

### 2.3.5 Enhancing the Productivity and Profitability of Small Holdings:

2.3.5.1 Nearly 80% of the land holdings in India are below 2 ha in size. Unlike in industrialized countries where only 2 to 4% of the population depends upon farming for their work and income security, agriculture is the backbone of the livelihood security system for 2/3 of India’s population. **Therefore, farmers constitute the largest proportion of consumers.** The smaller the farm, the greater is the need for marketable surplus in order to get cash income. **Hence, improving small farm productivity, as a single development strategy, can make the greatest contribution to the elimination of hunger and poverty.**

2.3.5.2 Indian soils are both hungry and thirsty. Hence, soil health enhancement and irrigation water supply and management hold the key to the enhancement of small farm productivity. The following steps are urgently needed.

i. National network of advanced **soil testing laboratories** with facilities for the detection of micronutrient deficiencies. **As a single agronomic intervention, supply of the needed micronutrients in the soil has the greatest impact on increasing yield.** Hidden hunger is as widespread in soils, as in human beings. In fact, the two have causal relationships.
ii. Million Wells Recharge Programme

iii. Restoring Water bodies and promoting mandatory water harvesting.

iv. Establishment of 50,000 Farm Schools to promote farmer-to-farmer learning.

v. Organisation of Small Farmers’ Horticulture, Cotton, Poultry, aquaculture and other Estates, to promote group farming and to confer the power of scale to small producers both at the production and post-harvest phases of farming.

2.3.5.3 Farming is becoming a gamble both in the monsoon and the market and hence small farmers urgently need proactive advice on land and water use. Land use decisions are also water use decisions. The Every Village a Knowledge Centre Movement can help to give farmers dynamic advice on meteorological and marketing conditions.

2.3.5.4 In addition to dynamic advice, farmers also need proactive advice on land and water use. For this purpose, State Land Use Boards should be restructured, retooled and reactivated on the lines indicated in Fig 1. This is a task of the utmost priority.

2.3.5.5 We suggest that under the recently concluded agreement for cooperation with the United States in the field of agriculture, the following areas may receive priority.

i. Short and Medium term weather forecasting, in order to assist Land Use Boards to give proactive advice to farmers on crop and varietal choice.

ii. Rapid and low cost soil testing technologies based on nanotechnology. This will enable the application of need based macro- and micro- nutrients. Factor productivity in relation to fertilizer application is low now and this enhances the cost of production. The average fertilizer response of food grain output to NPK utilization works out to 7.8 kg. grain per kg NPK. This is a very low return.

2.3.5.6 Unless factor productivity is increased, small farm agriculture will become unremunerative. This is one of the causes for a high percentage of farmers wanting to quit farming. We must recognize the need for increasing the productivity and profitability of small and marginal farms, in order to eliminate endemic and hidden hunger in the families such farmers.

2.3.6 Designing and introducing a Food Guarantee Act:

2.3.6.1 We have over a century of experience in organizing relief work, under the provisions of the Famine Code in the colonial period, and Food for Work programmes in the post-independence period. It is clear that our agriculture has reached a stage when
farmers will grow more only if we can consume more. Hence, a **National Food Guarantee Act**, combining the features of the Food for Work and Employment Guarantee Programmes, will represent a win-win situation both for producers and consumers. Women, in particular, prefer a combination of grains and cash as wage, provided the food grains are of good quality.

2.3.6.2 A **National Food Guarantee Act** should lead to a decentralized network of grain storage structures and thereby help to prevent panic purchase of food grains during periods of drought or flood. They will also help to prevent distress sales by producers at the time of harvest. In addition, it will help to enlarge the composition of the food security basket.

2.3.6.3 Brazil, Kenya and a few other countries have announced, “Zero Hunger” programmes. **India can take the lead to give meaning and content to the zero hunger concept by developing a National Food Guarantee Act.**

2.3.6.4 The major features of a National Food Guarantee Act were discussed at a Consultation held at MSSRF on 19 June 2005. The participants made the following suggestions:

1. The main aim of the proposed legislation should be to integrate the features of Employment Guarantee Acts (National and Maharashtra) and Food for Work Programmes, in order to ensure that every child, woman and man has physical, economic, social and environmental access to balanced diet, clean drinking water and primary health care. This is fundamental to providing every individual in the country an opportunity for a healthy and productive life. Rural and urban populations as well as migratory labour families will have to be covered. Social inclusion should be the bottom line.

2. The National Food Guarantee Act should be gender sensitive. The concept of “work” should be enlarged to cover also skilled work related to human and social development, as for example, establishing and running crèches, balwadis, preparing noon meals, etc.

3. Payment of a part of the wage in the form of food grains has the double advantage of helping farmers in the area of marketing, and consumers in the form of obtaining their basic caloric requirements in the form of good quality food grains
at a reasonable price. This will also help to enlarge the composition of the food security basket.

4. Food guarantee can become a reality only if there is an implementation mechanism characterized by low transaction cost, transparency and freedom from corruption. The Gram Panchayats / elected local bodies may be able to provide such a mechanism. The Gram Panchayat / Local Body can form in the respective villages a Consortium of Agencies like SHGs, Mahila Mandalas, Farmers’ Clubs etc, to provide oversight to the implementation of the integrated food for work and employment guarantee approach to the elimination of hunger and poverty.

The Panchayat can thus provide a platform for partnership at the grass root level. However Panchayats will need the necessary legal, financial and technical empowerment. There are a large number of tasks, which are assigned by Constitution Amendment 73 to Panchayats, but they have no capacity to discharge these responsibilities since they have not been legally or financially empowered to do so. Capacity building of women and men Panchayat members in undertaking such tasks has to proceed concurrently with financial empowerment.

5. Information empowerment on entitlements is vital for success. Household entitlement cards can be distributed and full use could be made of Mission 2007: Every Village a Knowledge Centre Programme. The recently enacted Right to Information Act will also facilitate the process of empowering the rural poor (often illiterate) in understanding their entitlements under various pro-poor schemes of Central and State Governments.

6. Training and Capacity Building of all concerned with the implementation of the programme is extremely important. Suitable institutions will have to be identified for imparting training to administrators, Panchayat leaders, SHGs and others who will be involved in implementing the Food Guarantee Act.

7. The Act should provide scope for including feasible land reform measures like providing dalits and the poor with space for a homestead garden where the needed vegetables and fruits can be grown. SHGs can also be given space on lease in common property land for raising nutrition gardens and fodder for farm animals.
8. Integration with primary health care is exceedingly important. For example, de-worming should be made compulsory at least once in two months. Multiple fortified salts could be used in noon meal programmes in order to attack the problem of hidden hunger caused by micro nutrient malnutrition.

9. The Act could stimulate a movement for storing grain and water everywhere through community food and water banks. A national network of community food banks could be established.

10. Nutrition and education are fundamental to enabling every individual to experience a productive and healthy life. Therefore the enactment of a Food Guarantee Bill will be the best method of ensuring that we are able to accomplish the UN Millennium Development Goals.

11. Thanks to the extensive work done both within the country and outside on issues relating to “Right to Food”, there is considerable legal and technical expertise available for preparing a framework for Food Guarantee. We should therefore proceed with this initiative.

12. It will be appropriate to operationalise the Food Guarantee Act on August 15, 2007, which marks the 60th anniversary of India’s independence.

### 2.4.0 Road Map for Eliminating Hunger

2.4.1 In summary, the six-point action plan recognizes that the problem of food security is both multidimensional and cuts across the rural-urban divide. Since urban food insecurity and deprivation are closely related to rural deprivation, a comprehensive rather than a sectoral approach is required.

The six points in brief are:

1. Reorganise the delivery of nutrition support programmes on a life-cycle basis with the participation of Panchayats and local bodies.

2. Eliminate micronutrient deficiency induced hidden hunger through an integrated food cum fortification approach.
3. Promote the establishment of Community Food and Water Banks operated by Women Self-help Groups, based on the principle “Store Grain and Water Everywhere”.

4. Help small and marginal farmers to improve the productivity and quality of farm enterprises.

5. Introduce support systems to SHGs to make them economically and organizationally sustainable. Establish for this purpose SHG Capacity Building and Mentoring Centres and focus on Livelihood Finance.

6. Formulate a **National Food Guarantee Act** continuing the useful features of the Food for Work and Employment Guarantee programmes and introduce it on 15 August, 2007, which marks the 60th anniversary of our independence. The Food Guarantee Act will be a powerful tool in achieving the goal of a hunger-free India. By increasing demand for food grains as a result of increased consumption by the poor, the economic conditions essential for further agricultural progress can be created.

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**Proactive Advice on Land use**

(Land use decisions are also Water use decisions)

**State Land Use Board**

(to be located in an Agricultural University)

Integrated advice

- Meteorological Factors
- Ecological Factors
- Marketing Factors (Home and external markets)

The Land Use Board through a virtual college should give proactive advice on the choice of crops and farming systems, so as to achieve a match between demand and supply in farm commodities and to ensure that the most efficient crops are grown in different agro-climatic and agro-ecological regions.
CHAPTER 3
FISH FOR ALL

3.1 The Terms of Reference of the National Commission on Farmers (NCF), inter-alia provide; “Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, Horticulture, Animal Husbandry; Fisheries (Inland and Marine), Agro Forestry, Agro processing and associated marketing infrastructure” etc.

3.2 Chapter V of the First Report of the NCF has already dealt with the subject of Horticulture and the subject of Marketing has been discussed in Chapter V of this Report. The subject of Fisheries (Inland and Marine) is discussed in the following paragraphs.

3.3 Fisheries, both inland and marine offer great scope for income generation and nutritional security for the people and export opportunity for the country. More than seven million fishers directly and an extremely large number of people indirectly are dependent on Fisheries for their livelihood.

3.4 The Tenth Five Year Plan had targeted GDP growth in agriculture and allied sectors at 4 per cent per annum. The actual growth during the first three years of the Tenth Plan is only 1 per cent per annum. In contrast, the growth rate in fisheries sector had been sustained at 4.3% during the Ninth Plan, because of the untapped potential being exploited particularly through aquaculture. It is felt that the greater attention to fisheries through higher investment proposed in this Chapter would help to further increase the growth rate of fisheries sector. A growth of 8% in the fisheries sector would be needed to help in the achievement of a 4% growth in agriculture.

3.5 The Tenth Five Year Plan envisages increasing fish production from 62 lakh tonnes in 2002-03 to 82 lakh tonnes in 2006-2007, with a financial outlay of Rs.740 crores in the Central and Rs.1324 crores in the State plans. This requires a focus on sustaining gains already made in production; protecting the productivity of inland and marine fisheries, increasing production through expansion of area and new technical breakthroughs; adding value to the produce and ensuring quality; and creating increased livelihood avenues through remunerative and assured marketing opportunity.
3.6. India’s strategy for attaining the objective of “FISH FOR ALL” is:

- **Enhancing** productivity in all inland ponds and achieving sustained high production per cubic volume of water in them; giving integrated attention to capture and culture fisheries both in inland ponds and in coastal areas.

- **Ensuring** the adoption of responsible and sustainable fishery practices in the area of marine fisheries and introducing a code of conduct for this purpose.

- **Establishing** agro-aqua farms, involving the cultivation of mangroves and *Salicornia, casuarinas*, cashewnut, coconut and other appropriate tree species and the culture of prawns and shrimps.

- **Spreading** quality literacy among fisher families with reference to sanitary and phytosanitary measures and codex alimentarius food safety standards.

- **Improving** facilities for fish landing, storage, transportation, processing and marketing.

- **Developing** social marketing techniques, which can help to ensure the availability of good quality aquatic products to resource-poor consumers.

- **Introducing Aquarian Reforms** to help in the spread of fish enterprises based on the principle of environmental sustainability, economic viability, social, general equity, nutritive quality and food safety. Aquarian Reforms should aim to promote harmony between artesenal and mechanised fishers and Agriculture and Aquaculture and cover both Indian and coastal water resources.

- **Organising Fish for All** training centres for fisher families based on the principle of learning by doing, to impart latest technical skills ranging from capture or culture to consumption. Helping both resource poor producers and resource poor consumers through sustainable self-help groups is a major objective of the “Fish for All” programme.
A Summit was organized by M.S. Swaminathan Research Foundation with World Fish Centre (ICLARM), Government of India and Government of West Bengal in Kolkata on December 18-19, 2003 for the National launch of “Fish for All”. The objective was to ensure “Fish for All and Forever” and the Summit sought to develop a road-map for achieving this goal by 15th August, 2007 which marks the 60th anniversary of India’s independence. To achieve the objectives, the Action Plan “Agenda 2007” was formulated as under:

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<tr>
<th>I. Public Policy and Action</th>
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<tr>
<td>• Through <strong>Aquarian Reforms</strong> ensure productivity, sustainability, profitability, gender and social equity in capture fisheries (marine and inland), aquaculture and non-food fisheries (e.g. sea weeds);</td>
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<tr>
<td>• Set up a separate <strong>Ministry/Department of Fisheries</strong> in the Union Government and bring aquaculture and fisheries on par with agriculture especially in the provision of basic infrastructure needed for the sector;</td>
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<td>• Formulate a National Fisheries Policy for sustainable development taking in to account the needs of the fisheries and aquaculture sectors as well as opportunities for domestic and international trade;</td>
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<td>• Strengthen existing fisheries legislation both at center and the states; and formulate new legislation where necessary in order to help in realizing the full potential of the sector to improve nutrition and provide more jobs and income;</td>
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<td>• Policy on water allocation for freshwater fish culture on par with irrigated agriculture; allocation of specific areas for women enterprises;</td>
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<td>• Reduce post-harvest losses and increase value by launching intensive Quality and Scientific Literacy Movement through use of modern ICT technology, sanitary and phytosanitary measures and globally accepted standards on hygiene and sanitation;</td>
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<td>• Legislation on introduction and control of exotic species.</td>
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<th>II. Implementation of Programs for Sustainable Development</th>
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<td>• Regulate and limit access through implementation of monitoring, control and surveillance of fisheries;</td>
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<tr>
<td>• Conserve and sustainably exploit marine resources through harmonized seasonal ban on fishing across maritime states; elimination of destructive fishing; declaration of closed areas and setting up of sanctuaries;</td>
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<td>• Deploy effort in less exploited areas (e.g. harnessing offshore marine resources, sea weed culture, etc.)</td>
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<tr>
<td>• Set up small-fisher aquaculture estates to bring in social equity. Estates to have backward linkages with R&amp;D institutions and forward linkages with assured and remunerative markets;</td>
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<tr>
<td>• Organise National Pilot Projects for demonstration of new technologies such as sea water farming for prosperity of coastal areas; setting up of bio-villages for providing sustainable livelihood opportunities; low external input sustainable integrated farming practices, culture of ornamental fishes, etc;</td>
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<tr>
<td>• Implement national level programs for reduction of post-harvest losses and popularisation of low-cost value addition technologies;</td>
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<tr>
<td>• Develop strong domestic marketing infrastructure.</td>
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<th>III. Strengthening of Institutional Mechanisms and Capacity Building</th>
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<tr>
<td>• Set up a professional–managed <strong>National Fisheries Development Board (NFDB)</strong> for overall fisheries and aquaculture development;</td>
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<tr>
<td>• Strengthen existing institutional mechanisms and census information for implementation of developmental programs;</td>
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<tr>
<td>• Strengthen existing fisheries education institutions and set up a national facility on the model of the Indian Institute of Technology for harnessing the opportunities provided by space, information and communication technologies as well as biotechnology and renewable energy technologies.</td>
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<th>IV. Public Awareness</th>
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<td>• Implement programs for bringing awareness among public and policy makers on the need for conservation and development of aquatic resources, sustainable and responsible fisheries and aquaculture, including adoption of good management practices;</td>
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<tr>
<td>• Create awareness on safety issues among small-scale fishermen;</td>
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<tr>
<td>• Create awareness on the contributions of fish to nutritional security.</td>
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<th>V. Partnerships</th>
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<td>• Develop bilateral, regional and international collaborations to strengthen the functioning of research and development institutions in the country.</td>
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3.7 There have been several major positive developments over the years, which have the potential to develop Fisheries to the optimum level. The Government of India have already formulated a Marine Fishing Policy in 2004. They have also adopted the FAO’s Code of Conduct of Responsible Fisheries and have very recently enacted Coastal Aquaculture Act, 2005. India is also a Member and host for Bay of Bengal Programme inter-governmental Organisation (BOBP-IGO) whose work for safety, responsible fisheries and small fisher marketing as well as simple post harvest technology have been commendable.

3.8.0 SWOT Analysis for the Fisheries Sector in India

3.8.1 It would be useful to conduct a SWOT analysis in order to appreciate the potential for employment, income generation and nutritional security for the people, while making Indian fisheries globally competitive.

3.8.2 Strengths

i. India has vast inland and marine water resources. We have 2.3 million hectares of fresh water tanks and ponds, 1.3 million hectares of oxbow lakes and derelict waters and reservoirs with water spread of 3.1 million hectares.

ii. Further, we have 1,91,024 km of rivers and canals system. Besides we have 1.2 million hectares of brackish water resources.

iii. India has an Exclusive Economic Zone (EEZ) of over 2.02 million sq. m with the continental shelf of about 0.51 million sq. km and a coastline of 8118 kms (3600 fishing villages) besides, our large coastline has substantial area under estuaries, lagoons and backwater, which harbour a variety of fin and shellfish resources.

iv. Further, India is blessed with a large variety of agro climatic zones extending from the very cold regions in the Himalayas to the temperate regions in the South for inland fisheries. Both saline water as well as fresh water resources are available.

v. India has also one of the richest and well-diversified fish fauna in the world.

vi. Since India is largely located in tropical and sub-tropical zones, the biological productivity of its aquatic resources is also very high. This could be utilized to have a broad based fisheries sector for the diverse conditions in the country.
vii. India has a well-established system of fisheries research and education through ICAR institutions focused on specific fisheries sub-sectors: Central Institute of Fresh Water Aquaculture, Bhubaneswar, Central Inland Fisheries Research Institute, Barrackpore and Central Institute of Brackish Water Aquaculture, Chennai, focus on inland fisheries. Central Marine Fisheries Research Institute, Kochi; Fisheries Survey of India, Mumbai, Central Institute of Coastal Engineering for Fisheries, Bangalore and Central Institute of Fisheries and Nautical Engineering and Training, Kochi, focus on other specific sub-sectors while Central Institute of Fisheries Education, Mumbai concentrates on Human Resource Development for Fisheries. In addition, there is a National Research Centre on Cold Water Fisheries, Bhimtal and National Bureau of Fish Genetic Resource, Lucknow. These are being supplemented by the large number of Agricultural Universities with Colleges of Fisheries. This research and training infrastructure must provide technological backup to fishers for more productive and sustainable fisheries through optimum utilization of available water resources. Marketing and export promotion is further assisted by Marine Products Export Development Authority (MPEDA) and National Cooperative Development Corporation (NCDC)

viii. Fisheries is a well-established activity in many parts of the country and the traditional knowledge and the expertise of the fishers has the potential to be utilized for bigger and more sustainable harvest through proper training and technological support.

ix. India has one of the best fish-processing infrastructures in the world, which is currently under utilized due to shortage of raw material.

3.8.3 Weaknesses

i. Through years of neglect, the water bodies particularly river systems in the country have faced massive pollution level arising out of increased and unrestrained industrial activity. This has recently affected the fisheries resources particularly in the rivers. Similarly, marine resources have suffered due to pollution arising out of unsustainable activities in the coastal regions and
inadequate attention to pollution due to off shore oil exploration and shipping. There has been inadequate awareness generation and insufficient technology dissemination.

ii. Due to unsustainable activities particularly in the Himalayas, there has been substantial soil denudation leading to heavy silting of the rivers system leading to shrinkage of water bodies.

iii. There has been inadequate attention to maintenance of water bodies like ponds, floodplain lakes (beels) etc., and even recently constructed reservoirs and ponds/tanks have reduced capacity for stocking of fish due to growth of water hyacinth etc.

iv. Quality control for fish seed as well as fish feed is virtually non-existent leading to malpractices and exploitation of the fishers. Further, there is reliance only on a few species. This has dangerous repercussions.

v. Post harvest losses in the marine sector are as high as 30 per cent due to constraints of fishing fleet bed on shore handling and poor marketing facilities.

vi. Open access regime due to population pressure both for inland and marine fisheries leads to reduced catches per unit effort and uncompetitive production.

vii. Multi-user conflicts and excess extraction of water for multifarious uses lead to depletion of fish stocks.

viii. Neglect of reservoirs at the pre-impoundment and impoundment stages leads to inefficient exploitation of this vast resource.

ix. Unsustainable and unscientific leasing policy leads to poor utilization of resources.

x. Database on resources as well as production/yield levels creates difficulties for policy formulation.

3.8.4 Opportunities

i. Fisheries are an excellent source for nutrition particularly for protein. White meat particularly fish is preferred by the health conscious people over red meat globally. There is thus an adequate market for higher quantities/varieties of fish both nationally and globally.
ii. Considering India’s huge population, the size of the domestic market itself offers great incentive for higher production and technologies are available both nationally and internationally for optimum utilization of aquaculture, both fresh water and brackish water, for enhancing production sustainably. Approximately 60% of our population is fish eating.

iii. Many countries have over-fished their marine resources and now offer a large market for produce from India.

iv. Developed countries take up 85% of total imports of fishery products. Global trade is of the order of US $ 56 billion.

v. India has produced and is exporting Tiger shrimp (\textit{P.monodon}), which enjoys a premium market abroad in view of its size and taste. In marine fisheries, India alongwith Maldives produces yellow fin tuna, which is a premium variety internationally.

vi. Indian rivers particularly in the Himalayas and Cauveri in the South have excellent game fisheries of Mahseer. Through appropriate stocking of Mahseer and Rainbow trout, sport fisheries provide an excellent means of promoting tourism.

vii. Entire Himalayan region, which is relatively unpolluted eco-system, is under exploited in terms of cold water fisheries.

3.8.5 Threats

i. India’s neighbours, particularly China, have gone in for large-scale production of \textit{P.vannamei} through domesticated brood stock. Compared to this, India’s Tiger shrimp production is still dependent on wild brood stock. Requirement of protein for \textit{P.vannamei} is also less, making it cheaper to produce. China and other South Eastern countries produce large quantities of \textit{P.vannamei}, and offer stiff competition for Tiger shrimp in the market abroad.

ii. There is an absence of well-equipped fish health laboratories and competent extension centres, to advise aquaculture fishers about, fish health and treatment.
iii. The infrastructure, particularly for marketing, is poor and the facilities for maintenance of hygiene and good value realization in the fish markets are deficient.

iv. The infrastructure for marine capture fisheries is also inadequate going by the size of the fishing fleet. The harbours and fish landing centres suffer from inadequate facilities for hygienic landings, cold storage and cold chains availability and poor handling. All these constraints lead to poor value realization by the fisher and also may create problems for exports in view of sanitary requirements.

v. The technology for processing at fisher level is still not widely used. This leads to large-scale spoilage and the fishers are denied the benefit of value addition.

vi. People all over the country have not yet developed the taste for processed marine fish and, therefore, there is inadequate domestic market for processed marine fish.

All told, the strengths of the fisheries sector coupled with opportunities have a great scope of promoting livelihood and providing nutrition. India has the capability of taking care of the weaknesses and the threats to improve its position as the fourth largest fish producer, and second largest producer in Aquaculture globally. We have to proceed in the directions of greater productivity, better diversification, sustainable practices, hygienic handling at all stages comprehensive infrastructure and above all skill upgradation and human resource development.

### 3.1.0 Inland Fisheries

#### 3.1.0 An overview

3.1.1 The vast and varied inland waters (viz. lakes, reservoirs, wetlands, rivers, streams, ponds and tanks) constitute an important fisheries resource of the country. In recent years, the fish production from these open and confined waters has increased considerably reaching to a current level of 3.4 million tonnes- accounting for 53.12% of the country’s fish basket. Notwithstanding this marked achievement, the traditional fishers have gained little in stature and income out of the fisheries development and concerns on the economic condition of fishers persist. These concerns become more important in the context of rising environmental degradation, depressed prices world
over, emerging new economic order following WTO and signing of several multilateral agreements. Further, despite generation of considerable baseline information and technologies by the national institutions/universities, the country’s cumulative fish production is hardly commensurate with the nation’s water resources and decidedly far below the inland fish production of China which is about ten times more than India.

3.1.2 Inland water resources harbour the original germplasm of one of the richest and most diversified fish fauna of the world, comprising 930 fish species belonging to 326 genera. The resources provide full time vocation to 1.2 million inland fishers, and yield 3.4 million tonnes of annual fish production. India is the second largest producer of inland fish in the world and the sector plays a great role in nutritional security and employment potential. Besides being a source of income and livelihood to poor fishers, it also engages the rural population in ancillary jobs such as marketing, retailing, transportation etc. The sector achieved a growth rate of 12.7% during 2002-03. However, the sector still remains largely unorganised even today mainly due to the scattered and diffused nature of activities.

3.1.3 During the past two decades, a shift has been observed from marine fisheries to inland fisheries. Fish farming of carps and crustaceans is likely to witness manifold increase in the coming years in view of its profitability. This would be possible only through diversification of cultural practices and enlarging the cultivable *ecotypes* including new species as well as cultural practices like fish-cum-pig culture, fish-cum-poultry, and paddy cum fish culture etc. The new unexploited areas also include rainbow trout farming, ornamental fisheries, fresh water pearl farming, farming in inland saline waters, backyard fish culture, air breathing fish culture, flow thru fish culture, algae culture etc. There are a few other challenges viz. multiple use of water leading to scarcity of water in future affecting aquaculture activities, large scale diversion and abstraction of water in view of emergence of new river valley projects, risks from diseases making bio-security a critical issue, availability of quality seed and fish feed etc. In particular, care should be taken by the State authorities in the interest of the ecology to discourage brick kilns from coming up near village ponds/water bodies, which harbour fish biodiversity/natural fish breeding.
3.1.4 The above challenges highlight the need for accelerating productivity through genetic improvement of brood stock, sustainability of production, better health management, water control/management, code of conduct for responsible fisheries, feed management, processing and value addition, fishery credit, legislation and strengthening of marketing infrastructure and extension machinery.

3.1.5 Though fisheries has been recognized as a thrust area in the country’s successive five-years plans, a clear-cut comprehensive fisheries policy is yet to be finalized.

3.1.6 In recognition of the increasing role of inland fisheries in overall fish production, the GOI is implementing several schemes including support to Fish Farmers Development Agencies (FFDAs)/Brakishwater Fish Farmers Development Agencies (BFDAs) programme for fish seed development, cold water fish culture, strengthening of inland marketing etc. A network of 429 FFDAs and 39 BFDAs cover all potential districts of the country. The fresh water area brought under fish culture till date is 6.5 lakh hectares benefiting 11.3 lakh farmers. Over 7.6 lakh unemployed youths have been trained in improved fishing practices. Additionally, about 0.14 million ha area has been covered under shrimp culture. Under the national programme for fish seed production, over 1070 (300 shrimps) fish seed hatcheries have been commissioned producing 20,000 million fish fry in the country during 1999-2000. However, out of the country’s resources only 16% of fresh water area and 10% of brackish water area is reportedly being utilized for fish culture. More comprehensive use of the untapped resource should be planned.

3.1.7 While the country has achieved record fish and seed production levels the variety and quality are still an area of concern. Over 80% of fish seed produced in the country belongs to three species of Indian major carp viz. Rohu, Catla and Mrigal or to some extent Silver Carp, Grass Carp or Common Carp, even though there are 46 species of fish and shell fish amenable to culture in the country. Barring a few trials undertaken by the ICAR institutes, standard large-scale seed production technologies of mahseer, hilsa, large catfishes, air breathing fishes, snow trout etc. are still elusive. The varied type of water resources and country’s agro-climatic conditions necessitate the availability of seed of these hitherto neglected fish species and bring them into culture arena.

3.1.8 There is an overall need to actively involve Panchayati Raj Institutions, Cooperatives, private sector, NGOs and Self Help Groups (SHGs), in the extension and
promotion programme. Instruments like seed, feed, credit, extension, R&D and database are critical. Certification of seed as well as feed by Government recognized agencies warrant priority attention.

3.1.9 A separate National level Agency coordinating with Research Institutions and providing requisite support to aquaculturists / entrepreneurs / corporate bodies is urgently needed and should be set up by restructuring the Central Institute of Fisheries Education, Mumbai.

3.1.10 Aquaculture is not treated at par with agriculture or industry. This is not only unjust but also a big impediment to the growth of fisheries. During mid 1990s, a decision to put fisheries at par with agriculture was taken in the Central Board of Fisheries meeting held under the Chairmanship of Union Agriculture Minister but later the decision was not implemented. It is high time that final decision to place aquaculture and artesenal fisheries at par with agriculture is taken. Fisheries rightly deserve parity with agriculture in view of several commonalities. In view of the dwindling catches in the rivers system and in the coastal fisheries due to various constraints, fisher folk can be weaned away into aquaculture sector very conveniently which would provide them sustainable employment and income and also relieve pressure on riverine and coastal fish resources. Since aquaculture offers immense scope for employment generation and export opportunities, it would be in the interest of the Government to encourage this activity by exempting small-scale aquaculturists and artisnal fishers from income tax by treating this activity as agriculture. Similarly they could lower the cost of production if they are offered credit at differential rate of interest, loan facility for tubewell, supply of water/canal water at concessional rates, supply of seed and feed at subsidized rates, supply of fertilizers at subsidized rates and subsidy on transport and acquisition of means of transport. Persons involved in agriculture enjoy these facilities and fishers who face similar risks and constraints should also get these benefits. It should be possible for the Department of Agriculture and Cooperation to work out the costs and benefits for extending these facilities to fishers by treating aquaculturist and artesenal fisheries activities as agriculture.

3.1.11 During the series of consultations held with the stakeholders/administrators and field workers, it emanated that many of the problems of fisheries, especially aquaculture,
could be solved and the sector can grow fast if an autonomous **National Fisheries Development Board (NFDB)** on the lines of National Dairy Development Board (NDDB) is set up in the country. The status of an autonomous body would provide much needed working freedom and momentum to the various programmes to benefit fisheries sector in general and fishers in particular. It should be a body with technical experts/professionals from different segments of the fisheries sector. The Board should do the handholding for the fishers from the production to the marketing stage, particularly for small fishers and be the friend, philosopher and guide for them. Above all the Board must adopt a single window approach so that the multiplicity of agencies/regulatory bodies/Ministries could be avoided. This is particularly necessary in the interest of the State Governments implementing various programmes and the fishers who are often unable to benefit from such programmes due to plethora of rules/ agencies. It would also avoid duplication and ensure flow of funds more effectively. While the Board should have representation at a very senior level from the various ministries/stakeholders, it should be supervised by an Advisory Committee headed by the Union Agriculture Minister. Needless to add, it is critical to have representative of the fisheries sector drawn from the inland and marine sector, women fisher folk, feed and seed producers, traders, exporters, vessel owners, processors and banks. The Board could also serve as an umbrella organization for a host of training institutions, which exist today but suffer from lack of cohesion and composite direction. It is however stressed that the Board should never degenerate into a body delivering subsidies only but must cover all activities relating to planning and implementation in collaboration with the States/Research institutions and the stakeholders. The Commission would be very happy to assist in the formulation of the scope of the Board. Since the Board has to be provided a very large and effective mandate, it must be provided adequate funds to serve as margin money so that it could also draw institutional finance for its revenue generating activities.

It is felt that a sum of Rs. 3500 crores up to the end of Eleventh Five Year Plan should be provided to the Board with 50 % as grant and the remaining as interest free, long-term loan. Considering that the Government has decided to step up public investment in agriculture, funds of this magnitude should not be difficult to find, especially in view of
commendable growth rate in fisheries sector vis-à-vis agriculture and the great opportunity for income from export.

3.1.2.0 Capture Fisheries

3.1.2.1 The capture fisheries resources of the country comprise of rivers, canals, estuaries, flood plains, wetlands, lagoons and reservoirs. The riverine systems comprise 14 major and 44 medium rivers, innumerable tributaries and branches. With a combined length of 45,000 kms and 20,000 sq. kms of catchment area, the country’s riverine resources provide one of the richest fish germplasm of the world. The flood plains are primarily continuum of rivers and exist in the form of oxbow lakes especially in the states of Bihar, West Bengal, Assam, Manipur and eastern Uttar Pradesh. Reservoirs constitute the single largest inland fishery resources both in terms of resource size and productive potential. As per FAO, the country has 19,370 medium and large reservoirs with water spread of 3.15 m ha.

Table 1: Number and area covered under different sizes of reservoirs

<table>
<thead>
<tr>
<th></th>
<th>Small (&lt;1000 ha)</th>
<th>Medium (1000-5000 ha)</th>
<th>Large (&gt;5000 ha)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>19134</td>
<td>180</td>
<td>56</td>
<td>19370</td>
</tr>
<tr>
<td>Area (ha.)</td>
<td>14,85,557</td>
<td>5,27,541</td>
<td>11,40,268</td>
<td>31,53,366</td>
</tr>
</tbody>
</table>

3.1.2.2 Seven major rivers contribute to the estuarine resource of the country. Besides, a large number of smaller rivers on both the coasts also end up in estuaries. The largest and richest estuarine system in the country encompassing the Sundarbans, a complex of several estuaries is Hooghly-Matlah followed by Mahanadi, Narmada, Tapti and other peninsular estuaries.

3.1.2.3 The major river systems of India on the basis of drainage are divided broadly into two: (i) Himalayan River System (Ganga, Indus and Brahmputra) and (ii) Peninsular river system (east coast and west coast river system). The flood plains of Ganga and Brahmputra have the distinction of nurturing some of the finest wetlands of the country. The country has an estimated 2.0 m ha of flood plains lakes where fish and fisheries remain a traditional economic activity with tremendous socio-economic impact in the rural sector. The cold water fisheries resources of the country are comprised of rivers,
streams, lakes, reservoirs with combined riverine length of 8,310 kms and 43,770 ha of lakes and reservoirs. Besides, there are vast sheets of inland saline water located in different states of the country and largely unexploited.

3.1.2.4 After independence and ushering in of an era of industrialization, pressure on the water intensified and need for power, irrigation, flood control and waste disposal led to progressive destruction and shrinking of river water, their siltation and pollution with chemical and domestic discharges.
### Table 2: Profile of river systems of India

<table>
<thead>
<tr>
<th>S. No.</th>
<th>River system</th>
<th>Names of main rivers</th>
<th>App. length (Km.)</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Himalayan or Extra-Peninsular rivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.</td>
<td>1. Ganga</td>
<td>Ganga</td>
<td>2525</td>
<td>Uttar Pradesh, Bihar, West Bengal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ramganga</td>
<td>569</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gomti</td>
<td>940</td>
<td>Uttar Pradesh, Bihar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ghaghra</td>
<td>1080</td>
<td>Uttar Pradesh Bihar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gandak</td>
<td>300</td>
<td>Bihar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kosi</td>
<td>492</td>
<td>Bihar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yamuna</td>
<td>1376</td>
<td>Panjab, Haryana, Delhi, Uttar Pradesh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chambal</td>
<td>1080</td>
<td>Madhya Pradesh, Uttar Pradesh, Rajasthan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tons</td>
<td>264</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Son</td>
<td>784</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ken</td>
<td>360</td>
<td>Madhya Pradesh</td>
</tr>
<tr>
<td></td>
<td>2. Brahmaputtra</td>
<td>Brahmaputtra, Dibang, Siang, Lohit, Manas, Buri, Dihang, Dhansri, Koppili</td>
<td>4000</td>
<td>Arunachal Pradesh, Assam, Nagaland, Sikkim, Manipur</td>
</tr>
<tr>
<td>3. Indus</td>
<td>Jhelum</td>
<td>400</td>
<td>Jammu and Kashmir</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chenab</td>
<td>330</td>
<td>Jammu and Kashmir, Himachal Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beas, Satluj, Ravi</td>
<td>400</td>
<td>Himachal Pradesh, Punjab, Himachal Pradesh, Punjab, Jammu and Kashmir, Punjab</td>
<td></td>
</tr>
<tr>
<td>B. Peninsular rivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. East Coast</td>
<td>Mahanadi</td>
<td>851</td>
<td>Orissa, Madhya Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Godavari</td>
<td>1465</td>
<td>Maharashtra, Andhra Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Krishna</td>
<td>1401</td>
<td>Maharashtra, Andhra Pradesh, Karnataka</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cauvery</td>
<td>800</td>
<td>Karnataka, Tamil Nadu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bhima</td>
<td>861</td>
<td>Karnataka</td>
<td></td>
</tr>
<tr>
<td>5. West Coast</td>
<td>Narmada</td>
<td>1322</td>
<td>Maharashtra, Gujarat, Madhya Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tapti</td>
<td>720</td>
<td>Gujarat, Madhya Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mahi</td>
<td>583</td>
<td>Gujarat</td>
<td></td>
</tr>
</tbody>
</table>

3.1.2.5 Despite the ‘Clean the Ganga’ programme the river Ganga is highly contaminated from Hardwar down to Diamond Harbour. The average fish yield has gone down from 27 kg/ha during 1958-61 to 3 kg/ha during 1999-2000. There is a significant change in the
catch spectrum coupled with reduction in size distribution of fish. The tributaries of the Ganga too are highly polluted and impacting its fisheries. Water abstraction owing to construction of dams has resulted in reduced flow affecting the migratory run of fishes. The increased pollution and silt load have further aggravated the problem of water quality and fish carrying capacities. Yamuna is perhaps much more polluted due to discharge of effluents. The fish catches have dwindled drastically and coarse, hardy, trash fishes have taken over the place once occupied by the commercially important Indian carps. Similarly the Brahmaputra with 20 tributaries on its northern bank and 13 on its south, is carrying more silt than water during its flow resulting in the rise of its bed and loss of breeding grounds. Mahseer, snow trout and minor carps dominate the catches. As for Mahanadi, catfishes, carps and mahseer/prawn dominate three different regions of the river. In view of emergence of number of impoundments, the Godavari has been reduced to the status of a trickling stream. The barrages built across the river have restricted Hilsa runs while the transplanted Indian major carp failed to develop into commercial significance.

3.1.2.6 Cauveri is a biodiversity hot spot in having a unique fauna of exotic and Indian carps, catfishes and minor carp. Flowing along the foothills of Himalayas, the rivers Ravi, Satluj, Beas and Chenab harbour precious varieties of cold water fishes viz. trout, mahseer, snow trout and other hill stream fishes. These upland rivers and streams are basically the cradles of cold water fishes and serve as nurseries and rearing grounds for commercially important fish species. Changes in riverine ecology due to water abstraction, dam construction effluents and domestic discharges have adversely affected the breeding, feeding and rearing grounds of the fishes. Rapid industrialization has further added the woe of pollution and sediment concentration.

3.1.3.0 Fisheries management

3.1.3.1 In view of fast ecological degradation, the scientific management of riverine fisheries has not been made possible. The Central Inland Fisheries Research Institute, Barrackpore, has monitored the catches at a few selected centers on the Ganga, Yamuna, Brahmaputra, Narmada and Godavari. With the construction of series of dams and resultant ecological changes in the riverine habitat, the catches are declining markedly
and posing a vocational threat to the traditional river fisher folk. This threat gets further compounded with the release of noxious industrial effluents and pesticides in these water bodies. The situation warrants immediate measures by taking active conservation programmes such as habitat restoration of select stretches of streams. Further, basin-wide approach with legal and institutional mechanism is imperative for reducing adverse interaction and conflicts between fisher and hydro power/industrial sector. Undertaking of Environment Impact Assessment Studies (EIA) for ascertaining project’s adverse impact of projects on fisheries needs to be made mandatory, prior to signing of new hydropower project agreements. Compensatory capture/culture fishing activities should be provided for those who lose livelihoods. This would be on the principle of compensatory afforestation. In areas where industrial pollution threatens local fisheries, the cost for controlling of chemicals or sediments for mitigating fish losses requires compensation. The States’ Fisheries Acts need suitable revision with a provision under which polluters must pay the damage cost.

### 3.1.4.0 Reservoirs

3.1.4.1 Besides being keystones of development, reservoirs formed due to damming of rivers are a veritable source of fish production. They have requisite ingredients for fishers, anglers, bird watchers, tourists and naturalists etc. Presently, the area under reservoirs is 3.15 m ha. It is expected to reach 4.0 m ha by the end of the next decade. At present level of utilization, they yield on an average 20 kg/ha, which hardly matches with their potential.
Box-2

Reservoir Fisheries (Gobindsagar, Himachal Pradesh) – a successful story

Gobindsagar reservoir is located in Bilaspur district of Himachal Pradesh. The reservoir is formed on the river Sutlej and covers an area of about 10,000 ha at effective storage level. The water spread at full storage level encompasses 16,000 ha. Gobindsagar is one of the best-managed reservoirs in the country from the fisheries point of view. The average fish production from the reservoir during the last five years was about 1,000 tonnes per annum or 100 kg/ha/yr. The maximum yield obtained from Gobindsagar has been to the tune of 122 kg/ha/yr, which is the highest in the country for a large reservoir.

The reservoir has a predominant fauna of the exotic Silver carp (about 60–65% of the total catch) followed by Indian major carps (20–25%), Mahseer species (8-10%) and Minor carps (8 – 10%). The Indian major carps are dominated by *Catla catla*. The Department of Fisheries, Government of Himachal Pradesh implements several welfare and production oriented schemes for the benefit of the reservoir fishermen. These Centrally Sponsored Schemes include, Saving-cum-Relief Scheme, Group Insurance Scheme for Active Fishermen and the Housing Scheme. The Schemes implemented under the State Plan include Risk Fund Scheme and a Calamity Relief Scheme.

Besides closed season, which is implemented in the reservoir for 2 months (1st June through 31st July) every year, areas suitable for natural breeding in the reservoir are also protected to allow the fishes to breed and thereby help in auto stocking of the reservoir. To maintain species balance, supplementary stocking is done from time to time.

About 3000 registered fishermen inhabit the periphery of the reservoir of which about 1900 are active. These fishermen are grouped into 16 co-operative societies, which are then grouped into an apex body called the Bilaspur Fisheries Marketing and Supply Federation. The Federation assists the fishermen in sale and marketing of fish (including retail marketing, if necessary) and its assets include a cold storage, an ice plant and refrigerated vans. The Gobindsagar fish is marketed in major towns/cities in Punjab, Jammu and Kashmir and Delhi and also the bordering areas in Uttar Pradesh and Haryana.

Gobindsagar is an excellent example of a well-managed large reservoir and the practices adopted need to be replicated in other large and medium reservoirs of the country.

Management of a reservoir is in fact governance of a water body, which includes a variety of issues ranging from property rights, involvement of stakeholders, strict regulation, good research and appropriate choice of policy. A three-pronged strategy comprising selection of appropriate mesh size, increased stocking support and fishing efforts can however substantially catapult the fish catches of reservoirs. In case of small reservoirs, stocking alone could be more effective in improving the yield as success in the management of small reservoirs depends solely on recapturing the stocked fish. The main management principles suggested in the management of small reservoirs are: i) determination of ideal stocking density derived on the basis of hydro-biological
parameters; ii) selection of right species derived on the basis of fish food resources and iii) proper stocking and harvesting schedule.

3.1.4.2 The fisheries potential of large reservoirs is largely under utilized as evidenced by low production, low income and poor inventory building exercises. The management policy in large reservoir needs to have twin objectives of development and conservation. Further, the poor marketing infrastructure has also depleted the incentive and returns of the fishermen. There is a need to evolve a package approach comprising stocking, monitoring, equitable and just royalty arrangements, market intervention through cooperatives/corporations and quick transport/distribution channels etc. Fisheries Department must be consulted by the Irrigation Departments of States while managing the water resources, since single-minded attention to irrigation can work to the serious detriment of the fisheries resources. Water allocation policies should be in tune with the biological threshold levels for fisheries so that both the water resources and fish resources could be optimally utilized. In fact even while the Irrigation Department could continue to manage the headworks and the canals, the management of the water resource for fisheries in terms of stocking, exploitation, conservation, fishing rights etc., must be under the exclusive control of State Fisheries Department, if the production and productivity of fisheries in reservoirs is to be raised.

3.1.4.3 Indian reservoirs are distributed under divergent geoclimatic and environmental conditions and classified as small (< 1000 ha), medium (1000-5000 ha) and large (> 5000 ha). Fish catches from these reservoirs is exceedingly low - an average 12 kg/ha in case of large and medium and 50 kg/ha from small reservoirs; Notwithstanding the low levels of yields, there are a few reservoirs in the country where good management practices have resulted in increased catches, comparable to the world’s best reservoirs. Gobindsagar (H.P.) is one such example where management/scientific intervention has yielded positive results and an annual production level of 120 kg/ha has been achieved. Poor management and inadequate stocking are the main reasons for low fish production. It is recommended that:

a) All small reservoirs comprising 98 % of the total reservoirs of the country be developed as pure culture fisheries units;
b) Medium and small reservoirs be developed by proper conservation, added stocking efforts and involvement of fishermen.

3.1.4.4 Some other measures for raising fish production from manmade impoundments are strict enforcement of management rules, observance of close season, provide training and fishing tools to fishers and last but not least, observing ethics of responsible fisheries.

The recommended stocking rates for different types of reservoirs are:

**Table 3: Stocking rate and expected fish production of different sizes of reservoirs base**

<table>
<thead>
<tr>
<th>Reservoir base</th>
<th>Stocking rate</th>
<th>Expected fish production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000-2000 ha</td>
<td>1000 (100-125 m)</td>
<td>500 kg/ha</td>
</tr>
<tr>
<td>2001-5000 ha</td>
<td>750 (100-125 m)</td>
<td>125 kg/ha</td>
</tr>
<tr>
<td>5001-10,000 ha</td>
<td>500 (125-150 m)</td>
<td>810 kg/ha</td>
</tr>
<tr>
<td>Over 10,000 ha</td>
<td>300 (125-150 m)</td>
<td>50 kg/ha</td>
</tr>
</tbody>
</table>

3.1.4.5 The cumulative fish seed requirement for the development of fisheries in exploited reservoirs would be around 350 million fingerlings and the country’s hatcheries are very well in position to meet this demand. The stocking of the reservoirs will have to be continued regularly for a period ranging from 5-10 years. The present system of auctioning and leasing is highly detrimental on long term basis and needs to be replaced by cooperative, SHG system; management of reservoirs by fishermen cooperatives needs to be promoted in order to increase the efficiency and production levels; since fishermen have been proved the best managers, involvement of fishermen residing around the reservoirs is highly important. Observance of close season, mesh size regulation are highly important in conserving the stock. Besides training, Fishermen’ Welfare Schemes such as providing subsidized fishing nets/boats/tents, close-season assistance, premium free insurance, calamity assistance and establishment of fisheries villages need strengthening in terms of level of benefits. In fact, atleast Rs. 1500 per month for the non-fishing months should be available instead of the present level of Rs. 300 per month, in view of the increased costs of living. An additional allocation of Rs. 50 crores per annum adding to Rs. 350 crores upto the end of the 11th Plan should be provided for this purpose from the Government of India.
3.1.4.6 With the launching of ICAR funded All India Co-ordinated Research Projects on five large reservoirs located in different agro climatic regions of the country, considerable baseline information on the limnology and fishery of major reservoirs has been generated and management norms evolved. Under these norms, following select management measures on large, medium and small reservoirs could yield production levels of 100, 75 and 50 kg/ha respectively. Taking these production levels into consideration the country’s reservoir fish production could be raised from 94,000 tonnes to 2,45,000 tonnes, constituting an increase of 160%.

**Table 4: Current yield vis-à-vis potential from different categories of reservoirs**

(In tonnes)

<table>
<thead>
<tr>
<th>Category</th>
<th>Total area ha.</th>
<th>Present</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Av. Production</td>
<td>Total production</td>
<td>Av. Production</td>
</tr>
<tr>
<td>Small</td>
<td>14,85,557</td>
<td>49.90</td>
<td>74,129</td>
</tr>
<tr>
<td>Medium</td>
<td>5,27,541</td>
<td>12.30</td>
<td>6,486</td>
</tr>
<tr>
<td>Large</td>
<td>11,40,268</td>
<td>11.43</td>
<td>13,033</td>
</tr>
<tr>
<td>Total</td>
<td>31,53,386</td>
<td>29.70</td>
<td>93,650</td>
</tr>
</tbody>
</table>

### Development of fisheries in flood plains/ wetlands

3.1.5.1 Freshwater wetlands are extensively spread particularly in Assam, U.P., Bihar and West Bengal and estimated to cover 20 million ha of water in the country. The wetlands are ecosystems where water and land meet. In view of their nutrient status, largely due to predominance of aquatic plants (including weeds), fish production from these water bodies ranges from 100-150 kg/ha, though in view of their organically rich characteristics they have the potential of yielding 1000 kg/ha. The general strategy for development of these wetlands should be to clear them from weed infestation and undertake stocking of fingerlings of grass carp, common carp, *L. rohita* and *C. carpio. and C. batrachus* in the ratio of 10:10:20:30:30. National Rural Employment Guarantee Programme or Food for Work Programme should be used for clearance of weed infestation and the weed could also function as green manure.
3.1.6.0 Estuaries / Coastal waters

3.1.6.1 Estuaries or coastal waters of the country having potential for brackish water fish farming are of the order of 1.23 m ha. These are the most productive estuaries system in the world with average yield varying from 45-75 kg/ha. Out of the total area, 80% is under traditional farming system and the remaining is under extensive or semi-extensive shrimp farming. The activities of shrimp farming on commercial scale have been taken up in the States of Andhra Pradesh and Tamil Nadu while traditional farming is practised in West Bengal and Kerala.

3.1.6.2 The flood plains of Ganga and Brahmaputra rivers have the distinction of nurturing some of the finest wetlands of the country which perform a variety of social functions. These natural ecosystems have intimate relationship with mankind since their inception both directly (fishery, irrigation, industry, recreation) as well as indirectly (recharging of ground water, climate regulation, soil protection, aesthetic values etc.). An estimated 2.0 m.ha of flood plain lakes is available in the country where fish and fisheries remains a traditional economic activity with tremendous socio-economic impact on the rural sector.

3.1.7.0 Cold Water Fisheries

3.1.7.1 The cold water fisheries resources comprise high and mid altitude lakes, rivers, streams, tributaries and reservoirs fed by such rivers. These resources are poorly developed primarily due to lack of scientific and development efforts. The waters maintain fairly low temperature, which obviously support scanty primary and secondary productivity leading to slow growth of fishes. However, while cold water fisheries constitute a small part of the total fish economy, its importance in the larger context of the environmental quality of the river system should not be underestimated.

3.1.7.2 The common cultivable species in the hill States are Mahseer (T. spp., A hexagonolepis), Snow trout (Schizothorax spp.), Mirror carp (C. specularis) and the introduced trouts (Brown and Rainbow trout). In view of its prolific breeding propensity, hardy nature, quick growth and consumer’s preference, mirror carp is the most common fish in stagnant waters. However, due to repeated inbreeding, the species has of late been showing syndromes of genetic fatigue reflected in the form of poor health and slow growth as well as low survival rates. Among the indigenous species, snow trout
(Schizothorax) is the most important in rivers and streams but its stock is declining. Mahseer is a highly important fish of the cold water both as a commercial and sport fish. Though successful attempts have been made for the breeding and seed raising of mahseer, large scale seed availability of seed of golden mahseer (T. putitora) is still a constraint.

3.1.7.3 The most important aspect of cold water fisheries is that they provide excellent sport. Trout and mahseer are world known game fishes providing ecstatic pleasures to anglers. Kashmir, Himachal Pradesh, Uttarakhand, North Bengal, Nilgiri, Kodai hills and Munnar High range offer excellent game fishery to anglers. The approximate resources of cold water States in India is given in the table:

Table 5: Area-wise list of different kinds of natural water bodies in the Indian uplands

<table>
<thead>
<tr>
<th>Particulars of water body</th>
<th>Stream length/Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Himalayan and Deccan Plateau river systems</td>
<td>8310 km</td>
</tr>
<tr>
<td>II 1. Brackish water lakes (above 3000 msl)</td>
<td>2390 ha</td>
</tr>
<tr>
<td>2. Fresh water natural lakes (1500-2000 msl)</td>
<td>18150 ha</td>
</tr>
<tr>
<td>3. Kashmir high mountain lakes (above 3000 msl)</td>
<td>400 ha</td>
</tr>
<tr>
<td>4. Valley wetland ecosystems</td>
<td>3000 ha</td>
</tr>
<tr>
<td>5. Shivalik Himalayan lakes</td>
<td>74 ha</td>
</tr>
<tr>
<td>III Central Himalaya</td>
<td></td>
</tr>
<tr>
<td>1. Fresh water lakes of Kumaon</td>
<td>355 ha</td>
</tr>
<tr>
<td>IV Himalayan manmade lakes and reservoirs</td>
<td>43770 ha</td>
</tr>
<tr>
<td>V. Peninsular zone</td>
<td></td>
</tr>
<tr>
<td>1. Natural lakes</td>
<td>85 ha</td>
</tr>
<tr>
<td>2. Manmade lakes and reservoirs</td>
<td>4400 ha</td>
</tr>
</tbody>
</table>

3.1.7.4 Successful rainbow trout farming has been achieved in J & K and H.P. Private farming units in the form of battery of raceways have also been set up in HP and the trout production from these two States alone has gone up to 150t/yr annually. It is important to consolidate success both in strength and scale. The issues being confronted in further
boosting the production are marketing, largescale availability of trout feed, crop insurance etc. and require early solution. The Country’s cold water States have the potential of producing a minimum of 2000 tonnes of trout within a short spell of time. Stock of brown trout (*Salmo trutta fario*) – anglers’ favourite, is fast declining both from the farms and streams of cold water States underlying an imperative need to build up the stock of this world famous sport fish either by importing the new strains or intensification of efforts in our farms.

3.1.7.5 The cold water rivers/streams are under growing pressure. In addition to the degradation of water quality, a more serious problem is the disruption of flow pattern with impact on the quality of waters. Besides obstruction of migratory path of major cold water fishes like trout and mahseer, dam construction or channelisation or diversion of water are instrumental in vitiating the natural biological production cycle.

### 3.1.8.0 Future Challenges

3.1.8.1 The future challenge for open-water fishery is very demanding. Not only have we to make efforts to sustain the existing contribution to inland production basket but also find ways and means to raise this productivity. This has to be achieved in spite of deterioration of open-waters in quality and likely reduction in quantity as well as ever increasing demand for other sectors. Water is critical for fish; it has non-consumptive use in fishery sector. It also acts as substrate for its growth and sustenance. Therefore, any water management issue affects fishery directly. The emerging freshwater scarcity needs to be recognized as an issue of utmost importance. There is a growing awareness that increased water use by humans not only reduces the amount of water available for future industrial and agricultural development but also has a profound effect on aquatic ecosystems and their dependent aquatic life including fishes. Balancing the needs of the aquatic environment and other uses is becoming critical in many of the river systems in the country as population and associated water demands increase. In this context, what is often lacking is the understanding that planning environmental water allocation means striking the right balance between allocations of water for direct human use and indirect human use.
3.1.8.2 A recent assessment of the status of freshwater ecosystems showed that their capacity to provide the full range of such goods and services appears to be drastically degraded. Many freshwater species are facing rapid population decline or are threatened, and yields from many open-water fishery resources have dwindled as a result of interrupted water flow, habitat degradation and pollution. In order to sustain the ability of freshwater dependent ecosystems to support food production and biodiversity, environmental flows especially of rivers and streams must be established scientifically, made legitimate and maintained.

3.1.9.0 Culture fisheries

3.1.9.1 Aquaculture accounts for 70% of the total inland fish production of the country. Besides the exploitation of traditional resource of ponds/tanks, the available technologies have made it possible to utilize small reservoirs and canals too for aquaculture. As per rough estimate only 65% of the pond culture resources had been brought under fish culture mainly through FFDA with average yield of 2,200 kg/ha by 2001-02. There is thus considerable scope for enlarging the coverage and bringing the remaining ponds/tanks/small reservoirs under fish farming.

3.1.9.2 Aquaculture has shown continuous expansion since 1980 and has maintained its position as one of the fastest growing food production activities in the country. The average growth rate of 12.4 % during 1990-96 verily shows the potential of the sector. Aquaculture has been recognized as a major economic activity among the agrarian population and is gaining popularity especially among the rural unemployed youths.

3.1.9.3 The freshwater culture resources in the country comprise 2.25 million ha of ponds and tanks; 1.3 million ha of beels and wetlands; 2.09 million ha of lakes and reservoirs, 0.12 million km of irrigation canals and channels and even paddy fields.
Table 6: Fresh water aquaculture at a Glance:

| 1. Water area available under pond/tanks | 23,58,634 ha |
| 2. Present Annual fish production       | 22,42,170 t  |
| 3. Fish production aquaculture          | 15,12,000 t  |
| 4. Area still to be brought under fish culture | 11,99,500 ha |
| 5. Projected cumulative fish production  | 33,12,800 t  |
| 6. Mean projected unit area production  | 2.672 kg/ha/yr. |
| 7. Requirement of fry                   | 15362 m      |
| 8. Requirement of feed                  | 52,04,500 t  |

3.1.9.4 India is basically a carp country with 84% of our fresh water production being contributed by carps alone. Research investigations undertaken in the country’s fisheries institutions resulted in the development of over two dozen high yielding technologies including composite fish culture involving combination of indigenous (C. catla, L. rohita and C. mirgala) and exotic carps (H. molitrix, C. idella and C. carpio). By extension of this technology through FFDA, it would be possible to boost the aquaculture programme. Later a few other eco-friendly technologies based on utilization of farm’s wastes and other byproducts that do away with the cost on feed and fertilization, can be passed on as alternate choices to farmers.

3.1.9.5 The possibilities of integration of fisheries with agriculture and livestock viz. paddy, pigs, poultry and ducks, have opened new possibilities for enhanced income and more ecologically suitable practices. Cattle dung when used as a fertilizer ensures fish production rate of 3-6 t/ha. Use of biogas slurry and aquatic weeds has also been tried successfully. The excreta of pigs, poultry and ducks form valuable feed, especially for organic fish farming. The fish in turn feed the ducks. Similarly, large areas growing paddy can support fisheries, which in turn add to the paddy yield. Extension machinery in agriculture should more actively encourage the adoption of these practices for which the technologies are available in the country. China in particular has benefited substantially from these practices.
Box - 3

Success of Carp Farming in Andhra Pradesh, Haryana and Punjab

Andhra Pradesh, Haryana and Punjab have emerged as the most progressive States with respect to the development of freshwater fish farming in the country. While Andhra Pradesh was to some extent a traditional fish farming State, Haryana and Punjab are non-traditional States and fish farming started only during the early seventies. Today, fresh water fish from Andhra Pradesh is marketed in about a dozen other States (all the States in the NE region, West Bengal, Orissa, Bihar and eastern Uttar Pradesh) and also in the neighbouring countries - Bhutan and Nepal. Similarly, fish produced in Punjab and Haryana is marketed in the neighbouring States after meeting their own requirements.

In Andhra Pradesh, the Kolleru Lake area is the hub of freshwater fish farming. Besides, Indian major carps (IMC) such as catla and rohu, farmers also raise catfishes like African magur (Clarias gariepinus) and Pangasius sutchi. The average productivity from the farms in Kolleru Lake area is around 5-6 tonnes per ha and scientific methods of farming are deployed to maximise the returns from the ponds. The seed and feed inputs are well organised in the area, which is a big support to the fish farmers. Similarly, the marketing infrastructure is also well knit that takes care of the fish transportation by refrigerated vans to far-flung areas of the country. Per hectare production in Haryana and Punjab is close to 4000 kg and besides Indian major carps, the farmers are also raising freshwater prawn. In these two States, the markets are close to the production centres and, therefore, the per kilogram realisation to the fish farmer is much higher as compared to what the farmers get in Andhra Pradesh.

Freshwater carp farming in the above-referred States exemplifies the innovations and ingenuities of the small-scale fish farmer in optimising per hectare yield from the fishponds and are worth replication in the other carp farming areas of the country.

3.1.9.6 Air breathing catfish culture (C. batrachus and H. fossilis) known for their medicinal properties are in great demand. Though hatchery technologies for their seed production have been developed, large-scale seed availability is still a far cry. Presently, the seed is collected from the wild for stocking the ponds. The culture of these fishes is highly suitable in shallow, seasonal and weed-choked ponds along with trapa (Trapa. bisponsa) and makhana (Eurale. ferox) as practised in north Bihar and eastern Madhya Pradesh.

3.1.10.0 Trout farming: Advancement and scope

3.1.10.1 The farming of rainbow trout (Oncorhynchus mykiss) on a commercial scale has been made possible in the hill States of the country. All impediments pertaining to breeding, farm husbandry, production of high conversion feed have been circumvented and the sole irritant, viz. disease infestation in the farms, has also been taken care of to a large extent by establishment of a national pathological laboratory at Indo-Norwegian Trout farm Patlikuhl. This laboratory is in a position to cater to the need not only of
Himachal Pradesh trout growers but also the farmers of J&K and Uttaranchal as well as other parts of the country. A team of departmental workers has been trained from National Veterinary Institute, Oslo, Norway and these personnel have attained sufficient expertise in tackling trout pathological aspects. Regular surveillance and monitoring is being maintained of the trout stock of all the trout growers of the State. Marketing, being a very important issue, a national level marketing study has been conducted through Tata Consultancy Services (TCS), which incorporates assessments regarding domestic and export potential of the trout. Production levels are being upgraded and a vision plan has been prepared by the State of Himachal Pradesh envisaging a trout production level of 500 tonnes within three to five years. Similar production multiplication programmes have been made by the States of J&K and Uttaranchal. The programme is receiving a big boost with the release of financial packages to hill States (viz. J&K, HP, Uttaranchal and Sikkim) by Government of India for construction of hatcheries, establishing feed mill, liberal subsidy to trout growers, inventory survey of fisheries resources, habitat restoration etc.

3.1.10.2 All the country’s hill States now have modern trout hatcheries, battery of raceways, feed mill plants and other farm infrastructure. The development in trout fisheries has generated tremendous enthusiasm among the local hill inhabitants in taking up trout farming as full time vocation. A number of trout farming units have already been set up in the state of Himachal Pradesh, Uttaranchal and Sikkim and are adding to the income and prosperity of growers.
Successful Trout Farming in private sector in the state of Himachal Pradesh/J&K

The successful implementation of two foreign aided projects (supported by EEC and NORAD) in the field of rainbow trout farming in the States of Jammu and Kashmir and Himachal Pradesh have brought new hopes and prospects in the development of cold water fisheries resources of the country. The farming of rainbow trout (*Oncorhynchus mykiss*) on commercial scale has been made possible in the hill States of the country. The farming system demonstrated in the State run farms have generated tremendous enthusiasm among the local unemployed youth to take up farming of trout fish as a means of livelihood. With the support, motivation and knowhow by the extension wings of State Government better farming units have come up even in the remote hill pockets of the States of Himachal Pradesh, Uttarakhand and Sikkim.

The main reasons attributed to the up front acceptance of the technology success by the growers are:

i) Import of quick growing European/Swedish strains of rainbow trout.

ii) Modernisation of trout hatcheries vis-à-vis easy and adequate availability of troutlings to private trout growers.

iii) Evolvement of compounded pellitized feed for all the stages of trout with high FCR, appetite value and stability factor.

iv) The bulk quantities of farm-reared trout seed and its transplantation in rivers and streams has contributed significantly in the revival of sport fisheries in the states.

Country’s trout farming programmes need strengthening both in strength and scale. Against the current production of 150 tonnes farm-reared rainbow trout annually the production could be raised ten fold within a short period. The success achieved in the states of Himachal Pradesh and J&K in trout farming is worth emulating by other states for generating employment and raising proteinous food for hill inhabitants.

3.1.10.3 The current production level of trout of 150 tonnes annually can easily be raised manifold among the hill youths. Entrepreneurs are also evincing keen interest in establishing large farms and entering the export market. The only action required is simplification of rules in the acquisition of land for these investors.

3.1.10.4 The high altitude snow bound lakes located all around the mid-Himalayas could be developed as Angler’s paradise. The only requirement is the ranching of fry/fingerlings of game fishes viz. lake trout (*Salvelinus namycush*) and Arctic char (*Salmo Salar*) - all excellent game fishes and stocked world over in high altitude waters.

3.1.11.0 Species diversification

3.1.11.1 As per FAO, India utilizes only three bio-categories and 15 species in contrast to 29 by China, highlighting the need to diversify aquaculture and ensure
sustainability and increase in farm production. The thrust as in diversified production must cover both technological and non-technological aspects such as consumer preference, the economics of production and marketability of the selected species. It is time that the available technologies for nationally and internationally breeding and culture of murrels, minor carps and large catfishes, are utilized by scientific institutions/State departments and industry more comprehensively. Though hatchery seed of mullets, mahseer, snow trout, catfishes air breathing fishes are not available in required quantities, yet considering their high price, these would be welcome addition to the fresh water aquaculture system.

3.1.11.2 Yet another critical infrastructure gap relates to setting up of model large scale hatcheries particularly for targeting the hitherto under-utilised species like trout, mahseer, Sea-bass and Sea-bream, etc. These hatcheries would have to be in the public sector for supplying brooders to recognized private sector hatcheries and to provide seed directly to fishers. It is proposed to set up 10 such hatcheries in different States at a cost of Rs. 1.5 crores per hatchery.
Table 7: Species wise aquaculture production in India in the year 2000.

<table>
<thead>
<tr>
<th>Species</th>
<th>Production (mt (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshwater</strong>*</td>
<td></td>
</tr>
<tr>
<td><em>Cyprinus carpio</em></td>
<td>86400 (4.12)</td>
</tr>
<tr>
<td><em>Labeo rohita</em></td>
<td>567433 (27.1)</td>
</tr>
<tr>
<td><em>Cirrhinus mrigala</em></td>
<td>516900 (24.7)</td>
</tr>
<tr>
<td><em>Catla catla</em></td>
<td>546200 (26.1)</td>
</tr>
<tr>
<td><em>Ctenopharyngodon idellus</em></td>
<td>151100 (7.2)</td>
</tr>
<tr>
<td><em>Hypophthalmichthys molitrix</em></td>
<td>16489 (0.79)</td>
</tr>
<tr>
<td><em>Clarias spp.</em></td>
<td>10235 (0.49)</td>
</tr>
<tr>
<td><em>Anabas testudineus</em></td>
<td>65000 (3.1)</td>
</tr>
<tr>
<td><em>Channa spp.</em></td>
<td>21920 (1.05)</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>59371 (2.83)</td>
</tr>
<tr>
<td><strong>Marine:</strong></td>
<td></td>
</tr>
<tr>
<td><em>Penaeus monodon</em></td>
<td>52471 (2.50)</td>
</tr>
<tr>
<td><em>Penaeus indicus</em></td>
<td>300 (0.01)</td>
</tr>
<tr>
<td><em>Crassostrea madrasensis</em></td>
<td>14 (0.001)</td>
</tr>
<tr>
<td><em>Pema viridis</em></td>
<td>609 (0.03)</td>
</tr>
<tr>
<td><em>Paphia gallus</em></td>
<td>630 (0.03)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20,96,072</strong></td>
</tr>
</tbody>
</table>

3.1.12.0 **Introduction of new species**

3.1.12.1 There has been a continuous debate on the subject of the introduction of new species in the country. With the setting up of National Committee on Introduction of Exotic species in the country by Govt. of India, a very restrictive view or a blanket ban may not be in the long run interest of the country and introduction proposals must be considered on merit and with a forward looking view. The role played by some of the exotic fishes viz. trouts, silver carp, grass carp, mirror carp in raising country’s overall fish production cannot be overlooked. Many countries in our neighbourhood have benefited from the exploitation of exotic species. The scientific development and
emerging technologies, monosex populations etc., would be able to offset the adverse impacts, if any, of these introductions. It may not be desirable to legalise entry or allow introduction of such species like African carp (*Clarias gariepinus*), which could play havoc with the country’s aquaculture programme in view of its voracious carnivore feeding regime. However, some other species deserve introduction for enrichment of stock and tapping of opportunities which have hitherto remained unexploited.

3.1.12.2 The high attitude lakes dotted all along the foothills of Himalayas, though important potentially for development of sport and food fisheries, are currently lying severely under-utilized. Both rainbow and brown trout have failed to establish themselves in view of extremely low high altitude water temperature during a major part of the year. Suitable species for such arctic, lentic, glacier-laden waters are Arctic Char (*Salmo salar*) and lake trout (*S. fontinalis*). It is recommended that eyed-ova of these species may be imported as establishment of these species in these upland waters would not only provide protein and livelihood to hill inhabitants which have little income opportunities but also promote sport fisheries in these far flung pockets.

3.1.12.3 Another exotic freshwater species on the horizon is *Tilapia niloticus*. Highly popular as a food fish in neighbouring countries, this *easy to breed - quick to grow* fish has high consumer’s performance in international markets although it has its defects too. Some stakeholders felt that it could be useful for India since it could reduce our over-dependence on *P. monodon* for export and also allow participation of fresh water fisheries in the export arena. However, since there is some controversy about its suitability for Indian conditions, its performance in water bodies where it has already been grown, through the backdoor should be studied in a time bound manner by a small group of experts and industry. The Department of Animal Husbandry, Dairying and Fisheries (DAHDF) should set up this group.

3.1.13.0 **Culture of Air breathing fishes**

3.1.13.1 In view of consumer’s preference and medicinal values, the air breathing fishes viz. *Clarias batrachus, Anabas testudineus, Heterophenstes fossilis* command high price in fish markets. These fishes have an advantage of growing in shallow, seasonal, muddy, weed-choked ponds, scattered in the villages of UP, MP, West Bengal, Assam,
Orissa and northeastern states. These fishes are also easy to transport, requiring less water and are quite hardy for long transportation route. Presently, the seed of these fishes is collected from the wild as large-scale seed availability of both Magur and Koi is not there.

3.1.13.2 In Thailand, *Clarias maculates* is being bred by specialized breeding techniques and rearing is done on a large scale. Production rate as high as 30-60 tonnes/hectare have been reported. The Thai Magur also grows 3-4 times more than Indian Magur and attains size of 600-800 grams in one year. Considering the potential of promoting air-breathing fish culture programme in the country, research institutions should go in for large-scale brooder seed production of both Magur and Singhi. Some stakeholders have also felt that Thai Magur (*C. maculatus*) should also be introduced on a large scale. However, there is some controversy about its suitability for Indian conditions and its performance too should be studied by a group consisting of experts and industry to be set up by DAHDF.

3.1.13.3 Similarly, large catfishes, especially *Mystus seenghala* and *Wallago attu*, are in great demand among the consumers in north Indian states. While no technology on breeding and raising large-scale production of these catfishes is available in the country, great strides have been made in America and other European countries on intensive monoculture of Channel catfish (*Ictalurus punctatus*). The import of technology of Channel catfish farming under a bilateral project, would perhaps be a step of great economic importance and also meet country’s consumers’ demand of highly sought after catfishes.

3.1.14.0 Ornamental fish culture

3.1.14.1 World trade in ornamental fishes has touched a record figure of over US$1 billion and is growing @ 10% per year. Despite vast potential, India’s share in export of ornamental fishes is negligible. A large number of ornamental fishes that abound in the country’s freshwaters viz. *Danio rasbora, Trichogaster spp, Gara spp, Botia spp, Carasius auratus* etc. are known world over. Ornamental fish culture has grown as a cottage industry in several Asian countries with substantial employment potential. Besides being a foreign exchange earner, it has a great domestic market. There is a need
to expand the activities both in mini farms and mega units. Several private farms have sprung up in eastern and southern parts of the country. The ornamental fisheries if developed on commercial scale have the potential of creating large-scale employment for the fisherfolk rendered jobless consequent to depletion of fish catches in the rivers and streams in the country.

**Box - 5**

**Ornamental Fish Culture and Trade (Chennai, Tamil Nadu) - a Success Story**

Kolathur village on the outskirts of Chennai is famous for ornamental fish cultivation by small-scale producers. There are about 600 families earning their livelihood through ornamental fish cultivation in Kolathur and on an average each household in the village earns over Rs 5000 per month through ornamental fish farming. About 45 kms from Kolathur, Gummudippoondi village is another hub of ornamental fish production where women SHGs have successfully taken up breeding and raising of ornamental fish to earn their livelihood.

On the commercial front, the ornamental fish trade is a growing business with Chennai and Kolkata turning out to be the major production and export centres. The domestic trade is a mix of medium and small ornamental fish farmers. In Chennai, many farmers grow fish in their backyards and sell the stock to bigger companies, which are engaged in the export business. The State Government undertaking Tamil Nadu Fisheries Development Corporation (TNFDC) joined the field in 2000. It rears popular varieties like goldfish, angelfish, mollies and fighters in its farm near Coimbatore. The ornamentals are sold in the local markets.

The global trade in the ornamental fish is estimated at Rs 5000 crores, of which India has a minuscule Rs 2.0 crore. This is despite the country’s tropical climate, varied freshwater sources, and 8 000 plus-km coastline. However, the growing demand for ornamental fisheries and the growing interest in aquarium may change all this very soon.

Singapore and other South East Asian countries account for 80 per cent of the global trade. The main markets are the US, the UK, Belgium, Italy, Japan, China, Australia and South Africa. According to industry estimates, India’s domestic annual turnover is about Rs 15 crores, but the global market is much bigger. With its tropical climate, India can become a key player. Many Indian species like catfish, dwarf and giant gouramis, and barbs are popular abroad and fetch good prices.

To popularise ornamental fish production and trade, Kolathur is an excellent example to emulate. It provides a good mix of both domestic as well as commercial-scale production, which largely caters to the export market.

3.1.14.2 There is a need to recognize ornamental fisheries as a potential sector under fish farming; impart scientific orientation to the activity by involving geneticists and pathologists in the programme; activating the role of Govt. of India/ICAR / MPEDA in the promotion of ornamental fish culture in the country and training of riverine
fishermen in the culture and breeding of ornamental fishes/ construction of Aquarium and other configuration are some other issues for consideration and implementation.

### 3.1.15.0 Backyard aquaculture

3.1.15.1 With an aim to promote small-scale fish farming in urban areas, the concept of backyard fish culture or kitchen ponds is getting increasingly popular, especially in South East Asian countries. Common carp and air breathing fishes are most suitable under the backyard fisheries. Being omnivore with wide range of feeding regime, any type of trash food/kitchen refuse could be served to these fishes and converted into fish flesh. India also has several other species, which fits the concept of backyard fish culture viz. magur (*Clarias*), grass carp, *Seenghi Heteroprenstes* etc. All these fishes except grass carp have an additional trait of thriving in shallow, muddy waters. A small pond of 50-100 sq meters can easily meet a family’s demand of fish without involving any recurring cost except the one time purchase of fish seed. Depending upon the inclination and interest of the pond owner, these backyard units could also be used for breeding and raising ornamental fishes and contribute to the family’s income. The concept of backyard fish farming is well accepted in the country and is already prevalent in limited scale in the States of West Bengal and Assam. The present need is to expand it into other states of the country through extension and mass awareness programmes. Both scientific institutions and development departments should come out with pre-packed information and ideal size of backyard ponds, species stocking and growth details etc.

### 3.1.16.0 Sewage fed fisheries

3.1.16.1 Biological amelioration of sewage is a viable option to overcome the problem of large-scale generation and accumulation of organically rich sediment/material. In recent years, sewage fish culture after proper treatment is increasingly being used for production of fish. The fish production levels in the system are quite high while cost of fish culture is greatly reduced in the absence of component of feed and its expenditure. A number of sewage fed fish farming units have been set up in the country especially in West Bengal. Sewage fish culture is also ecologically beneficial and can convert such disadvantaged areas into Bio Parks for leisure activities as in
Mudialy (W.B.) States must launch programmes to encourage municipalities and other local bodies to set up aquaculture based sewage treatment units, which would produce fish and treat the sewage in an ecologically friendly manner. It is estimated that one acre of such a treatment pond would be needed for treatment of one million litres per day of sewage.

3.1.16.2 Gambusia (*Gambusia affinis*) has been recommended for mosquito control in stagnant water due to its preference for mosquito larvae. It is a live bearer and is easy to keep and breed. Care should be taken however, as it cannot survive in highly polluted waters and in community tanks or ponds with other fish since it eats up the larvae of other fish and even its own young. They have been used extensively in USA and also in India in clean wells, small tanks with stagnant water etc. However, fathead minnows, which are hardier and less nasty, are also recommended.

**Box - 6**

**Mudialy Fishermen’s Cooperative Society, Kolkata (West Bengal)**

The Society, registered in 1961, obtained 70 ha.of waterlogged wasteland-cum-garbage dump from Calcutta Port Trust and 10 ha. from the State Government. The Society has since engaged in production of fish in the sewage water and has also set up a Nature Park involving growth of an eco-tourism centre and extensive plantations of fodder plants, dust absorbing plants, canopy trees and agri horticultural plants. In the process, the Society has not only been successful in treating 25 million litres of waste water through biological means for pisci-culture, but has also provided various facilities to its members like daily-wage medical and educational assistance, funeral aid, marriage aid and housing advance. The integrated and mutually beneficial nature of these activities has converted a stinking, disadvantaged area into an ecologically friendly expanse of greenery. The Society has successfully cultured Indian major carps as well as many exotic carps and successfully demonstrated the technology for sewage water fisheries. The work of the Society has won it the National Productivity Award twice as well as Indira Priyadarshini Brikshamitra Award, Award for overall performance in Pisci-culture and Award for Overall Excellence from NCDC. The “Mudialy Model” has successfully demonstrated the feasibility of production of fish and establishment of an eco-friendly facility even while utilising industrial wastewater and disadvantaged wetland.

3.1.17.0 Pen Culture

3.1.17.1 Raising fish seed in pens (fabricated enclosures of bamboos and nylon nets) erected around the marginal areas of beels, chaurs, lakes or even reservoirs is gaining wide acceptance among the fish culturists of Bihar, West Bengal, Assam and some other states of the country. This seed raising system helps in utilisation of organic
matter, especially decayed matter and detritus etc., piled up in the shallower areas of these nutrient water bodies.

3.1.17.2 Taking in view the country’s wide constraints of rearing space in fish farms vis-a-vis high cost entailed in construction of new fish farms, pen culture offers great promise and scope in enhancement fish seed production of the country. It is one such system where seed could be grown in plenty up to fingerling stage for meeting the huge seed requirement of large water bodies including reservoirs without incurring extra cost on feeding the fish seed. Special schemes need to be formulated by State and Central Govt. bodies with an aim to encourage pen culture programme in the country.

3.1.18.0 **Brackish water fish culture**

3.1.18.1 Since 1980, development of brackish water fish culture has been one of the most outstanding features of the aquaculture sector in the country. It has brought substantial economic gains to fish farmers.

3.1.18.2 In India an area of about 1.2 million ha has been estimated as amenable for brackish water aquaculture in the coastal areas of the country out of which 0.14 million ha has been brought under farming. The infrastructure facilities established over the years include hatcheries, both in private and public sector, feed mills in private sector and processing units. Over 0.03 million persons are reportedly engaged as direct employees in shrimp farming and double of this number i.e. 0.06 million are employed in ancillary activities.

3.1.18.3 The Ministry of Agriculture has established BFDAs in the coastal states of the country. Under the BFDA an area of about 1000 ha had been developed for shrimp culture by the agency till 1999-2000. There has been a steady increase in cumulative shrimp production over the years and the production level during 1990-91 was 83,000 tonnes. However, the white spot virus disease outbreak during 1995-96 reduced the production. The production subsequently increased and is presently stagnating at the 1995-96 level. Though a traditional activity, shrimp farming has grown as a commercial enterprise not only among small and marginal farmers but also in the corporate sector. This has improved the rural economy, increased employment, living standards of coastal population and has led to foreign exchange earnings. At the same time, due to
unregulated growth and poor farm hygiene, there have been losses and socio economic problems. Brackish water fish culture deserves expansion after taking the entire ecological aspects into considerations.

3.1.18.4 Production of freshwater prawn, popularly known as Scampi (Macrobrachium rosenbergii) in saline waters particularly in inland areas represents yet another opportunity for employment generation and income. Large areas in the country have suffered from the problem of salinity due to excessive irrigation and inappropriate water management. While these soils have been treated with gypsum to control the salinity, which is costly, a more profitable utilisation of such saline soils can be through culture of Scampi. The technology is indigenously available and the States using the saline soils/water for production of scampi should launch special extension efforts and incentives to popularise freshwater prawn farming.
Farmers’ Associations or Aqua clubs (Thanjavur, Bhimavaram)

(a) Thambikottai-Vadakadu Shrimp Farmers Association in Thanjavur district, Tamil Nadu.

In Tamil Nadu, shrimp farmers in Thanjavur district have formed village level associations and organise regular meetings to follow good management practices for achieving eco-friendly and sustainable shrimp farming. One of the best examples of this association is the “Thambikottai-Vadakadu Shrimp Farmers Association”. The members of this Association consult themselves before initiating pond preparation, introducing water in their ponds, selection and stocking of seed, feed management, shrimp health management, prevention of disease, formation of separate channels for draining out waste water, time for harvest of the crop, fixing of price, etc.

The Association members also inspect the shrimp hatcheries located at Chennai and Marakanam areas and collect seed samples for testing in at least three PCR laboratories to ascertain the presence/absence of pathogens. The tested seed is purchased in bulk, which is then divided amongst the members of the Association as per their requirement. If a viral disease affects any farmer’s crop, all precautionary measures are taken to prevent the spread of the disease to the other ponds. The Association also suitably compensates the affected farmer’s loss. The Association takes the responsibility of road laying and providing other infrastructure like drainage canal and street lamps to the villages adjacent to shrimp farm cluster. The Association organises meeting of the members on fortnightly basis and discusses and solves their problems with mutual consent.

(b) Sri Subrahmanyeshwara Aqua Club in West Godavari district, Andhra Pradesh

To promote cooperative approach in management of shrimp farming activities and other common issues that commonly arise in cluster-based shrimp farms, aqua clubs have been set up in Andhra Pradesh. A total of 128 aqua clubs with a membership of 3367 farmers is now existing in the State. However, one of the best initiative of this kind is the Sri Subrahmanyeshwara (SS) Aqua Club in Mogalthur village is West Godavari district of Andhra Pradesh. The SS Aqua Club comprises 58 farmers with 108 ponds spread over 58 ha and the farmers involved are mostly small-scale, practicing improved traditional farming with low investments. Based on the technical inputs provided by the Network of Aquaculture Centres in Asia –Pacific (NACA), Bangkok and the Marine Products Export Development Authority, Kochi, the farm level ‘better management practices’ or the BMPs were demonstrated in the shrimp ponds of the SS Aqua Club with great success.

The above two initiatives by the shrimp farmers in the Tamil Nadu and Andhra Pradesh need to be replicated in the other coastal states also where shrimp is fast developing on commercial-scales.

3.1.18.5 In India, coastal aquaculture is synonymous with farming of tiger shrimp (*Penaeus monodon*). With the availability of hatchery and grow-out technologies, shrimp
farming picked up momentum during the late eighties, which continued until 1996 when the Supreme Court placed restrictions on intensive scales of technologies, which had adverse impact on the ecology and the environment. However, with the setting up of Aquaculture Authority in February 1997 and regulation of farming activities, the practices have gradually became sustainable. With the enactment of the Coastal Aquaculture Bill by the Parliament in May 2005, shrimp farming activities are likely to get a further boost in the near future. Therefore, it is essential that all future developments in shrimp farming are geared towards practices which are sustainable and do not have any adverse impact on the environment. In this regard, the following recommendations are suggested:

3.1.18.6 To make shrimp farming globally competitive and provide a level-playing field to the Indian growers, it is essential that import duties and taxes on feed and feed ingredients should be reduced. Similarly, reductions in power tariff to bring it on par with agriculture will provide great relief to the shrimp farmers. Presently, industrial rates in power tariff are levied on shrimp farming, which places a heavy burden on the farmers with small holdings.

3.1.18.7 Domestic marketing of shrimp and other seafood should be developed to reduce the total dependence on export market. Development of domestic markets would also necessitate extensive publicity and promotion, which should be undertaken at the national level by utilizing the print and electronic media.

3.1.18.8 Domestication of shrimp brood stock should be initiated through a private-public partnership so that the hatcheries get specific pathogen free and ultimately specific pathogen resistant brood stock for supplying quality seed to the shrimp growers in the country. Central agencies like Aquaculture Authority should also initiate seed certification program to enable the farmers to receive quality seed for raising in their farms. This work could be taken up by the NFDB when set up. There should be a registration of all hatcheries in the States and regular inspection of their brood stock and hatching practices. Air freight for transportation of shrimp brood stock and nauplii should be revised to bring it on par with the rates levied for fish seeds.
3.1.18.9 Shrimp farmers face considerable difficulties in terms of pond water quality and animal health management. Many farmers face heavy losses due to want of timely and reliable advice. It is, therefore, suggested that Aquaculture Service Centres should be set up with the active involvement of the farmers in different production areas. These Centres should be equipped with a laboratory, storage facilities for inputs and with communication facilities. The Centres should be run by trained and capable managers who are available to the farmers to provide reliable technical advice, arrange for procurement of quality seed, feed, probiotics, etc. They should also provide information on the market and price fluctuations to the farmers. The centres should be provided with the initial seed money and should subsequently be self-financing.

3.1.18.10 The coastal States should formulate a sound leasing policy to allot Government land to small and medium farmers, entrepreneurs and corporate houses engaged in shrimp farming. The Coastal Zone Management Plans should allocate lands in the coastal areas for shrimp farming and also permit conversion of unproductive agricultural land for aquaculture if adequate precautions are taken to prevent salt water incursion to the neighbouring agriculture land or groundwater sources.

3.1.18.11 The Banks should provide loans to farmers to undertake shrimp aquaculture. Similarly, crop insurance should also be initiated to protect the farmers from the risk of viral and bacterial diseases and natural calamities such as cyclone, tsunami, floods and droughts. Premium should be fixed at reasonable rates, especially for weaker section/ self-help groups.

3.1.18.12 Shrimp farming is presently centered on a single species *i.e.* *P. monodon*. To make the farming practices sustainable, diversification is necessary and new candidate species of shrimp and fin fishes should be encouraged for which technology is either indigenously available or needs to be sourced from other countries. The role of the Government in this regard is paramount and it should catalyse the entry of new candidates into the farming systems.

3.1.18.13 Potential lands for coastal aquaculture have been given on long-term lease to private entrepreneurs for salt production. Such lands in many parts of the country are not being used profitably due to various reasons. The Government should review this lease policy and permit shrimp and fish culture in salt land and salt affected areas.
3.1.18.14 All shrimp farms and shrimp hatcheries should be registered with the Aquaculture Authority. However, the registration process should be simple and easy to comply with. Each registered farmer and hatchery operator should be given an identity card and the period of registration should match the repayment period of bank loan.

3.1.18.15 The coastal States/Union Territories should formulate Integrated Coastal Zone Management Plans, which should include areas suitable for development of shrimp farming. Fresh micro level survey to identify potential land for coastal aquaculture should be conducted to arrive at the correct estimate. Larger areas should only be taken up after environment impact assessment studies are conducted. Permission should be given for water intake through forest land wherever necessary.

3.1.18.16 Considerable communication gaps exist between scientists and farmers. The Fisheries Research Institutes under the ICAR system should provide technical support to the Aquaculture Service Centres on a day-to-day basis and inter-alia assist them in water and soil quality and aquatic animal health management. The concerned ICAR Research Institute should also undertake surveys on wild brood stock of important aquatic species, prioritise research programs on domestication of *P monodon* and establish laboratory facilities to test antibiotic residues at appropriate places.

3.1.18.17 Shrimp farms draw water from the creeks and estuaries, which also receive pollutants from point and non-point sources of pollution. There, it is essential to regularly monitor the pollution levels so that they do not adversely impact the development of shrimp farming. Similarly, the waste water from the shrimp farms needs to be monitored and adequately treated before it is released into the open waters. The use of mangroves, mussels and oysters, seaweeds and sea grasses should be encouraged to reduce the levels of organic matter in the wastewater.

3.1.18.18 Shrimp farming provides livelihood support to about 1.0 million people in the coastal areas, besides making substantial contributions to the foreign exchange earnings of the country. To ensure sustainable growth of shrimp farming in the country, the government should assist in setting up of infrastructure such as common effluents treatment plants for cluster-based farms, domestication of shrimp brood stock, opening of bar mouths and dredging of channels and creeks for flushing at regular intervals.
In view of the importance of shrimp in the fisheries basket especially for exports and its contribution to export earnings and looking to its vast employment potential using the brackish water resources of the country, it is proposed to identify a cluster of shrimp farms and shrimp estates where common infrastructure consisting of intake/settling reservoirs and effluent treatment etc. would be provided in the public sector, even through user charges could be levied on the fishers. It is to be noted that the Government does invest substantially for such common infrastructure for export oriented activities like Export Promotion Industrial Parks, Export Promotion Zones etc. It is proposed to set up 10 such clusters in the relevant States @ Rs. 5 crores per cluster.

**Box - 8**

Success achieved in raising Shrimp and Scampi Seed Production in Chennai/ Pondicherry

Presently, about 237 shrimp hatcheries have been set up in the coastal states with an installed capacity of about 12 billion seed per annum. Of these as many as 110 have been set up in Andhra Pradesh, 67 in Tamil Nadu and 21 in Kerala. In Orissa, 13 shrimp hatcheries exist.

Practically, all hatcheries were set up to breed tiger shrimp, *Penaeus monodon*, with some also breeding *P. indicus*. However, during the last 4-5 years, many of these hatcheries have also started breeding freshwater prawn, *Macrobrachium rosenbergii* (scampi).

Most of the modern and state-of-art hatcheries are located either in Kakinada area in Andhra Pradesh or in the Chennai – Marakanam belt in Tamil Nadu. These hatcheries are an excellent example of the efforts that have gone towards the development of commercial-scale shrimp and scampi farming in the country and any further development envisaged in this sector has to keep in mind the hatchery infrastructure set up so far. It may be noted that scampi production is quite spread unlike shrimp production, which is in clusters. Scampi, which represents a major strength for Indian fisheries, since it can be grown profitably in inland areas even in the North India in slightly saline conditions, is especially amenable to contract farming.

### 3.1.18.20 Economics of Aquaculture

ICAR has estimated the economics of various categories of Aquaculture as under:

1. **Carp polyculture**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Production t /ha/ year)</th>
<th>Returns (Rs. /ha/year)</th>
<th>B:C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low input</td>
<td>2.5</td>
<td>75,000/-</td>
<td>1.8</td>
</tr>
<tr>
<td>Medium</td>
<td>6.0</td>
<td>1,80,000/-</td>
<td>1.5</td>
</tr>
<tr>
<td>High</td>
<td>10.0</td>
<td>3,00,000/-</td>
<td>1.3</td>
</tr>
</tbody>
</table>

180 man-days per ha per year can be employed.
II. Integrated Fish Farming

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Returns (Rs./ha/year)</th>
<th>B:C ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ducks</td>
<td>1,10,000/-</td>
<td>1.8</td>
</tr>
<tr>
<td>Poultry</td>
<td>1,50,000/-</td>
<td>1.4</td>
</tr>
<tr>
<td>Pigs</td>
<td>1,20,000/-</td>
<td>1.6</td>
</tr>
</tbody>
</table>

240 man-days per ha per year can be employed.

III. Other Culture Fisheries

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Production (t/ha/year)</th>
<th>Returns (Rs./ha/year)</th>
<th>B:C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prawn farming</td>
<td>1.5</td>
<td>2,25,000/-</td>
<td>1.5</td>
</tr>
<tr>
<td>Carp-prawn farming</td>
<td>3.0 &amp; 300 kg</td>
<td>1,35,000/-</td>
<td>1.6</td>
</tr>
<tr>
<td>Catfish culture</td>
<td>3.0</td>
<td>1,80,000/-</td>
<td>1.5</td>
</tr>
</tbody>
</table>

IV Economics of Shrimp Farming

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Production (t/ha/year)</th>
<th>Returns (Rs./ha/year)</th>
<th>B:C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive</td>
<td>1.0</td>
<td>2,50,000/-</td>
<td>1.7</td>
</tr>
<tr>
<td>Improved extensive</td>
<td>2.0</td>
<td>5,00,000/-</td>
<td>1.4</td>
</tr>
<tr>
<td>Semi-intensive</td>
<td>4.0</td>
<td>10,00,000/-</td>
<td>1.3</td>
</tr>
</tbody>
</table>

300 man-days per ha per year can be employed.

3.1.19.0 Running Water Fish Culture

3.1.19.1 Hills have more water than land. Schemes such as running water fish culture offer great scope and promise in the expansion of aquaculture in cold water states. The system is highly remunerative as richly oxygenated water - the critical component is available in abundance in hills enabling the culturist to undertake 5-10 times stocking densities. A crude type of running water fish culture system (RFS) called Johra fishery is being practised in the hilly pockets of Tripura and West Bengal. An improvised version is found in Himachal Pradesh. The RFS system is totally feed based and the cultured fish species are common carp and silver carp. Production rates as high as 54 tonnes/ha. have been reported by the Central Institute of Fresh Water Aquaculture (CIFA), Bhubaneswar. There is a need to enlarge the number of fish species for culture under RFS and standardize rearing protocols.
3.1.20.0 Quality control in seed

3.1.20.1 With the evolvement of technology of induced breeding by the ICAR institutes in the country and its later transference to State departments and various entrepreneurs, a large number of hatcheries have been set up in both private and public sector in different parts of the country. As per information, as of today, there are 911 carp hatcheries in the country. The nursery area available in government fish farms is around 2,893 hectares. In terms of fry, the production currently is around 18,500 million, with West Bengal, alone producing over 50% of the country’s total seed production followed by Assam. In the uplands, there are 23 rainbow trout hatcheries, in the States of Himachal Pradesh, J&K and Uttaranchal.

3.1.20.2 The mushrooming of seed production hatcheries has given a much needed thrust to the fish/prawn farming programme in the country but on the other hand, it has promoted sale of substandard and suspect quality seed. There is now a need for establishment of a **National Agency and Protocol of Seed Certification** in the country. A solution lies in the registration of all hatcheries by the State departments, followed by regular inspections of the brood stock and seed produced by a team of officers with representatives of research institution/SAUs and State fisheries department. The parameters for examination may include health status of brooders, hygienic standard of farms and condition of produced seed. Based on the inspection, the hatcheries may be approved for supply of seed to farmers and issuance of Accreditation Certificate. Further, each seed consignment packed for sale may be labelled indicating quality, quantity, batch number of species of fish and other relevant details. The state Accreditation Committee may keep surveillance and periodically check the hatcheries stocks. The seed supply would invariably carry stamp of the hatchery on the consignment meant for transportation. In case of any breach of rules by the hatchery operators, the accreditation committee would have the right to blacklist the firm and even cancel the registration of the firm. Such a measure is necessary for ensuring production of quality seed in the country and put a check on sale of substandard and dubious quality seed. The action is vital to protect the genuine seed suppliers and lend credibility to fish seed trade in the country.
3.1.20.3 Even while the ICAR system has an array of specific institutions concentrating on various segments in the fisheries sector, their contribution can be further enhanced if they move strongly into domestication of globally available technologies, consultancy to fishers and corporate sector, large scale production of brooders for recognized private sector seed producers, sale of good quality seed, especially for hitherto under-utilized species etc. These institutions could be encouraged to link their outlays to outcomes for meeting the felt needs of the fishers and to prepare a bankable project in this regard through Special Purpose Vehicles (SPVs) for undertaking commercially viable activities for production of brooders/seeds/other items of use for fishers. They could be provided margin money assistance of Rs. 30 crores for attracting institutional finance.

3.1.21.0 Quality control in feed

3.1.21.1 Nutritious feed and oxygenated water are key to good health of fish. The nutritional requirement of warm and cold water fishes ensuring high conversion ratio are well known. Formulated feed of carps and fresh water prawn with locally available ingredients have been prepared and marketed by CIFA. Use of probiotics and supplementation with vitamin A and vitamin E has also been worked out for preparing cheap diets.

3.1.21.2 While low quality unstandardized feed is available in the market, certified high quality feed at reasonable rates is still not available. There is a great demand for duly certified fish feed for carps, catfishes, trout and fresh water prawns. The problem is more acute in case of fishmeal, a major feed constituent for raising carnivore fishes viz. trout, mahseer catfishes and murrels. Fishmeal interspersed with sand, prawn meal, rotten blood meal, urea etc. when used as a feed ingredient creates hosts of problem ranging from poor growth to manifestation of diseases.

3.1.21.3 The country’s research institutes have to take a lead in solving this problem. Again, an accreditation cell needs to be set up under an appropriate authority to check and inspect the formulated feed on the basis of proximate analysis, stability ratio, appetite value and above all, Feed Conversion Ratio and subsequent issuance of accreditation certificate to feed manufactures. This would ensure availability of quality
feed to the fish growers and build their confidence on the purchased product and boost profitability of operations.

3.1.21.4 Feed production farms both for fresh water fish and shrimp should be in small size units located near the consumer and aqua estates and suitably dispersed, in order to generate small-scale employment and reduce costs since local material could be used more efficiently.

3.1.22.0 Bio-security from diseases

3.1.22.1 Quite often, a number of diseases are posing a potential threat to aquaculture as well as to wild stock of aquatic life. The emergence of such diseases in countries known to be free from such diseases or even in countries with established control system and eradication programme often result in significant losses. The recent disease epidemic of UDS (Ulcerative Disease Syndrome) or white spot or viral infection *irrido virus* in trout took a heavy toll of fatalities in fish farms. Disease monitoring system in the country is decidedly very weak with disease investigation centers located only in few national fisheries institutes. In view of poor sanitation of farms and non-observance of standard hygienic norms the hatcheries in majority of farms usually become hotbed of disease resulting in poor survival rate and slow growth.

3.1.22.2 Fish health, farm’s hygiene, surveillance of bio-stock are crucial to raise productivity in seed or fish producing centers as well as ensuring bio-security to the stock. Risk factors often posed by the disease in carps, trout and shrimp could be minimized by establishing pathological laboratories equipped with trained staff. Regular surveillance and requisite help to the stakeholders could be provided through these fish pathological laboratories. The need is for the fish grower to accord due priority to fish health and condition of farm’s. Further, we must set up the necessary legal provisions for the implementation of contingency plans. Such legal powers must include provisions for declaring a list of serious diseases for which action is needed, reporting measures for abetting or controlling these diseases and other legal provisions. A list of the crises centers/laboratory information, which has the necessary facilities to control or treat the diseases, should be made widely known to the stakeholders.
3.1.23.0 Organic Fish Farming

3.1.23.1 Based on the principles of protecting the environment, minimising soil and water degradation and optimising biological diversity as well as consumer demand, the concept of organic fish farming has a lot of potential. The system calls for intensive monitoring of environmental impact namely: i) integration of natural plant communities in farm management ii) processing according to organic principles iii) natural breeding protocols iv) use of certified feed and fertilizers v) non use of medicine and synthetic pesticides etc. Demand for organic aquaculture products viz trout, carp and mussel is increasing each year in international markets. There is a tremendous scope in the country to step up organic fish farming in order to fetch better price and profits as well as promote pollution-free fish culture practices. There is a growing awareness about the health hazards that may result due to the consumption of fish grown in polluted environments. DAHDF should set up a small technical group consisting of ICAR, industry representatives and small fisher organizations to work out protocols for organic fish farming which should be feasible, affordable and acceptable to international buyers.

3.1.24.0 Post- harvest Fisheries

3.1.24.0.1 The post-harvest fisheries consist of different type of functionaries working at different levels. The important stakeholders in the post-harvest sector along with their respective roles are as under:
Table 8: Stakeholder groups in Indian post-harvest fisheries

<table>
<thead>
<tr>
<th>Player</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishermen’s assistants</td>
<td>Mainly the wives of the fishermen are involved in helping the fishers in collecting the catches from the nets for sale after landing. No payment is involved.</td>
</tr>
<tr>
<td>Head loaders</td>
<td>Carry fish from the landing centers to the auctioning site, from auction site to godowns or transport systems. Some of them come from non-fishing communities.</td>
</tr>
<tr>
<td>Poor people collecting fish</td>
<td>Extremely poor people, collect fish from fishers either for free or in a barter system involving sweetmeats, etc. and either sell the fish for money or use for domestic consumption.</td>
</tr>
<tr>
<td>Money lenders</td>
<td>Lend money for business and personal purposes to the fishers and traders. Some moneylenders are involved only in money-lending activities, while others are involved in fish trade also.</td>
</tr>
<tr>
<td>Auctioneers</td>
<td>Auction catches which are landed. In traditional fish landing centers, in places like Chennai, it is exclusively women who act as auctioneers; in some others, it is only men. Some auctioneers are also moneylenders.</td>
</tr>
<tr>
<td>Boat owners</td>
<td>Own different size boats, possibly driver-cum-owner. Operat major mechanized centers.</td>
</tr>
<tr>
<td>Companies/Exporters</td>
<td>Buyers of fresh fish from the port/landing center for export or sale within the country &gt; 100km.</td>
</tr>
<tr>
<td>Agents</td>
<td>Act on behalf of buyers of fresh/dry fish. Accumulate economic lots to be sent elsewhere. Some agents buy in bulk and retail to cycle/moped traders on credit.</td>
</tr>
<tr>
<td>Tricycle and auto rickshaw owners and operators</td>
<td>Hired by the fishers for transporting fish to the wholesale and retail markets.</td>
</tr>
<tr>
<td>Cycle/moped traders</td>
<td>Buy from the landing center and sell in markets in and around the site (upto 50 km); Generally not from the fishing caste.</td>
</tr>
<tr>
<td>Petty traders (head load)</td>
<td>Buy and sell fish (fresh and dry) within 30 km of the site, mostly women, the fishing caste.</td>
</tr>
<tr>
<td>Fish collectors</td>
<td>Appointed by the commission agents, they are paid employees for taking care of collection, storage and transport of the catches from the village too difficult for the agent to access on a regular basis. Could be men or women, almost all of them from non-fishing communities.</td>
</tr>
</tbody>
</table>
3.1.24.1 Fish processing

3.1.24.1.1 Short or long term processing of fish to retain its desired quality is necessary to prevent wastage through spoilage of a valuable product. Domestic markets in India require mainly fresh fish. Indian processors of frozen fish have generally used different types of indigenously fabricated air blast freezers or horizontal blast freezers, some of which are imported while others are fabricated domestically.

3.1.24.1.2 Cold chain concept calls for provisions of integrated facilities to retain the quality of refrigerated or frozen fish from the term of harvesting till it reaches the consumers. The cold chain system requires following facilities:
   a) Adequate supply of ice for holding fresh fish before processing
   b) Containers for holding fresh fish in ice, cold storage at landing centers
   c) Intermediate points on the transit route
   d) Processing, marketing and distribution centers
   e) Facilities at retail markets.

3.1.24.2 Ice plants and production

3.1.24.2.1 There is no authentic study available on the requirement of ice meeting the need of inland fisheries. Ice often has to be transported, over long distance to the landings centers/villages and ponds at considerable cost. The availability of the ice to the producer especially during non-summer months becomes a serious concern. The ice producers, in view of their important role in helping fisheries industry deserve incentive and support. Some of the issues retarding the growth of this important item of infrastructure are constant increase in power tariff on ice plant factories; differential charges on ice plant factories vis-à-vis cold storage; hefty security deposit on quarterly basis charged by the Electricity Department; refusal of banks to advance loan to ice plant factories on viability grounds; high surcharge rate on ice plants even though it is a risk industry. These issues need to be given sympathetic consideration by State Governments since fisheries benefit the poor fishers and the sector can and does contribute to the State revenues.

3.1.24.2.2 Basket made of split bamboos with suitable lining inside are mainly used as containers for fish transportation in the country. Such baskets cause bruise on the fish skin because of rubbing against the rough and tough surface of the baskets. Other types of
containers such as tea chests, old plywood boxes are also used. Cheap containers with proper insulation have been developed but have lacked acceptance. It is important to develop/fabricate better plastic containers at affordable prices.

3.1.24.2.3 The inland sector, although characterized by highly displaced landings, has an advantage in having production sites close to the consumption centers. However, the reservoir fisheries are an exception to this and necessitate strengthening of infrastructure. There is a growing realization that closer ties between primary producers and manufactures would be mutually rewarding, the former being assured of a ready market for his produce at a reasonable price and the later being assured of an uninterrupted supply of raw market for his production line.

3.1.24.2.4 Aiming to create facilities for ensuring remunerative price to fishers and to make available fresh fish to consumers, avoiding slew of intermediaries, the Ministry of Agriculture launched a centrally sponsored scheme with 100% assistance viz. ‘Strengthening of infrastructure for inland fish production in the country’ during 1992-93. Under the scheme, 33 units were sanctioned to 18 States envisaging assistance of Rs. 200 million for creating infrastructure facilities in the form of fish handling sheds, ice plants, cold storage, retail outlets, insulated vans etc. During 2004-05, Ministry of Agriculture sanctioned another scheme viz. ‘Strengthening of post-harvesting infrastructure’ with an objective to reinforce post-harvesting network. The goals laid down under the scheme include developing fish preservation and storage infrastructure; developing marketing network such as retail vending, kiosk, aqua shops, insulated/ refrigerated vehicles, mini trucks, auto-rickshaw with ice box, moped bicycle/bicycle with ice box, fish display cabinets; weighing scales, computer units and allied components. The scheme is being implemented through self-help groups of fisher women, NGOs, cooperatives, joint ventures, Govt. undertaking, co-operatives in a location specific manner. The Government of India, Ministry of Food Processing Industries has also a number of subsidy-oriented schemes for NGOs/ cooperatives, private sector, joint venture etc. The schemes have been designed to provide incentive for setting up value addition projects on fisheries. Subsidy up to 75% is envisaged for providing beneficiaries for setting up unit in remote areas while 50% for other for projects involving cost up to Rs. 10 lakhs. The
assistance is provided ranging from Rs.40-100 lakhs to different categories from private sector to Govt. undertaking.

3.1.24.3 Economics of Inland Fish Trade

3.1.24.3.1 Select families in each market, both at wholesale and retail levels control inland fish marketing as a business. The margin of profit is generally kept high to cover the risk factors. The operation of inland fish is normally restricted in the districts, the inter-districts or inter-state movement is only during the high catch or glut seasons. The price spread and cost of marketing are quite high. The retail price of locally sold fish doubles when compared to the price received by the fisher. The cost of transport, ice, packing, handing, losses and other fixed costs together at wholesaling and retailing hardly ranges 8-12/- kg. Thus there is wide scope of reducing the price spread and increasing the producer share in the consumer rupee.

3.1.24.4 Marketing

3.1.24.4.1 Fish being highly perishable and difficult to handle, the streamlining of fish marketing requires much greater attention and effort. As a first step, the fish collection/auction and distribution centres should be separate from the retailing centres. Hygiene and cleanliness are important in the fish markets. There should be slit-wooden/plastic platforms and plastic sheets for stacking the saleable fish, preferably with provision of water nozzles for maintaining humidity, especially in bulk markets. Movement of fish stacks especially in large auction markets should be in plastic containers in order to avoid damage in crude baskets/bags.

3.1.24.4.2 Fish marketing involves functions from catching of fish to reaching the consumer. Post-harvest fisheries activities including processing, production, development, transport and marketing provide greater employment to labour than the harvesting sector. It is generally felt that post-harvest infrastructure is grossly inadequate in fisheries sector. The retail markets are unhygienic and lack basic facilities. Mostly the whole fish is sold in the market and there is negligible processing/ value addition in fresh water fish marketing. Further the marketing, transportation and storage being handled by
the private sector lack hygiene as well as price norms. This core activity has witnessed a slow growth, lagging far behind the production trends.

3.1.24.4.3 Physical infrastructure for marketing is important. It is proposed to provide composite fish marketing support to the States by setting up 20 units spread over various States for a period of seven years culminating in the end of the Eleventh Plan. The support would consist of assembly and auction market yards, small cold chains through cold storages, refrigerated and insulated vans and mobile retailing. The States could be permitted to have a suitable mix of these elements depending on local requirements. It is estimated that a sum of Rs.1 crore per unit would be needed.

3.1.24.4.4 Mandi/marketing Committee must take the responsibilities of renovation of fish marketing with requisite hygienic standards. A proper layout and design for small and large modern state of art fish markets should be developed by Cultural Institute of Fisheries Technology/National Institute of Agricultural Marketing, Jaipur, according to the conditions and needs of different regions of the country. A scheme should be formulated for development of large and medium fish markets, by tapping institutional finance. It should be realized that improper/unscientific handling in marketing centres can substantially lower the price realization, besides proving to be a health hazard. Foreign buyers too are getting increasingly conscious about the hygienic conditions in the landing centres and markets.

3.1.24.4.5 In particular, Kolkata wholesale fish market being the second largest fish market in the world needs a substantial overhaul. The market must be redesigned with proper layout, auction facility, hygienic, handling of fish and efficient drainage commensurate with the varieties and the volume of fish handled here. The layout would have to take into account the multifarious role of this market for assembly, auction, storage, export and even retail sale of fish. The State Government should prepare a bankable plan in consultation with the stakeholders with margin money from the Central Government.

3.1.24.4.6 It is imperative to ensure proper hygiene in large and small consumers market for fish. Municipal Committees must enforce the laws more strictly in the interest of public health.
3.1.24.4.7 It is further recommended that the present status of Fish Farmers Cooperative Federation should be carefully studied and specific steps should be identified and implemented to rejuvenate this important institution on a sustainable basis, in the interest of the fishers.

3.1.25.0 Socio-Economic Status of Fisher Folk

3.1.25.1 An overview of various studies relating to socio-economic aspects of small-scale fishers usually overemphasize on economic and technical factors rather than social parameters. It is said that, to date, fisheries management lacks the human element i.e. missing of social parameters in decision-making processes.

3.1.25.2 During the last fifty years of continuous development programmes, despite introduction of new technologies in fisheries and aquaculture and progressive increase in budget allocations; the status of today’s average fisherfolk in terms of access to the benefits of development has not changed much. In the Ninth Plan, the Union Govt. allocated around Rs. 207 million to fisheries, 400 times more than its allocation in the First five year plan. In the same period, inland fish production witnessed a growth of 12% and stood at 3.2 million tonnes during 2000-01. However, their socio-economic status has not improved in a commensurate manner. The situation is worse in case of riverine fisher folk, with rivers and streams turning into aquatic deserts. An integral part of the civilization and one of the oldest communities, the traditional riverine fishermen have even fallen below the poverty line. Even the Census of India refuses to acknowledge them as a separate community. We do not seem to have a clear category of riverine fisher folk.

3.1.25.3 Though no official figures are available on the number of riverine fishers. Their population is estimated to be around 0.45 million. A large chunk of the 387 communities of the fisherfolk, identified by Anthropological Survey of India are involved in inland fishing. These fishers are dependent on the 191,024 km of rivers, canals, etc.

3.1.25.4 The traditional fisher folk share an intricate relationship with rivers and they cannot afford to play with it. Non-fishing communities, however, go for maximum extraction. One of the factors quoted for destructive/over fishing is the short duration of lease. The leaseholders want to extract as much fish as possible from the rivers with each passing day of the lease period. Another problem is the use of restricted and destructive
fishing gears. While the traditional fisher’s gear are designed to catch legal-sized fishes, the lessees deploy massive, small meshed mahajal, which virtually sweep entire stretches of rivers without even sparing a fingerling or insect larvae. Further, with the dwindling fish population, locals have resorted to devious methods for catching fish. Poisoning, and electrocuting have become rampant and norms are flouted with impunity. The list is endless. If traditional fishers have to survive, they need help from the authorities.

### 3.1.26.0 Welfare of fishers

3.1.26.1 Welfare of the under-privileged poor fisher has always remained the core objective of Central and State assisted schemes initiated during the successive five year plans. These include subsidized supply of fishing tools viz. nets/boats/tents, premium free insurance, model fishermen village scheme, risk fund scheme of providing financial assistance in the events of floods/calamities, close season periodicity.

3.1.26.2 However, due to poor literacy level among fisherfolk, the effect of some of the welfare schemes have failed to percolate down to the targeted fishers. There is a need to undertake investigative studies to assess the impact of these schemes on the economic status of the fisher to generate benchmark data and initiate new schemes or improvise the existing ones. Since fishable waters are common property resource, competition among fishers often leads to conflicts. Fishing villages all along the riparian areas of rivers reflect backwardness and under-development. Exploitation by contractors who hire them, after seeking fishing rights of reservoirs or other water bodies is rampant. The entire system is disorganized and exploitive. Most of the studies on socio-economic profile of traditional fishers present disturbing trends.

3.1.26.3 There is a need for paying special attention on the subject. The first step is to organize them and bring them under cooperatives or self help groups. A complete registration of fisher population, followed by imparting to them training on latest techniques in fisheries viz. pond fish farming, seed production / integrated farming etc., and providing them fishing tools at subsidized rates and demarcation of riverine, and reservoir stretches etc is needed. Fishing nets and country boats are the two main requirements of traditional fisher which need to be made available to fishers at subsidized

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cost by the Central/State agencies. Basic amenities such as schools, banks, primary health centres, drinking water taps and other infrastructure facilities also require strengthening.

3.1.26.4 The fisherfolk should be provided access to institutional credit at low rates of interest.

3.1.26.5 With an aim to provide one-time financial help to the country’s aged and poor fishers over 60 year age, an Endowment scheme is recommended for implementation jointly by State and Central Governments, through LIC or any other insurance agency like Agriculture Insurance Company. The Central Government, State Government and fisherman in accordance with a reasonable cost-sharing formula could pay the premium on an annual basis. The scheme could operate through Cooperatives/Self Help Groups for better administration. Financial assistance would be provided to select number of fishermen on the basis of seniority of age, membership period and fixed quota of each state.

3.1.26.6 The Government of India as well as National Centre for Agricultural Economics and Policy Research has suggested certain schemes with an aim of uplifting economic status of poor fishers but in view of poor literacy level and sheer ignorance of the community, the benefits of these schemes have failed to percolate sufficiently to the fishers. Gujarat and some other states have got studies conducted which have shown that the marine fishermen have been benefited when organized under the cooperative fold or self help group scheme.

3.1.26.7 Women have traditionally played a crucial role in the production and marketing of fish. The areas like propagation and seed raising of ornamental fishes, seed raising and farming of trout, which are relatively indoor activities, are highly suitable for adoption as a vocation by women.

3.1.26.8 Retailing/ marketing of fish has for long been done by women in different parts of the country. The present day need is to upgrade their skill in fish marketing, sanitary and hygiene standards of sale shops, upkeep and maintenance of fish texture, quality with an ultimate aim of enhancing profitability in profession. The programme ensuring supply of insulated fish boxes, low cost drying rakes, initiated by Bay of Bengal Programme in the country has shown encouraging results and such efforts need
fortification both horizontally and vertically at state and national level by government and NGOs.

3.1.26.9 Although women contribute a large measure in fish marketing, they do not receive adequate share of the fish income or employment opportunities. The poor self-employed women have a triple disadvantage of being poor, self-employed and being women. They face problems related to posture of work (continuous sitting), their work environment (sitting on the road side for sale of fish) and physical endurance (loading fish containers on her head), besides the repetitive nature of movement from catching centers to markets. Currently, Bay of Bengal Programme is playing a laudatory role in improving the status of fisherwomen, focusing on training, awareness, saving and credit schemes and promotion of alternative income generating schemes. The programme needs expansion and wider coverage.

3.1.27.0 Aquarian Reforms

3.1.27.1 There is a need for a comprehensive set of Aquarian Reforms in order to foster the sustainable and equitable use of both coastal and inland waters for capture and culture fisheries. Introduction of Aquarian Reforms to help the fishers and the spread of fish enterprises based on the principle of gender and social equity as well as ecology are long overdue, even though concerns have been voiced in various fora over time. These reforms would inter-alia consist of leasing policy for major inland water resources like ponds, reservoirs and river system etc, as well as coastal areas for aquaculture, water tariff at concessional rate at par with agriculture, power tariff again at par with agriculture for small and marginal fishers, insurance against accidents/livelihood threatening events, enforcement of close season to permit sustainable fisheries in river system, the reservoirs and ponds. Further, since feed is a major component of the expense on aquaculture and in pond and reservoir fisheries, the taxes and custom duties should be minimum in order to sustain poor fishers who are suffering from dwindling catches. In addition, the open access system in marine fisheries has also caused severe stress on sustainability of fisheries resources and this must be regulated in a sustainable way so that the implementation is not coercive but consensual. It is essential to foster harmony in the use of living aquatic resources by artesenal fisher men operating catamarans and commercial
families operating mechanised fishing boats and trawlers. The major aim of the Aquarian policy should be the conservation of living aquatic resources, sustainable use, equitable sharing of benefits and harmony between artesianal and mechanised fishing.

3.1.27.2 While the elements of **Aquarian Reforms** are fairly obvious, their implementation over the years has been less than satisfactory for various reasons. It is suggested that the DAHDF should set up a small Committee, which should go into these elements keeping the requirements of gender and social equity and ecology in view and give its recommendations on the lines of land reforms, for adoption by the states after consultation with all stakeholders.

### 3.1.28.0 Fisheries in North Eastern States

3.1.28.1 Fisheries resources of the seven landlocked North Eastern States viz. Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur, Tripura and Nagaland are broadly of four types:

i) Rivers and streams; (18,968 km)

ii) Reservoirs (42,782 km);

iii) Beels/lakes (1,43,491); and

iv) Ponds (42,782 ha).

3.1.28.2 The average fish catches in these states from riverine resources range between 26-80 kg/ha, in case of ponds, it is 400-1300 kg/ha and in case of beels it is 30-180 kg/ha. There is a quantum rise in fish seed production in these states. Production of table size fish has shown only a nominal increase. In view of widespread and extensive waters in the form of rivers, lakes, beels, these states have tremendous potential for raising fish production. Besides the 19,000 km run of river Brahmaputra, the most important resource in the region is lakes/beels. Arunachal Pradesh offers immense scope for production of trout culture, running water fish culture, integrated fish farming, and ornamental fisheries. The priority areas for Assam are undertaking programme on integrated farming, exploitation of fisheries potential of beels, enhancement of fish production in ponds, freshwater prawn culture.

3.1.28.3 In case of Meghalaya and Nagaland, the scope exists for production of cold water fishes, development of lakes/ reservoirs/ beels and integrated fish farming.
Tripura has all type of water resources viz. rivers, beels, reservoirs etc. and a tradition of fisheries and the activities relating to integrated farming and ornamental fishery could be intensified for employment generation and higher production.

3.1.28.4 There is tremendous potential for development of mahseer and trout fisheries in the States of Meghalaya, Arunachal Pradesh and Nagaland. Hatcheries on the lines of J&K and HP could be constructed and rainbow trout farming could be promoted in the government. as well as private sector.

3.1.28.5 Lakes and beels having water spread of over 1.46 lakhs hectares constitute a major resource for fisheries exploitation. In view of their productive potential, with little efforts on management practices coupled with stocking, the average fish production in lakes and beels could be given a quantum raise. The scope for integration of fisheries with pig, poultry and duckery is immense in the region. 15-20% of paddy cultivation is being done in the region in low-lying area and in which deep water paddy is grown without pesticides. Such areas are ideal for paddy cum fish culture. The upland pockets of Meghalaya and Arunachal Pradesh are highly suitable for establishing running water fish culture units with cultivable species like trout and mirror carps.

3.1.28.6 Extension/ training activities require strengthening in all the North Eastern states. There is a need to raise teams of trained officials for providing support to extension.

3.1.28.7 ICAR centers for the North-East in Barapani should undertake a major programme of seed and brood stock production for species suitable for the North-East, particularly ornamental fish, at affordable rates.

3.2.0 Marine Fisheries

3.2.1 An Overview

3.2.1.1 The fishery wealth of India has enormous potential to provide livelihood and nutritional security to the large population of the country. Sustainable development of marine fisheries requires a sound combination of good management practices and conservation measures. These *inter alia* include sustainable harvesting of resources following eco-friendly fishing methods, enhancement of over-exploited resources through closed season and closed areas, rationalization of the existing fishing effort,
improved infrastructure for landing and berthing of fishing vessels, monitoring, control and surveillance, promotion of resource-specific fishing in the deep sea and a safety and security net for the small-scale fishermen. While agriculture provides food security, fisheries provide nutritional security to the country and both of them should be treated at par with each other in all development programmes.

3.2.1.2 The marine fisheries resources of the country comprise a long coastline of 8118 kms and an equally large area under estuaries, backwaters, lagoons, etc highly amenable for developing capture as well as culture fisheries. After declaration of the EEZ in 1977, the area available to India is estimated at 2.02 million sq. km, comprising 0.86 million sq. km on the west coast, 0.56 million sq. km on the east coast and 0.60 million sq. km around the Andaman and Nicobar Islands. With the absolute right on the EEZ, India has also acquired the responsibility to conserve, develop and optimally exploit the marine living resources within this area.

3.2.1.3 The harvestable potential of marine fishery resources in the EEZ has been estimated at about 3.921 million tonnes. An estimation of the depth-wise potential shows that about 58.0 per cent of the resources are available in 0-50 meter depth, 35 per cent in 50-200 meter depth and 7.0 per cent in depths beyond 200 meter (Table 9).

Table 9: Summary of marine fishery resources potential in the Indian Exclusive Economic Zone (in million tonnes)

<table>
<thead>
<tr>
<th>Depth Zone/Resources</th>
<th>0-50 m</th>
<th>50-200 m</th>
<th>200-500 m</th>
<th>Oceanic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demersal</td>
<td>1.280</td>
<td>0.625</td>
<td>0.028</td>
<td>-</td>
<td>1.933</td>
</tr>
<tr>
<td>Pelagic</td>
<td>1.000</td>
<td>0.742</td>
<td>-</td>
<td>-</td>
<td>1.742</td>
</tr>
<tr>
<td>Oceanic</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.246</td>
<td>0.246</td>
</tr>
<tr>
<td>Total</td>
<td>2.280</td>
<td>1.367</td>
<td>0.028</td>
<td>0.246</td>
<td>3.921</td>
</tr>
</tbody>
</table>

3.2.1.4 The marine fishing fleet comprises about 0.281 million traditional craft (including about 44,578 motorized traditional craft), 53,684 mechanised craft and about 170 large fishing vessels of 21 meter overall length (OAL) and more. As seen by the number of traditional craft and small-mechanised vessels, the major fishing activities are still concentrated in the areas within the 0 to 70-80 meter depth zone. As compared to the west coast, concentration of traditional craft (including motorized) is more on the east.

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1 The potential has been revalidated to 3.934 million tonnes in year 2000.
coast (about 57 percent of the total). In the case of mechanized vessels, the trend is reverse. The scale of mechanization is also reflected in the total fish landings of the two coasts.

3.2.2 Fish Production and Trend

3.2.2.1 It has been generally recognised that the Indian Ocean has the best-developed fisheries, but coastal resources in this ocean are under stress in many areas and require effective management, even though the potential for expansion may exist offshore. In India, while inshore waters have been almost exploited to the sustainable levels, the contribution from deep sea has been insignificant. The current (2003-2004) annual fish production has been estimated at 6.4 million tonnes (mt) – 3.0 mt from the marine sector against a potential of 3.9 mt and 3.4 mt from the inland sector against a potential of 4.5 mt (Table 10).

Table 10. Fish production

<table>
<thead>
<tr>
<th>Year</th>
<th>Marine</th>
<th>Inland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>2.447</td>
<td>1.710</td>
<td>4.157</td>
</tr>
<tr>
<td>1992-93</td>
<td>2.576</td>
<td>1.789</td>
<td>4.157</td>
</tr>
<tr>
<td>1993-94</td>
<td>2.649</td>
<td>1.995</td>
<td>4.644</td>
</tr>
<tr>
<td>1994-95</td>
<td>2.692</td>
<td>2.097</td>
<td>4.789</td>
</tr>
<tr>
<td>1995-96</td>
<td>2.707</td>
<td>2.242</td>
<td>4.949</td>
</tr>
<tr>
<td>1996-97</td>
<td>2.967</td>
<td>2.381</td>
<td>5.348</td>
</tr>
<tr>
<td>1997-98</td>
<td>2.950</td>
<td>2.438</td>
<td>5.388</td>
</tr>
<tr>
<td>1998-99</td>
<td>2.700</td>
<td>2.566</td>
<td>5.262</td>
</tr>
<tr>
<td>1999-2000</td>
<td>2.834</td>
<td>2.823</td>
<td>5.657</td>
</tr>
<tr>
<td>2000 – 2001</td>
<td>2.811</td>
<td>2.845</td>
<td>5.656</td>
</tr>
<tr>
<td>2001 – 2002</td>
<td>2.930</td>
<td>3.126</td>
<td>5.956</td>
</tr>
<tr>
<td>2003 - 2004</td>
<td>2.940</td>
<td>3.460</td>
<td>6.400</td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture, Government of India

3.2.2.2 The growth in marine fisheries production over the recent years has been rather slow (an average of 2.19 per cent during the period 1991-1992 to 1999-2000) as compared to the inland fisheries (average of 6.55 per cent during the corresponding period). Gujarat continues to be the leading producer of marine fish followed by Kerala, Maharashtra and Tamil Nadu. Penaeid shrimps, which dominate the export front, are at
their optimum exploitation levels, whereas tuna and cephalopods are the two least exploited fisheries owing to limited operational range of the majority of the present fishing fleets and also the lack of suitable technology. Several other species in the continental shelf are exploited only up to 70 - 80 m depths.

3.2.2.3 The export of marine products in terms of value registered a level of Rs. 60,920 million in 2003-04 against Rs. 17,674 million during 1992-1993. Frozen shrimp continued to be the largest item in terms of value. Shrimp contributed 31.50% in volume and 65.88% in value of the total export of marine products from India. USA continued to be the single largest market for Indian marine products in value terms, with Japan in the second position. Export to South East Asian markets have shown an increase over the years and several minor markets like South Africa, Tunisia, Poland, Ukraine and Hungary have emerged, showing a positive growth.

3.2.2.4 The growth rate in total fish production has been around 4.12 per cent per annum during the nineties. The inland sector has witnessed a much higher growth rate of 6.55 per cent as against 2.19 per cent in the marine sector during the corresponding period. Keeping in view the slow growth rate achieved in the marine sector and stagnation in the near-shore waters, a growth rate of 2.5 per cent has been proposed during the Tenth Plan. To even achieve this growth rate, it will be necessary to implement sound programmes for exploitation of the deep-sea resources.

3.2.3 Issues and Approach to Development

3.2.3.1 Entry 57 of List 1 of Seventh Schedule of the Constitution specifies Fishing and Fisheries beyond Territorial Waters as a Union subject, whereas Entry 21 of List II speaks of Fisheries as a state subject. Reading both the Entries together, it follows that control and regulation of fishing and fisheries within territorial waters is in the jurisdiction of the state, whereas beyond the territorial waters, it is the exclusive domain of the Union. Therefore, management of fishery exploitation in the EEZ requires close coordination between the centre and the states.
3.2.4 Coastal Marine Fisheries

3.2.4.1 India’s EEZ comprises different depth zones: 0-50 metres extending to 0.18 million sq. kms; 50-200 metres extending to 0.27 million sq. kms; and 200 metres and beyond extending up to the limits of the zone, 1.57 million sq. kms. Presently, 25 per cent of the present production is by the artesenal sector and 74 per cent is from small-motorized boats. Only about one per cent is from the deep-sea fishing vessels in operation. Fish production has increased over the years with the motorization of traditional craft and introduction of mechanized boats in the traditional sector, as well as by the diversification of fishing effort beyond 50 meters depth.

3.2.4.2 Fishing effort is currently concentrated in the 0 to 80-90 m depth zone. Approximately 99 per cent of the landings are obtained from this zone. While inshore waters have been almost exploited to the sustainable levels, the contribution from the deep sea has been insignificant. The fish production from near-shore waters (up to about 90 meter) has reached its optimum yield levels and has been stagnant for some years leading to pressure on the coastal fin and shellfish resources and regular conflicts between traditional and mechanised sectors. Although the Marine Fishing Regulation Act (MFRA) promulgated by the coastal states and the union territory of Lakshadweep provides zones for different categories and sizes of fishing vessels to operate in demarcated areas, this seldom takes place due to inherent weaknesses in the Act. Central Government should assist states to rectify these weaknesses.

3.2.4.3 India faces considerable difficulties in the development and management of its marine fishery resources for a host of reasons. The Indian subcontinent covers a vast region with long coastlines and different ecosystems, both on land and in the sea. The fishery resources are diverse, as are the fishery technologies and systems. Artesenal and small-scale fishermen operate from thousands of landing places dispersed along the coast and live within socially and culturally disparate communities. Responsibilities and programmes for fisheries management and development are split between the Union government and state/union territory governments, which differ in their policies, programmes and approaches. Central Board of Fisheries should meet at least twice a year to sort out these difficulties in the interests of all concerned.
3.2.4.4 A sizable population of the marine fisher folk living in the 3600 fishing villages are socio-economically backward due to poor literacy, total dependence on fishing, unstable income, extravagant spending on alcohol, health hazards and risky life in the sea without adequate insurance cover for family. They are also victims of cyclone, tsunami and other natural calamities. Several welfare schemes of the Government have helped only a small percentage of the population. Therefore, the programme of poverty alleviation of the families of nearly seven million fishers has to get top priority in the fisheries development programme.

3.2.4.5 Recent trends in both artesenal and small-scale fisheries in the country have been disturbing and indicate the need for implementation of sound management programmes. Several fish stocks are being over-fished. The loss in terms of harvest of juveniles is very substantial. Trawlers and Ring seiners cause maximum destruction of juvenile population followed by mini trawlers and purse seiners. In fact, such management for the coastal marine fisheries is long overdue. The catches and earnings of fisher folk have been declining. Resource scarcity and the dearth of new income opportunities have combined to make life difficult for small-scale fisher folk. The Government should take all steps to reduce juvenile harvest through introduction of appropriate fishing gears as developed by CIFT. Considering the large-scale exploitation of juveniles and discards by the trawlers, the cod end mesh size of trawl with square shape should be increased to 30 mm.

3.2.4.6 Introduction of mechanized boats and motorization of traditional boats have caused extended fishing operations. This has also increased the fishing pressure beyond recovery of certain standing stocks and depletion of resources is noticed in many fisheries. Therefore, restriction and regulation in the operation of mechanized/ motorized fishing vessel is required in a phased manner to curb the excess fishing effort. Further, mechanized fishermen and traditional/non-mechanized fishermen should have clearly demarcated zones for fishing to avoid clashes.

3.2.4.7 The open access nature of marine capture fisheries is one of the major reasons for depletion, economic waste and conflict among user groups. Without adequate control over access, these consequences will become increasingly sever and further impede the sustainable management of fishery and the resource. With an open access, no catch limits have been set on effort or the catch.
3.2.4.8 The restriction of fishing effort could be in the form of restriction in the number of vessels, number of days or hours at sea, engine power, size of the fishing gear, fish holding capacity, etc. Fishing pressure on over exploited fishery resources such as shrimp in the inshore waters has to be drastically reduced. Restriction in areas for resources specific fishing, prolonged seasonal closure to allow recovery of over-fished species, prevention of fishing juveniles and spawners during breeding/spawning season should be introduced. Since the monsoons trigger breeding and spawning and monsoon effects vary from place to place and year to year, a close monitoring of resources is vitally required to make a regular fisheries forecast. Until such fisheries forecast system is introduced, the present uniform closure of fishing in all maritime states and UTs could continue.

3.2.4.9 To optimise the fishing fleet size, a National-Level Review Committee was constituted in 1997 to study the size of the present marine fishing fleet in India vis-à-vis the harvestable potential and gives recommendations on the fishing effort that need to be deployed. The Committee concluded, after discussion with experts and with coastal states and the union territories that the mechanized fishing fleet, in the size range of 8.0 to 15.0 m over-all length (OAL), has attained optimum strength and no fresh entry should be allowed. However, 700 new-generation resource-specific vessels, about 18m OAL, including trawlers and gillnetters-cum-longliners, could be added to the fleet to tap resources in the EEZ beyond the 50 m depth zone. This step also vindicates the recommendation of the Committee on Deep Sea Fishing set up by the Union Government in mid-nineties. The recommendations of the Review Committee on Optimization of Fishing Fleet need to be implemented at the earliest to sustain the coastal fisheries.

3.2.4.10 At present, the mechanized fishing vessels alone are licensed. The system of licensing needs to be extended to motorized and non-motorized craft as well. Licensing will be helpful to maintain an inventory of all categories of fishing vessels. Another management option that has been considered for this area is to encourage small trawlers to diversify into fishing activities that can be practised further offshore, in order to reduce overcrowding in inshore waters and reduce the pressure on the fish stocks. However, few fishermen are equipped for such ventures, and there is a need to provide support to this category as also technical information on the availability of resources or the best fishing methods with which to target them. Assistance from the Food and
Agriculture Organisation can be sought to obtain suitable technology for the Indian conditions.

3.2.4.11 Gear employed for exploitation of demersal resources, particularly the bottom trawl, is being used excessively. The trawlable biomass appears to be overexploited and a reduction in the trawl effort is necessary to sustain the demersal fishery. On the other hand, the gear employed for the exploitation of pelagic resources is either underused or not used at all. Considering the biomass abundance of plankton feeders, such as the small pelagic species along the southwest coast, pelagic and mid-water trawling should be encouraged.

3.2.4.12 On a fair estimate, 70 per cent of the operational cost of a mechanized fishing vessel is accounted for by fuel cost alone. Therefore, one of the prime requirements of the fishing industry is development, demonstration and popularization of fuel saving designs of fishing craft, fishing gear and methods. Studies on the energy efficient hull designs for fishing vessels for reduced power requirements and their effect on vessel motions and manoeuvrability at sea, are required on a continuous basis. Development of deep-sea hull designs in FRP and aluminium for fishing vessels is also essential keeping in view the scarcity of timber.

3.2.4.13 The existing regulatory policies restrict fishing season, fishing areas and the mesh size of gear. However, there is no monitoring and surveillance system available with the concerned implementing organizations. Voluntary compliance by the fishermen to operate in the areas allotted to them is totally absent and encroachment by the larger mechanized vessels in the areas demarcated for the artesenal craft continues. The Central Government has now proposed to introduce a Vessel Monitoring System (VMS), which is expected to resolve the problem. Implementation of a sound monitoring, control and surveillance system including the VMS should be implemented at the earliest. The demarcation of the areas reserved for the small-scale sector also needs to be done on a priority basis. Similarly, the Central Government should also consider providing a fresh model bill to the states/union territories to enable them to revive their MFRAs on the basis of their present requirements and also global initiatives to which India is a signatory.

3.2.4.14 In the wake of the Tsunami disaster, substantial support both financial and
infrastructural, has come to the affected fishers and their villages in the form of fiberglass boats and huts etc. The fear has been expressed in some fora that the number of artesenal boats in the affected coastal areas would in fact go up since some fishers may even use the damaged boats after repair in addition to the new boats received by them. This would further increase the fishing intensity and may result in still lower catches and unsustainable stock. States must therefore immediately embark on a programme of registration of all boats in the coastal areas, in order to assess the situation and adopt suitable policies in consultation with all stakeholders to ensure a sustainable fishing fleet commensurate with availability of landing and berthing facilities.

**Box - 9**

**Self-Help Groups in Fisheries (Tamil Nadu)**

The Southern Districts of Tamil Nadu have witnessed significant increase in the number of fisherwomen Self Help Groups (SHGs). Punnakkayal village has the largest number of SHGs in an Indian village with over 50 groups consisting exclusively of fisherwomen.

Today, there are several examples of successful fisherwomen SHGs in the region and their experiences need to be promoted in the other states also. Examples: The fish market at Neelankarai is managed by fisherwomen belonging to 12 SHGs. The management practices established by this group demonstrate their efficiency and unity. Similarly, the SHGs formed by fisherwomen in Vellapatty village in Tuticorin has enabled its members to conduct individual business involving a wide range of activities, including fattening of crabs for sale in the local market. These SHGs also have good linkages with the NGOs who have helped them in the promotion of their business.

**3.2.5 Potential Fishing Zones (PFZs)**

3.2.5.1 Remote sensing can play a significant role in dissemination of information on potential fishing grounds and also assist in judicious exploitation, conservation and management of marine resources. The imageries received by the National Remote Sensing Agency (NRSA) at Hyderabad are used to derive the sea surface temperatures and interpreted to identify the PFZs. These identified PFZs are informed to the fishermen on a day-to-day basis. Ground truth surveys have indicated substantially higher fish catch rates in the PFZ areas than in the non-PFZ areas, especially for small pelagics. Encouraging and supporting development of local facilities for receiving, processing and broadcasting the PFZ data will be of great help to the small-scale fishermen.
3.2.6  Co-management of fisheries and stakeholder consultations

3.2.6.1 Fisheries cannot be managed effectively without the cooperation of fishermen. The delegation of fisheries management to the local fishing committees will be more effective than the direct management by the Government. Once the community is involved in the formulation and implementation of management measures, better acceptability and compliance can be expected. Co-management makes maximum use of indigenous knowledge and expertise to provide information on the resource base and to complement scientific information for management. The potential advantages of a co-management include effectiveness and equity. It can be more economical in terms of administration and enforcement than the present centralized systems. It provides a sense of ownership over the resource, which makes the community more responsible for long-term sustainability of resources.

3.2.6.2 The vital interest of artisanal fishing sector should be protected. Stakeholder consultations should be held at regular intervals to bring them into the management process and ensure a balance in exploiting fishery resources for long-term sustainability. Such consultations should include discussions on new policy formulations, amendments to the existing policies and other important issues as considered necessary.

3.2.6.3 We are already in the new millennium and at a very crucial juncture of marine fisheries development. Many landmark decisions have been taken in the near past (e.g. closed season during monsoon months, optimization of the fishing fleet, revalidation of the harvestable potential) and their implementation is likely to bring radical changes. Restricted access to marine fisheries is being talked about more loudly than in the past. In April, 2005 the Government of India has also conducted a census of craft, gear and other attributes of economic significance for the entire coastline (including the two groups of Islands). This exercise is also seen as a benchmark for the millennium and would be valuable for planning and development of the marine fisheries sector in the country. This should be utilized effectively.

3.2.7  Protection of coastal fishery resources (near shore and estuaries) for a sustainable fish production

3.2.7.1 Coastal zone is the vital bridge between terrestrial and marine aquatic ecosystem. It is considered as the most productive ecosystem on earth in terms of biological
production since it accommodates rich biodiversity in estuaries, lagoons, inter tidal zone, coral reefs, mangroves and wet lands which are acting as breeding and spawning grounds. Since the coastal fishery resources depend heavily on the coastal zone ecosystem, their protection is of paramount importance, through involvement of local communities.
Appropriate coastal zone management and development of the ecosystem in a holistic manner is critical for the sustainable management for the fisheries and livelihood of fishers particularly the traditional fishers and other stakeholders. The M S Swaminathan Committee to review Coastal Regulation Zones Notification 1991 has submitted its report in February, 2005 and has developed the following 12 tasks guiding principles which should govern future decision on Coastal Zones Management:

1. Ecological and cultural security, livelihood security and national security should the cornerstones of an integrated coastal management policy.
2. The coastal zone is including an area from 12 nautical miles including sea-bed and inland tidal water bodies etc., should be taken up for an integrated, cohesive, multi-disciplinary and multi sectoral coastal area management and regulatory system.
3. Regulation, education and social mobilization should be the three major components of a participatory and a sustainable Coastal Zone Management Strategy and Panchayati Raj institutions in coastal area should be fully involved in the educational and social mobilization programme.
4. The protection and sustainable development of the marine and coastal environment and its resources should be in conformity with international law. Every effort should be made towards ensuring an Integrated Marine and Coastal Area Management as prescribed in the 1995 Jakarta Mandate under the 1992 Convention on Biological Diversity.
5. Coastal regulation needs to be based on sound, scientific and ecological principles and should safeguard natural and cultural heritage. Heritage sites need particular care. Birds sanctuaries and parks and breeding ground of migratory birds should be protected.
6. The precautionary approach should be used where there are potential threats of serious or irreversible damage to ecologically fragile critical coastal systems and to living aquatic system.
7. Significant or irreversible risks and harm to human health and life, critical coastal systems and resources including cultural and architectural heritage would be considered unacceptable.
8. Ecological economics should underpin economic activities.
9. Coastal policy and regulations should be guided by the principles of gender and social equity as well as intra-generational and inter-generational equity. All stakeholders should be involved in decision making. Precious biological wealth coming under Marine Biosphere Reserves should be managed by Trusteeship mode.
10. Coastal protection and bio-resources conservation policy should be guided by techno economic efficiency, the precautionary approach, “polluter-pays” principle and “public trust doctrine”
11. Those engaged in hazardous dangerous coastal activities should bear the liability to compensate the victims of marine pollution and fish contamination and should also bear the cost of restoring the coastal environmental degradation. The onus should be on them for demonstrating that their developmental activities are environmentally benign. The principles contained in Biodiversity Act (2002) should be applied to coastal bio-resources management involving concurrent attention to conservation, sustainable use and equitable sharing of benefits.
12. The regeneration of mangrove wetlands, coral reefs and sea grass beds as well as promotion of coastal forestry and agro-forestry will confer both short and long term ecological and livelihood benefits. National coastal bio-shield movement along the coasts of the mainland of India and islands should be initiated as a priority task under National Rural Employment Guarantee and Food for Work programmes. Short term commercial interests should not be allowed to undermine the ecological security of our coastal areas.

Thus, coastal zones management requires cohesive, multi-disciplinary approaches as well as multi-dimensional vision. Sustainable human security in all its dimensions - ecological, economic, ethical cultural and human well being, in terms of the health and happiness both for men and nature should be the goals of an enlightened Coastal Zone Management Policy.
3.2.8 Deep Sea Fisheries

3.2.8.1 Besides shrimp aquaculture, fishing rights and responsibilities in the deep sea fishing sector have been the most debated issue since the mid-nineties and various user groups have different opinion on the modalities of harnessing the marine fisheries wealth, especially from the deeper waters. At the outset let us recognise the fact that traditionally India has had no entrepreneurship in the deep-sea fishing. Historically, the coastal communities have fished in the near-shore waters, using artesenal methods, most of which are still in vogue today. In order to develop entrepreneurship and promote investment for greater exploitation of the marine fisheries, the Government has provided policy supports for the development of the industry from time to time. The Shipping Development Fund Committee (SDFC) was entrusted with the task of extending soft loans to the deep-sea fishing sector. Loans were provided to the extent of 95 per cent of the cost of the vessel and the debt equity ratio was 6:1. A number of Indian companies acquired deep-sea fishing vessels since 1975, but almost all of them were shrimp trawlers, which operated on the east coast in limited areas from Visakhapatnam. Less than half the numbers of these shrimp trawlers are in operation at present. Acquisition of deep sea fishing vessels was financed by SDFC till 1986. In a few cases consortium of nationalised banks also came forward to finance deep sea fishing vessels. Later on SDFC was wound up and SCICI took over its activities.

3.2.8.2 Another policy initiative taken by the Government of India was to introduce the charter policies of 1981 and 1986. Subsequently, for obtaining requisite technology for exploiting the deep-sea resources and exposing the Indian entrepreneurs to the latest developments in the field, the New Deep Sea Fishing Policy was initiated during 1991. The accent of the policy was on increasing fish production and acquisition of deep sea fishing vessels by the entrepreneurs through joint ventures, leasing and test fishing for technology transfer, since other nations had the requisite technology and the appropriate vessels for this purpose. The 1991 policy also came to an abrupt end after the Government accepted the recommendations of the Deep Sea Committee in September, 1995.
3.2.8.3 In retrospect, it could be said that of the many flaws these policies had, one major flaw was that they were restricted to the deep-sea sector. Policies of such exclusive nature created chasm between the small-scale sector (small mechanised & traditional vessels) and those licensed to fish in the deep sea. The growing fear of complete domination by the big brother gradually led to agitation, which ultimately culminated in rescinding the New Deep Sea Policy of 1991. Subsequently, the Government of India has approved a Comprehensive Marine Fishery Policy in November 2004, which includes important elements for the Deep Sea Fisheries. These must be implemented in a time bound manner and in full collaboration with the States. It is important to stress that the States must also be consulted and kept in the picture while licensing Deep Sea ventures for better control and harmony in the seas.

3.2.8.4 Of the many options to harness the deep-sea fishery resources, diversification of the existing deep sea fishing fleet and introduction of resource specific vessels for long lining, purse seining and squid jigging is absolutely necessary in the present circumstances. Mechanised vessels below 20m OAL necessitate major inputs in their design to not only increase their voyage but also facilitate bringing back the catch in as good condition as possible. The design of the boat, engine power, winch capacity, gears and cold storage facilities on board may have to be checked to equip them properly for offshore fishing. However, countries like Sri Lanka have successfully promoted the use of intermediate range of fishing vessels to fish in the deeper waters and thereby reducing pressure on coastal stocks. Introduction of modern fishing vessels in the intermediate range (15-19 m OAL) is also essential to exploit areas between 90 to about 150 m depth to harness both demersal and pelagic resources.

3.2.9 Empowering small-scale fishers for offshore fishing

3.2.9.1 Participation of small-scale fishers in offshore fishing is limited due to heavy capital investment and recurring expenditure. In this regard the fisher cooperatives/associations/groups should be assisted through bank loan and subsidy to enable them to take up offshore fishing. Assistance should be provided to engage carrier cum supply vessels to a group of fishers so that they can fish longer in the sea and the catch could be brought back in good quality at regular intervals through carrier vessels.
3.2.9.2 Our fishing effort around Andaman & Nicobar Islands and Lakshadweep Islands is negligible. Though these two groups of islands in the Bay of Bengal and Arabian Sea are located strategically to exploit oceanic pelagic fishery resources, no serious attempt has been made so far to develop a strong base for oceanic fishing. The resource potential of these islands in the Indian EEZ is estimated at 250000 metric tonnes and the present harvest is about 40 000 metric tonnes. Special cells should be set up in Lakshadweep and Andaman & Nicobar Islands, to exploit tuna and other oceanic pelagics. These fishing bases should be developed as in Maldives with mother fishing operation to harvest tuna and squid resources in the EEZ and beyond in the international waters. Oceanic tuna fishing should be the main focus for which all infrastructure facilities should be developed with adequate incentive for the Island fisherman cooperatives. Commercial fisheries development should be encouraged to allow private entrepreneurs to invest in Island fisheries.

3.2.9.3 Since mother ships are costly, the Govt. should position one mother ship in A&N Islands and other in Lakshdweep Islands, which could collect the catch of smaller boats and process them on boat for value addition/store the catch in refrigerated holds and thereby allow fishing boats to operate for longer periods without spoilage of fish. It is recommended that Rs. 10 crores should be earmarked for purchase of two mother ships.

3.2.9.4 Taking into account the harvestable potential for deep-sea resources, the first step is to fix the fleet size for different category of resource- specific fishing vessels. Once an optimum fleet size is fixed, the second step would be to arrive at a policy for acquisition and deployment of such vessels. In the absence of indigenous capabilities to construct resource- specific vessels and the activity also being capital- intensive, equity participation with sound guidelines may have to be considered. Coupled with this, adequate support through post- harvest infrastructure and marketing would also be necessary. Some of these aspects are discussed in greater details in the following paragraphs.
Fishermen Cooperatives (SIFFS, Trivandrum)

The South Indian Federation of Fishermen Societies (SIFFS) originated through the intervention of NGOs in the artesanal fishing sector during 1970s and 1980s. Starting as an apex body of societies of Trivandrum district, SIFFS in its present form comprises a three-tier structure. The three core activities of SIFFS include (i) marketing of fish caught by members, (ii) providing credit for renewal of fishing equipment and (iii) promoting savings. Some of the major interventions of SIFFS include:

**Boat Building**

SIFFS pioneered the introduction of marine plywood boats in 1982. Since then, it has been playing a major role in the promotion of marine plywood boats in three districts on Southwest coast of South India. The activities under this programme include (i) setting up boatyards to manufacture different models of boats and undertake repair works, (ii) conducting research and development on designs of boat models and materials for boat building and (iii) providing training in boat building and maintenance. Today, SIFFS is a leading player and a leader in plywood boat building market in South-West Coast of India.

**Outboard Motors**

SIFFS recognises the link between OBMs and plywood boats and, therefore imports outboard motors and spare parts for distribution to the beneficiaries at affordable prices. Today, SIFFS is the country dealer for Suzuki marine products, and a leading importer of OBMs and spares in South India. Over the years, SIFFS has also kept pace with rapid increase and spread of motorised craft through setting up of OBM service centres and spares parts outlets for sale and maintenance works.

**Fish Marketing & Ice Plants**

Fish marketing has been one of the major areas of intervention of SIFFS and has been exploring new areas for marketing of both fresh and processed fish through trials and experiments in export market. Quality improvement programme is an area of priority for SIFFS now. SIFFS has also initiated marketing of fish in the domestic sector through a retail shop in Trivandrum. The shop aims to serve as a channel to sell the surplus fish procured for the export purpose.

SIFFS is an excellent example of cooperative endeavour coupled with modern marketing enterprise, which can be replicated in other states also.

3.2.10 Post-harvest Infrastructure and Marketing

3.2.10.1 In India, approximately 67 per cent of the total fish production is consumed in fresh form as per the available data. Nearly 6 per cent is used for reduction into fishmeal. Altogether 23 per cent is consumed in processed and preserved form that includes 16 per cent used for drying, 7 per cent for freezing and less than one-half per cent for canning- almost all of these under medium and small- scale sectors. As spoilage of fish starts right from the time it is caught, the proper storage, preservation and prompt disposal or transport services are essential. Various studies have from time to time
pointed to the high levels of wastage in the fishery due to spoilage. This is particularly acute during the monsoon, when up to 30 per cent of the catch could be lost. This is a vital area to be addressed, and may result in increased economic returns to those dependent on the fishery without any increase in fishing effort. Therefore, strengthening of post-harvest infrastructure such as storage facilities, ice plants, cold chains, roads and transportation, etc., as well as effective marketing system in identified areas are the key requirements for the development of this sector. This would ensure higher profit margins to the producers enabling faster fisheries development.

3.2.10.2 Since fish is subject to rapid deterioration in quality in view of the generally hot climate in India and the inadequate cold chain, it is necessary to ensure quality literacy amongst fishers in order to ensure appropriate value realization for them and also to protect the health of the consumers. This could be achieved by regular programmes of awareness generation/knowledge dissemination on the pattern of the good work done by National Egg Coordination Committee.
Corporate Sector in Aquaculture and Seafood Processing  
(The Waterbase Ltd, Nellore, Andhra Pradesh)

The Waterbase Limited (TWL) is the largest and the only integrated aquaculture unit in India located in the heart of shrimp country at Nellore, Andhra Pradesh. The Company began operations in 1993 and is today a US$18 million company (Rs. 1 billion) with facilities that comprise a shrimp hatchery, feed plant, grow-out farms, and an ultra-modern process plant. Black Tiger (P. monodon), White (P. indicus) and Scampi (M. rosenbergii) are raised in the farms of the Company. The Company sells shrimps in various forms such as cooked, beheaded, deveined, etc depending on the customer requirements. Apart from its own stock of shrimp, the Company also sources it from other farmers to meet orders. The Company follows HACCP guidelines and is among the few Indian companies that have FDA approval for export of marine products to USA.

The Company exports shrimp in different forms to the quality-conscious markets of Japan, USA, and Europe. It has a 50: 50 joint venture with Handy and Son of US. This JV is exporting pasteurized crabmeat that is considered a delicacy in the West. The Company has also made a retail foray with a specialty seafood restaurant in Bangalore called Tiger Bay and proposes to take this concept to other cities soon. The Company has recently entered into an R&D alliance with INVE of Belgium.

The Government of India has recently permitted the Company to import P. monodon broodstock from Myanmar waters for breeding and also for initiating a long-term programme on domestication of tiger shrimp. The Company is also in the process of perfecting the technology for breeding and raising of mud crabs (Scylla serrata), which have a lucrative domestic and export market.

M/s Waterbase Ltd is today the only corporate sector player in shrimp farming and its integrated unit in Nellore is an excellent example of corporate sector’s contributions to the development of seafood industry in general and shrimp farming in particular.

3.2.11 Assistance to women fish vendors

Women fish vendors largely do retail marketing in the marine sector. Over the years, the supply of fish to women vendors is on the decline and they face several other hardships in selling fish, which is a highly perishable commodity. Schemes to promote retail marketing of fish in hygienic conditions should aim at providing assistance to women fish vendors, especially with regard to containers for carrying fish, transportation facilities, etc. Self-help Groups comprising women fish vendors should also be assisted in setting up of hygienic retail outlets with facilities for keeping the product in chilled/ refrigerated conditions. Such schemes will be helpful in sustaining their livelihoods and ensuring quality fish to the consumers.
Hygienic Marketing of Fish in the Domestic Sector
(Chennai, Kochi)

Hygienic marketing of fish and fish products in the domestic sector has been a neglected area. Despite several attempts by the Central and State Governments, no tangible results could be achieved. However, in recent years retail marketing of fish and fish products (mainly marine fish) by the private sector has been successful and retail shops have been set up in Chennai, Kochi, Bangalore and Hyderabad. While some of these retail outlets are linked to processing units, others have been set up by enterprising youth. A visit to some of the retail shops in Chennai or Kochi will show the difference it makes to the quality of the product.

This is a significant development and there is a need to promote this initiative, especially through the private sector in the other states also.

3.2.11.2 In the marine fisheries sector, the Central Government has been implementing a central sector scheme and a centrally sponsored scheme since 1964 to provide infrastructure facilities for landing and berthing of mechanised fishing vessels (MFVs), traditional and motorised fishing craft and deep sea fishing vessels. At the end of the First Five-Year Plan, there were 863 mechanised fishing vessels operating along the Indian coast. Presently, there are about 54,000 Mechanised Fishing Vessels and 44,578 motorised fishing crafts. The landing and berthing facilities commissioned so far can only meet the needs of a quarter of the total fishing fleet, resulting in over-crowding and a host of other accompanying problems. Therefore, there is an imperative need to develop more fishing harbours and landing centres to meet the requirements of the existing fishing fleet.

3.2.12 Upgradation of fishing harbours and fish landing centres

3.2.12.1 Most fishing harbours in the country are not properly maintained, due to lack of management and inadequate revenue collections. After the harbours are commissioned, the responsibility of maintenance and management is vested with the user agencies/ cooperatives/SHGs. The income should be ploughed back for management and maintenance of the centres. However, adequate revenue is being collected regularly in only a few fishing harbours. In some, the revenue collected is too meager for proper management and maintenance. Perhaps, more Aqua shops for catering to the
requirements of the fisher folk in terms of fishing gears/boats etc. along with repair shops for these could be setup to increase revenues. NABARD already has a scheme for assisting technical graduates for setting up Agri-Business Clinics and the scheme could be utilized by fisheries graduates also to set up Aqua shops. Qualified professionals are required to set up these shops due to stringent hygienic requirements under HACCP.

3.2.12.2 The hygiene and sanitation conditions in most of the harbours and fish landing centres are below the normal specifications. This is partly due to inadequacies in the design and construction of the facilities and partly due to poor maintenance. The user groups are largely responsible for the poor state of hygiene and sanitation. Accepted standards of hygiene and handling of fish demand that these facilities be maintained strictly, and that contamination of fish be kept down to a minimum. The fishing harbours in India need to be modernised to meet minimum international standards necessary for fish quality assurance\(^2\). Special design approaches need to be adopted to meet the requirements of standards laid down by Hazard Analysis and Critical Control Points (HACCP) and ISO 9000. If these requirements are not met in the immediate future, the marine products exports may face trade restrictions, since most of the importing countries have stringent hygiene and sanitary conditions. Further, a greater awareness is necessary for the fisher folk on the importance of hygienic handling and preservation of fish as also personnel hygiene in improving the quality of landed fish and prevention of loss and wastages.

3.2.12.3 It is necessary to undertake an ambitious programme to construct minor harbours and fish landing centres which would directly benefit the marine fishers through better handling of fish and safer landing leading to better value realization besides improving the prospects of exports through compliance with the requirements of importing countries. This should be in the central sector considering that the present scheme has had limited success because of its insistence on state share. It is estimated that over the seven-year period culminating in the end of the Eleventh Plan, a total of 20

\(^2\) For modernisation of the existing facilities, the Ministry of Agriculture has allocated budget in the Ninth Five Year Plan @ Rs. 4.0 million for a minor fishing harbour and Rs.2.0 million for a fish-landing centre. This would be a one-time assistance to the states/union territories.
minor harbours each costing Rs. 12 crores and 40 fish landing centres each costing Rs. 3 crores would be required, on a conservative estimate.

3.2.12.4 In addition, greater attention would have to be paid to the existing minor fishery harbours and fish lending centres, which have been constructed over the years and are now becoming difficult to use because of the heavy siltation. It is estimated that at least 50 existing fishing harbours/landing centres need maintenance dredging. Dredging operations can go long way for improving the capacity and utility of these centres. These centres because of their smaller size require special Dredgers; a small Dredger was received as a gift from the Government of Japan a few years back and has been in operation on the Kerala coast with good result. However, the country still needs three more Dredgers, two for the Eastern coast and one more for the Western coast. One method could be to acquire these through normal tenders and operations through a Central agency. Other solution could be to outsource the work of Dredging to private operators with grants from the Govt. of India of Rs. 20 crores for a limited period of five years to the states so that they could afford the Dredging operations. This would save capital costs and operation and maintenance expenses. Since the private sector does not seem to have such small sized Dredgers presently, it may be more practical to acquire these three Dredgers at a cost of approx. Rs. 30 crores.

3.2.12.5 The development of deep-sea fishery industry is of concern to the entire marine fishery sector because it would have considerable impact on the management of near-shore fisheries, shore-based infrastructure utilisation and post-harvest activities, both for domestic marketing and export. Selected fishing harbours should also be equipped with storage facilities for sashimi grade tuna. To avoid over-capitalisation and to ensure a cautious growth of the infrastructure as well as the investments, a rationalised approach will be essential in determining the number and size of fishing vessels, their resource-specific gear and operational equipment as well as technology to be made available either indigenously or through foreign collaborations. The Master Plan must be updated after due consultation with states keeping factors like potential, fishing fleet and export earnings in mind.

3.2.12.6 Lastly, it would be desirable to set up a Central Fishery Harbour Development Authority, which could comprehensively manage the Minor Fishery
Harbours and Fish Landing Centres in terms of construction, management, maintenance and dredging etc., in consultation with the States and the stakeholders. DAHDF should prepare a proposal for a law on the subject after consulting the States etc. so that harbours and fish landing centres could be managed more professionally.

**Box - 14**

**Marine Mussel Farming (Kerala)**

Marine mussels form one of the most dominant cultivable species all over the world. In India, two species of marine mussels (green mussel - *Perna viridis* and brown mussel – *P. indica*) support a traditional sustenance fishery. However, in recent years, the increasing demand for mussels (especially in northern Kerala) has enabled farmers in north and central Kerala to adopt commercial-scale technologies for mussel farming. More than 450 families in Kasargod, Kannur, Kozhikode, Thrissur and Malappuram are now proud owners of mussel farms.

The technologies for mussel farming have been developed by the Central Marine Fisheries Research Institute, Kochi and include rack, long line and raft methods.

The Malabar Coast of Kerala has now become the centre of mussel farming in India producing about 4,000 tonnes during 2004-05. On an average the mussel farmer is earning about Rs. 6,800 per season. Based on the success of this activity, women SHGs have adopted mussel farming in the back waters adjacent to their houses and the Banks are providing loans ranging between Rs. 8,000 – 9,000 per member of the SHGs. The Government of Kerala also provides financial support through DWCRA and IRDP to promote mussel farming.

### 3.2.13 Mariculture/ Sea Farming

**3.2.13.1** Mariculture provides immense opportunities for significantly increasing food production, employment, income and foreign exchange. Given the wide spectrum of cultivable species and technologies available, the long coastline and the favourable climate, mariculture is likely to generate considerable interest amongst the coastal population in the country. At a time when we speak of over-exploitation in the near-shore waters, limited access to capture fisheries and the need for diversification, mariculture can be one of the most appropriate alternatives. Technologies for a couple of species are presently available in the country and there is an urgent need for developing package of practices for many more commercially important species (e.g. sea bass, sea bream)

**3.2.13.2** However, with a possible scenario of large-scale mariculture activities taking place in the near future, it is likely that a situation akin to shrimp farming can be created where unplanned and a fast growth resulted in social conflicts and challenges to
the sustainability of the coastal environment. To avoid repeating the shrimp history, a systematic macro and micro-level survey of the entire coastline would be necessary, to prepare a comprehensive status on the area-wise suitability of the available mariculture technologies, carrying capacity of the ecosystem, social, legal and environmental implications, research and policy support, credit availability and other forward and backward linkages. A status report of this nature would essentially be a SWOT analysis and keep us in preparedness if mariculture activities were to be adopted on a larger-scale during the Eleventh Five-Year Plan. Meanwhile the States should have a liberal leasing policy for marine resources to encourage mariculture and avoid conflicts.

3.2.13.3 It may also be worthwhile to develop an All India Coordinated Research Project on Mariculture for transferring the technologies developed so far. Pilot-scale programmes are essential for standardisation and also to enable the end-users to familiarise with the technology, which has been tried successfully abroad.

3.2.13.4 Integrated capture and culture fisheries through seawater farming also offers an opportunity for fisher families particularly women. They can take to rearing of prawns and suitable salt tolerant fish species in canals along the sea coast, using low external input sustainable aquaculture (LEISA) techniques. Agro-aqua farms involving the concurrent cultivation of tree species and rearing of fish and prawn can be promoted to enhance income and employment and opportunities.

3.2.14 Seaweed culture

3.2.14.1 Seaweed cultivation is a profitable activity in the coastal areas and should be initiated as a poverty alleviation programme. Since these activities are new to fishers, demonstration with proper hand on training is necessary. Seaweed training programme, started in Ramnad, Kanyakumari and Tuticorin districts of Tamil Nadu for self-help women groups has given rewarding results. The banks have also come forward for financing seaweed cultivation with a guaranteed buy-back arrangement from companies making products from the seaweeds. Awareness creation, technology dissemination through training and assured marketing through Corporate Sector has created a momentum, which should be continued.
Seaweed Farming (Tuticorin, Tamil Nadu)

Seaweeds grow in the shallow coastal waters of the seas and are vital as a habitat for a variety of marine organisms. Seaweeds provide a valuable source of raw material for manufacture of health food, medicines, food additives, pharmaceuticals, etc. Some of the important products of seaweeds include agar, algin and carrageenan. The most common seaweeds in India available for farming include species of the Genus *Gracilaria*, *Gelidiella* and *Eucheuma/Kappaphycus*.

In Tamil Nadu seaweed cultivation is common in Rameshwaram, Pamban, Mandapam, Vedalai and Kilakarai areas, where cultivation is now being promoted through the SHGs. M/S PepsiCo India Holding (p) Ltd is also supporting the enterprise through buy-back arrangements.

Seaweed farming is a viable livelihood option for fisher-communities and has considerable potential in other states also. It is environment-friendly and has no adverse impact on the coastal ecology. The experience of the SHGs and other fisher groups in Tamil Nadu can be considered as a successful example for replication elsewhere in the country.

3.2.15 Artificial Fish Habitats and Artificial Reefs

3.2.15.1 It has been widely recognized that installation of Artificial Fish Habitats (AFH) and Fish Aggregating Devices (FADs) are helpful in increasing fish production. The AFHs and FADs allow congregation of fishes as they provide a congenial micro-clime in the ocean for shelter, food and nursery sites. Both AFH and FADs have been used extensively in Japan and Philippines. Large floating rafts called payaous are being used in some countries for exploiting tunas in the distant waters. Modern payaous are equipped with radar, reflectors and solar powered lights and are anchored in deep waters. Such rafts are now also becoming popular among the fishermen of Tamil Nadu and floating rafts installed about 100 km off Nagapattinam have helped fishermen in increasing their catch of oceanic tunas. Such practices need encouragement through liberalised leasing policies and with funding assistance from the Government.

3.2.15.2 Artificial Reef (AR) is entirely different from Fish Aggregating Device (FAD). FADs are either natural or man-made structures that are used to congregate fish for harvest. The purpose of the artificial reef, however, is to establish a new habitat for fish and other marine organisms to feed and breed. Artificial reef are man-made structures, which are deployed in the sea and targeted to increase coastal productivity in
the long run by providing hard-bottom habitat for growth of sessile organisms and establishing food chains. It increases the chance of post larval settlement of many invertebrates and fish larvae and also the survival of juveniles. The holds, crevices, vertical relief and ledges of the artificial reef structures increase habitat space for marine organisms. AR are generally created to provide habitat or shelter for fish and other marine organisms, serve as a nesting, feeding, breeding, spawning and nursery ground, act as a deterrent to bottom- trawling and other destructive gears, help create fishing grounds and create recreational fishing area. About 45 countries are at present engaged in establishing artificial reefs in their coastal waters. In the past, scrap materials, wooden and bamboo structures, used tyres, broken ships etc were used in the fabrication of artificial reefs. However, due to environmental pollution from some of these material such as tyres and less durability of some other materials such as wooden and bamboo structures many countries now use concrete with steel and high-density polythene materials for the construction of artificial reefs. Artificial reefs too should be strongly encouraged through liberalised leasing policies and financial assistance by the coastal states and with the involvement of fisher community.
Artificial Reefs: M S Swaminathan Research Foundation Experience

In Gulf of Mannar, fish production is declining fast because of over-exploitation and habitat degradation. Bottom trawling, exploitation of berried females and juveniles, coral mining and pollution are the major reasons for the degradation of fish habitats. This resulted in reduced catch/effort ratio. Now fishermen have to put more efforts and inputs to catch the same quantity of fish they caught in the past. As a result, income of the fishermen has reduced substantially. Secondly, catch per unit head of fishers has also decreased drastically. In order to reverse this situation there is need to increase the fishery productivity of the Gulf of Mannar. Fishery productivity of the marine waters can be enhanced by two methods: i) sea ranching and ii) artificial reef. In the present attempt role of artificial reef in increasing fish productivity by providing fish habitat is being demonstrated on an experimental basis. With this background, an artificial reef with four different modules, each 30 in number, was deployed about 14 km offshore from Therespuram village. Fishing community of the Therespuram participates in the development, deployment, monitoring and management of this artificial reef.

Monitoring of the artificial reef using underwater photography showed that most of the modules were covered with a variety of different kinds of seaweeds as well as sessile organisms including soft corals. Apart from this, adults of various species were found taking shelter in the reefs, particularly grouper fish were found in large number within the reef. In addition, local community has also noticed the presence of large shoal juvenile fish of different species in the reef region. All these clearly indicate that this artificial reef is gradually becoming breeding and feeding place of fish, which otherwise indicates that artificial reef can be used as a tool to enhance fishery resources. The Therespuram Artificial Reef Society manages the reef without much problem in collaboration other fisher societies, district administration and Fisheries Department.

Replication of the present artificial reef module has already been started by the Tamil Nadu Fisheries Department. It deployed an artificial reef about 25 km north of Kombuthurai coast near Tuticorin. The Fisheries Development Mission of the Tamil Nadu Fisheries Department provided financial support and MSSRF provided technical expertise in the development of this artificial reef. This reef has three modules, each 35 in numbers. The Gulf of Mannar Biosphere Trust has also allotted funds for the establishment of artificial reef.

3.2.16 Monitoring Changes in Fisheries Environment due to Pollution, Global Warming and Sea Level Rising

Global warming and sea level rise are now a reality. Warming and displacement of ocean currents, flooding, sea erosion, upwellings, changes in fish habitats, impact on breeding and spawning of fish species, changes in biogeochemical cycles, species migration, inundation of coastal lands, loss of wetlands and mangroves, increased salinity of rivers, bays and aquifers, increased nutrients are some of the visible consequences of these changes. Therefore, regular and systematic monitoring of changes in the living resources and the ecosystem due to global warming and their impact on marine fishery should be encouraged.
32.16.2 Environmental concerns, fish health and food safety are integral part of sustainable fisheries. However, the burgeoning population, rapid industrialization, increasing urbanization and intensification of agricultural activities are together causing irreparable damage to the marine fisheries resources. Point and non-point sources of pollution are degrading the environment. It should be however borne in mind that while education place an important role in addressing point pollution, the non-point pollution needs more comprehensive measures. To check this damage, regular investigations are necessary, especially in all the “hot spots” of pollution along the coastline.

3.2.17 Ecosystem-Based Fisheries Management

3.2.17.1 The living aquatic resources are an integral part of their ecosystem and management of the ecosystem is a prerequisite for the well being of fisheries resources. In the Ecosystem-based Fisheries Management (EBFM), fisheries management is not seen in isolation from the wider management of the marine environment and it is integrated with other sectors of marine management. In the EBFM, there could be a close connection between the Integrated Coastal Zone Management (ICZM) programmes and the management options. It is a major conceptual advancement and there are pragmatic ways to begin implementation with interactions of institutions and societies. The following steps are proposed for moving towards EBFM:

- Identification of relevant ecosystems, their boundaries and characteristics;
- Agreement of management objectives for each ecosystem by encompassing wider ecosystem factors and all stakeholders;
- Development of long-term and immediate objectives for each ecosystem;
- Establishment of sustainability indicators such as reference points, targets and limits;
- A decentralized approach enabling management measures to be taken that are appropriate to biologically distinct areas; and
- An effective management capability.

3.2.17.2 In consultation with the stakeholders and other interest groups, short-term and long-term objectives must be agreed upon for each ecosystem. One of the best ways to conserve the marine living resources is to establish networks of fully protected marine reserves of no-fishing zones. The potential biological benefits of Marine Protected Area
(MPA) are increase in spawning stock biomass, healthier fish stocks, strong age/size composition, more yield per recruit, restoration of healthy tropic levels and spill over effects to non-protected areas. All these benefits lead to and enhance the long-term sustainability of the fishery. A carefully planned protocol and implementation of EBFM within a logistic timeframe would be necessary to contribute to the protection of marine biodiversity and fisheries.

3.2.18 Human Resource Development and Welfare Measures

3.2.18.1 To sustain Indian fisheries in the third millennium, the quality, technical skills and management of fisheries manpower will have to improve in consonance with the rapidly changing needs of our society, both nationally and internationally. Human Resource Development (HRD) for raising a cadre of experts at various levels to support research and vindicate a sustained development of the fishery sector is critically important to India. Moreover, to maintain the pace of growth witnessed by the fisheries sector in the recent past, the efforts may have to be probably larger and faster by several times more than made earlier.

3.2.18.2 For the overall good of the sector, there should be an All-India Master Plan for HRD and social security in the fisheries sector. Fishers, women and men have so far relied on their traditional skill both for catching and marketing fish. However, they must benefit from the advancement of technology in both these segments. State Governments must undertake regular programmes for training and capacity building for them in collaboration with ICAR/other institutions and this must form an integral component of the Master Plan for HRD in the fisheries sector. Fish for All training centres on the model of the Krishi Vigyan Kendras (KVKs) should be organized for the capacity building of fisher women and men in the technical aspects of all the steps in the capture/culture to consumption chain. In the HRD at the organised level where formal education in given, there is need for more sector-oriented education and greater linkage between the formally educated and the industry. There is need for the HRD of the labouring sections who are responsible for giving value to the resource by catching, processing and marketing it. Given the continued poverty of the fishing communities and the extreme risk in the occupation, more promotional and protective social security
measures at the national level need to be conceived. There is need for greater emphasis on the role of women in the sector and greater care and attention to the health and welfare of the children in the communities. Measures for ensuring the safety of those fishing at sea need to be given greater priority both during the normal operations and during times of unpredictable weather. Further, the traditional skill of fishers should be preserved and protected and the younger generation should be encouraged to continue fishing through education, training and incentives. A well-planned educational programme at grass roots level should be initiated to implement conservation measures through community-based initiatives. Further, the infrastructure in the 3600 fisher villages must also be upgraded on priority to improve the quality of life of fishers through provision of better road connectivity, appropriate housing, commensurate with the harsh conditions near the coast, clean drinking water, electricity and telephone connections etc. The components and financial resources of the Prime Minister’s Bharat Nirman should be utilised to benefit these fisher villages on priority, considering that the artesenal and traditional fishers represent some of the poorest section of our population and they undertake fairly hazardous work.

**Box - 17**

**Bharat Nirman**

Prime Minister has approved an outlay of Rs. 1,74,000 crores for “Bharat Nirman” which would bring an additional one crore hectare under assured irrigation, connect all villages that have a population of 1000 (or 500 in hilly/tribal areas) with a road, construct 60 lakh additional houses for the poor, provide drinking water to the remaining 74,000 habitations that are uncovered, reach electricity to the remaining 1,25,000 villages and offer electricity connection to 2.3 crores households and give telephone connectivity to the remaining 66,822 villages.

3.2.18.3 **Village Knowledge Centers** should be set up to create awareness and direct access to information on various issues including technology, quality awareness, finance, marketing, processing etc. These centres could provide technology dissemination as well as skill upgradation and could tap the R&D resources provided by the various ICAR institutions. These Village Knowledge Centres could be supported by the State Fisheries Departments and it is proposed to set up one such centre in each State/Union Territory to
give a fillip to fisheries as a source of livelihood and nutrition. 34 such Village Knowledge Centres could be set up at a cost of Rs.50 lakh per centre.

Box - 18

State Institute of Fisheries Technology (Kakinada, Andhra Pradesh)

The State Institute of Fisheries Technology (SIFT) at Kakinada provides an excellent example of state-level institutional support to the fisheries sector. From the original mandate of imparting practical training to marine fishermen in handling mechanised fishing boats with imported gear, SIFT now handles a variety of activities. These activities broadly include training and awareness programmes; induction and refresher courses for officials of the Fisheries Department of the State Government and testing of diseases in fin and shell fishes, antibiotic residue testing, soil and water analysis and testing of other inputs such as feed used in aquaculture.

The SIFT has an attached hostel for outstation trainees, a good library, a state-of-art laboratory for detection of shrimp diseases and testing of antibiotics and other necessary infrastructures. The Institute also generates its own revenue through the fee levied on analysis of animal tissue /soil/water samples and PCR testing of shrimp larvae and adults. SIFT provides a good support to the fisheries sector in the State by meeting the requirements of training, skill upgradation, awareness and other technical advice to the fish farmers and the Department of Fisheries.

3.2.19 Fisheries Legislation

3.2.19.1 For sustainable development of the marine resources the Indian Parliament enacted the Territorial Sea, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Acts in 1976 which led to the establishment of a 200 nautical mile EEZ with effect from January 15, 1997. Since then, India has also enacted a number of other laws and regulations, including the Coast Guard Act, 1978, the Maritime Zones of India (Regulation of Fishing by Foreign Vessels), Act, 1981 and the related Rules of August, 1982. However, we still do not have a legislation to regulate fishing in the Indian EEZ by wholly Indian owned fishing vessels. This aspect needs priority attention of the Government and a comprehensive legislation to regulate the Indian fishing vessels in the EEZ needs to be promulgated. It should prohibit transfer of catch on high seas and provide for the catch to be unloaded only on Indian soil where sufficient spare capacity exists for processing.
3.2.20 Participation in Regional Fisheries Management Bodies and Ratification of International Instruments

3.2.20.1 The 1990s have witnessed many other international agreements and accords relating to the intentions of the international community to achieve sustainable fisheries and to which India has been a party. These agreements represent milestones in international efforts over many years and include Chapter 17 of Agenda 21 of the UN Programme of action which includes programme areas relating to coastal areas and the oceans; the 1992 International Conference on Responsible Fishing (held in Cancun, Mexico) and the 1993 Agreement to promote compliance with International Conservation and Management Measures by fishing vessels on the high seas.

3.2.20.2 India needs to adopt all international fishery and related conventions and agreements. (e.g. Compliance Agreement). In fact, being the largest maritime country in the region we need to set the example. It is also in our strategic interest to do so first. Because of the straddling and migratory nature of valuable stocks like tuna, it is also important to take the lead to strengthen regional fisheries bodies like the Bay of Bengal Programme, which will help to collaborate with the countries in the region, effectively harvest the shared stocks and also widen the use of our national research and technical expertise in the region.

3.2.20.3 The Plans for the Fisheries Sector in the country have so far focused on an integrated approach to optimise production and productivity, augment export of marine products, generate employment, improve socio-economic conditions of the fishermen and fish farmers, conserve aquatic resources and genetic diversity and increase per capita availability and consumption of fish. This focus shows that so far there has been emphasis on development; in other words, more and more exploitation of the resources. However, management, which is often perceived as a response to development, has not received the desired attention. The Code of Conduct for Responsible Fisheries provides an excellent opportunity to integrate management with development and should be implemented with all earnestness.
3.2.21 Separate Department for Fisheries

3.2.21.1 Fisheries, being multidisciplinary in nature, is handled by various Ministries/Departments in both the Central and the State Governments. This has resulted in problems of coordination since various elements of fisheries are handled not only in the DAHDF but also in Department of Ocean Development, Department of Biotechnology, Ministry of Food Processing Industry etc. Many countries smaller than us have separate Departments of Fisheries in view of the importance of the sector. Many States also have separate Departments of Fisheries. Therefore, it is suggested that a separate Department for Fisheries should be set up by the Government of India as a part of the Ministry of Agriculture. This will ensure appropriate focus and thrust to the sector, which has enormous potential of employment generation, food and nutritional security and foreign exchange earnings.

3.2.22 State Road-Maps

3.2.22.1 ICAR has produced state-wise road maps for Fresh Water Aquaculture Development for each State based on its resources and potentiality. DAHDF should hold discussions individually with these States in collaboration with ICAR to identify the road blocks in implementation of these road maps and identify specific inputs needed to implement the road map in a time bound manner.

3.2.22.2 Fisheries offer immense scope for employment generation and production in A&N Islands and Lakshadweep Islands. Fisheries in these islands has not grown adequately due to absence of infrastructure and problems brought about by destruction of coral life by coral lime manufacturing. The potential of these islands has now been recognised by the Central Govt and it is heartening that series of initiatives have been listed in the Comprehensive Marine Fishing Policy, adopted by the government in November 2004. The recommendations are well founded and reasonable and must be implemented in a time bound manner to benefit the economy of these Islands in general and the livelihood of fishers in particular.
3.2.23 Projections

Subject to a reasonable implementation of the provisions of the recent policies/legislation in the fisheries sector and the implementation of the recommendations made in this Chapter, it should be possible to achieve the following levels by the year 2010:

(i) Increase in fish production from the current level of six million tonnes to about eight million tonnes (approximately 3.2 million tonnes from the marine sector and 4.8 million tonnes from the inland sector, mainly from aquaculture and reservoir fisheries).

(ii) Increase in landing and berthing facilities for fishing vessels from the current level of about 25% to about 50%, which would result in reduction of post-harvest losses (from the present level of about 20% to about 10%) and better return on investment for the marine fishermen.

(iii) Perceptible improvements in hygiene and sanitary conditions of landing and berthing facilities.

(iv) Significant improvements in marketing, packaging and transport infrastructure for domestic marketing. This will reduce the role of middlemen and ensure remunerative price for the fishermen.

(v) Productive utilisation of water bodies such as reservoirs, rivers, inland saline/alkaline lands, and waterlogged areas like beels, oxbow lakes and derelict water bodies. (At least 75% of the water spread area to be brought under aquaculture in place of the present level of about 40%).

(vi) Increase in export earnings from fish and shell fish exports from the current level of Rs. 7,000 crore to about Rs. 14,000 crore.

(vii) Creation of additional employment/self-employment opportunities for about one million people.

3.3.0 Conclusion

3.3.1. Effective exploitation of the estimated harvestable resource of 3.934 million tonnes from India’s EEZ would entail extending activities beyond the limits of the area of present exploitation, which is mostly within shore range. Future marine fishing policy needs to be formulated by keeping in mind past experience, the capacity of the present
fishing fleet and the availability of funding for the acquisition of resource-specific vessels. Simultaneously, the emergence of a new world order in global fishery must also be kept in mind. Exclusive access rights have replaced freedom of the seas. This exclusive right is now accompanied by responsibility and sustainable development (Code of Conduct for Responsible Fishing). India must formulate and strictly implement a national Code of Conduct for Responsible Fisheries based on the FAO’s code. UNCED’s Rio Declaration states that the right to fish is conditional and accompanied by the duty to manage and conserve resources for present and future generations. It has therefore to be ensured, that all stakeholders in the marine sector adopt the path of sustainability. Programmes which aim to develop marine fishery must have in-built components of responsible, sustainable and environment-friendly practices.

3.2.24.2 **Additional** requirements of funds for the period till the end of the Eleventh Plan, over and above the existing levels of budgetary funding, for some of the major recommendations of this Chapter are summarised in the Chapter on “Composite Financial Summary”.

**3.3.0 Acknowledgement**

3.3.1 The Commission organised stakeholders’ consultations involving State Govts., scientists, experts, bankers, associations and fishers in Kolkata for inland fisheries, in collaboration with Govt. of West Bengal and in Vizag for marine fisheries in collaboration with BOBP-IGO and Govt. of Andhra Pradesh. Aquaculture Authority of the Govt. of India also organised a consultation in Chennai on the request of NCF, on Brackish Water Aquaculture. The Commission also benefited from the inputs from Consultants/Experts. Their contributions are gratefully acknowledged.
CHAPTER - 4.1
ENHANCING PRODUCTIVITY, PROFITIBILITY, STABILITY AND SUSTAINABILITY

HILL AGRO ECOSYSTEM

4.1.1.0 The State of Hill Agro Ecosystem and Hill Farmers

An Overview of the Strengths, Weaknesses and Opportunities

4.1.1.1 Hills and mountains in India are distributed all over the country with major areas located in Himalayas extending 2,500 km in length and 250 to 400 km in breadth. Himalayas in India are composed of north-western and north-eastern flanks. The Western Ghats, Eastern Ghats, Vindhyas and Deccan Plateau constitute the other major hill agro-ecosystems in the country. These systems cover nearly 50 percent of the total national geographic area and occur in almost all the agro-ecological zones of the country.

4.1.1.2 The perennial presence of snow and glaciers in the Himalayan Region provide vast natural reservoirs of fresh water resources and form the tallest water tower of our planet, dynamically impacting the weather and climate both spatially and temporally-influencing local, regional and global air circulations. Further, the hills and mountains in the country represent extremely diverse agro-ecological settings, providing scope for producing almost any crop, commodity, livestock or fish of the World, whether tropical, sub-tropical, sub-temperate or temperate.

4.1.1.3 The Hills and mountains are the richest repository of biological and agrobiological diversity, and the snow and glacier fields act as reservoirs for terrestrial and aquatic species and snow micro-organisms. Pashmina goats, yak, aromatic rices, landraces of sorghum, veritable fruits and vegetables, multicob maize, saffron, orchids, bamboos, cold water fishes and the like constitute unique germplasm treasures of the hills and mountains. Several rare genes have been used from Himalayas and Western and Eastern Ghats for enriching our major crop species.
4.1.1.4 Besides the major niche resource for hydropower and other productive options, the rich natural resource endowments of the hills and mountains include the bulk of the country’s forest resources/reserves, timber and non-timber forest products, besides possessing rich reservoirs of minerals and medicinal and aromatic plants and tremendous opportunities for various kinds of tourism, including agro-ecotourism.

4.1.1.5 The hills have their weaknesses also. The two most important problems in hill and mountain agro ecosystems are: ecological degradation and high level of poverty. This unholy alliance between poverty and ecological degradation has not been critically studied and analyzed. Economic deprivation and ecological degradation are not unrelated. For integrating the ecological health with economic growth, an understanding of the poverty-ecological degradation nexus is absolutely essential.

4.1.1.6 As regards opportunities, the hills’ unique biological wealth could be converted into economic wealth and can confer livelihood security on a sustainable basis. The bio-treasure provides multiple viable options for diversification. But most of the indigenous variability of different species have not been exploited fully. Niche production of high value crops and commodities, including selected livestock species, cold fishes, high quality seeds, organic farming, production of medicinal and aromatic plants are other opportunities.

4.1.1.7 Yet, most of the hill States have high concentration of hunger and their poverty and agricultural progress has not been upto the mark. Given the inherent agro-ecological and economic interdependence of the hills and plains, the hills–plains divide should not only be halted but also urgently bridged. This paper critically analyses the current situation of hill agriculture and of hill farmers, identifies the issues, challenges and opportunities of the agro-ecosystem and finally suggests pathways to congruently achieve enhanced and sustained productivity, ecological security, economic viability, employment security and social justice.
The Himalayan Agro Ecosystem

4.1.1.8 A highly diverse system: The North West Himalayan Region (NWR), comprising the States of Jammu and Kashmir, Himachal Pradesh and Uttarakhand, covering 331392 sq km, accounts for 10.08 percent and the North East Himalayan Region (NER), comprising eight States, namely, Anunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, covering 262179 sq km, accounts for about 8 percent of the country’s total area (Table 1). Ranging from tarai plains to low, mid and high hills, up to the snowline traversing through valleys, river basins, sub-tropical to temperate, from cold arid to warm and humid, the Himalayan hills have been classified into five diverse agro-ecological zones.

Table 1. Selected indicators of demography and agriculture in the Hill Agro Ecosystem

<table>
<thead>
<tr>
<th>Region</th>
<th>Geographical Area (Sq.Km)</th>
<th>Agricultural Land Area (‘000 ha)</th>
<th>Total Population (‘000 No.)</th>
<th>Total Rural Population (‘000 No)</th>
<th>Net Cropped Area Per Rural Person (ha)</th>
<th>Area Under Forest (‘000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North West Himalayas</td>
<td>331392 (10.08)</td>
<td>2072 (1.47)</td>
<td>24,711 (2.40)</td>
<td>19,420 (2.61)</td>
<td>0.11</td>
<td>7183 (10.41)</td>
</tr>
<tr>
<td>North East Himalayas</td>
<td>262179 (7.98)</td>
<td>3971 (2.81)</td>
<td>39,078 (3.80)</td>
<td>32,987 (4.44)</td>
<td>0.12</td>
<td>11961 (17.33)</td>
</tr>
<tr>
<td>Western Ghats</td>
<td>187144 (5.69)</td>
<td>9249 (6.55)</td>
<td>58137 (5.65)</td>
<td>4100 (0.55)</td>
<td>2.26</td>
<td>4969 (7.20)</td>
</tr>
<tr>
<td>Eastern Ghats</td>
<td>184744 (5.62)</td>
<td>5069 (3.59)</td>
<td>33492 (3.26)</td>
<td>2866 (0.39)</td>
<td>1.77</td>
<td>2702 (3.91)</td>
</tr>
<tr>
<td>Deccan Plateau</td>
<td>644910 (19.62)</td>
<td>36585 (25.90)</td>
<td>150961 (14.67)</td>
<td>94882 (12.78)</td>
<td>0.39</td>
<td>9493 (13.75)</td>
</tr>
<tr>
<td>Hill Agro Ecosystem</td>
<td>1610369 (48.99)</td>
<td>56946 (40.32)</td>
<td>306379 (29.78)</td>
<td>154255 (20.77)</td>
<td>0.37</td>
<td>36308 (52.60)</td>
</tr>
<tr>
<td>India</td>
<td>3,287,240 (100)</td>
<td>141231 (100)</td>
<td>1028,831 (100)</td>
<td>742,707 (100)</td>
<td>0.19</td>
<td>69024 (100)</td>
</tr>
</tbody>
</table>

* Figures in brackets are percentage of the country total
Source: Statistical Abstract of India, NBSSLUP
4.1.1.9 **High demographic pressure on the land and other natural resources:** The Himalayan region of India is home to 63.8 million people, 6.2 percent of the country’s population. While the population density in the Himalayas ranged from one-fourth to one-half of the national average in the NWR and NER respectively, the net cropped area per rural person in the NWR, NER and the country as a whole, was 0.11 ha, 0.12 ha, and 0.19 ha, respectively, the wide intra-and inter-State differences notwithstanding *(Table 1).* For instance, the highlands, rising up to the snowline, are sparsely populated and constitute the alpine pastures and grazing lands and the economy is based primarily on livestock, whereas the valleys are densely populated with high cropping intensity.

4.1.1.10 Given the continued high dependence on agriculture for employment and the population increase on the one hand and the decline in net cropped area, the agricultural land availability will further shrink. In order to support relatively larger population per unit area of cultivated land, higher cropping intensities were recorded in the hill and mountainous States, 160 in the NWR and 145 in the NER as compared to the national figure of 134. Forests are the major land use and account for nearly 59 percent of the total area of the Indian Himalayas. However, illegal felling and timber extraction for commercial purpose have caused large-scale deforestation.

4.1.1.11 **Low yields:** Hill agriculture in India has so far remained neglected and the Green Revolution has failed to climb the Himalayan heights. The average cereal and oilseeds yields in the hills are about two-thirds of that of the national average *(Table 2)*, although there are considerable inter State differences. Consequently, self-sufficiency in foodgrains could not be attained so far in the hills. Sugarcane yields in the hills are highly depressed. As regards fruits, vegetables and potato, despite the high agro-ecological congeniality of the hills for these crops, the yields were half to two-thirds of those of the national averages, exception being Tripura which has recorded consistently higher yields for rice, potato, fruits and vegetables as compared with the yields in other hill States as well as with the national average yields. As regards individual fruits and vegetables, the yield gaps between the national averages and NER averages are quite
large, especially for papaya, citrus, banana, apple and onion. Average yields of livestock and fisheries in the hills are also depressed.

Table 2. Yield of important crops (Kg/ha)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>North Western Hills</th>
<th>North Eastern Hills</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>1887</td>
<td>1799</td>
<td>1328</td>
</tr>
<tr>
<td>Maize</td>
<td>1459</td>
<td>1592</td>
<td>1179</td>
</tr>
<tr>
<td>Wheat</td>
<td>1550</td>
<td>1605</td>
<td>1336</td>
</tr>
<tr>
<td>Pulses</td>
<td>513</td>
<td>626</td>
<td>453</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>628</td>
<td>484</td>
<td>580</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>59225</td>
<td>40141</td>
<td>39185</td>
</tr>
<tr>
<td>Potato</td>
<td>13792</td>
<td>12005</td>
<td>7352</td>
</tr>
<tr>
<td>Vegetable</td>
<td>2174</td>
<td>12391</td>
<td>7038</td>
</tr>
<tr>
<td>Fruits</td>
<td>3443</td>
<td>3347</td>
<td>7646</td>
</tr>
</tbody>
</table>

Source: CMIE Agriculture; Agricultural Research Data Book 2003
*TE: triennium ending

4.1.1.12 Foodgrain crops continue to predominate the agriculture sector despite slight drop in area due to diversification towards horticultural crops: About 75 percent of the gross cropped area of entire Himalayan region, 77.4 percent in the NW and 64.4 percent in the NE, is under staple food grain crops (Table 3). The analysis shows that, the production of food grains has not declined in the Himalayas as much as is often thought of and the per caput production in the hills, especially in the NW, is almost as high as in the rest of the country (Table 4). In the Western Himalayan region, wheat is the main crop and rice, maize, millets, barely and buckwheat, pulses and oil seeds are also widely grown. However, Uttaranchal is unique in the sense that it has more area under millets and pulses. In addition, potatoes and variety of vegetables, off season vegetables, spices, and fruits are also widely grown in the Himalayas. In the North East, rice is the staple food crop occupying about 81% of the cropland area under food crops. In non-rice fields, often diverse mixture of 8 to 10 crops is grown in a mixed farming system by the NE farmers. Crop survey assessments have shown that, although
continuing to be the most preferred crops in certain areas, the area under paddy and maize is declining in the Himalayas as a whole but area under wheat remains unchanged.

Table 3. Changes in the percentage share of major crop groups in total area in various hill States/regions

<table>
<thead>
<tr>
<th>States</th>
<th>Foodgrains</th>
<th>Fruits</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>80.27</td>
<td>75.81</td>
<td>14.42</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>83.37</td>
<td>79.00</td>
<td>11.17</td>
</tr>
<tr>
<td>Uttaranchal</td>
<td>79.82</td>
<td>77.39</td>
<td>11.93</td>
</tr>
<tr>
<td>Total</td>
<td>81.07</td>
<td>77.40</td>
<td>12.49</td>
</tr>
<tr>
<td>Eastern Hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>76.19</td>
<td>68.71</td>
<td>8.18</td>
</tr>
<tr>
<td>Assam</td>
<td>71.30</td>
<td>65.61</td>
<td>1.90</td>
</tr>
<tr>
<td>Manipur</td>
<td>81.00</td>
<td>55.74</td>
<td>9.40</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>55.46</td>
<td>49.70</td>
<td>10.08</td>
</tr>
<tr>
<td>Mizoram</td>
<td>78.35</td>
<td>75.27</td>
<td>11.77</td>
</tr>
<tr>
<td>Nagaland</td>
<td>83.14</td>
<td>66.97</td>
<td>2.48</td>
</tr>
<tr>
<td>Sikkim</td>
<td>64.54</td>
<td>60.32</td>
<td>5.07</td>
</tr>
<tr>
<td>Tripura</td>
<td>65.54</td>
<td>62.24</td>
<td>10.11</td>
</tr>
<tr>
<td>Total</td>
<td>71.08</td>
<td>64.41</td>
<td>3.76</td>
</tr>
<tr>
<td>India</td>
<td>68.82</td>
<td>65.94</td>
<td>1.55</td>
</tr>
</tbody>
</table>

Source: CMIE Agriculture; National Horticulture Board, Agricultural Statistics at a Glance

4.1.1.13 The reduction in area under foodgrains is largely because of shift towards cash crops like fruits and vegetables. As seen from Table 3, between 1990-91 and 2003-04, area under fruits in the hill States increased by about 28 percent and under vegetables the increase was 26 percent in the North West and 33 percent in the North East.

4.1.1.14 High livestock density: Indian Himalayas support about 50 million domestic animals (six animals/ha net sown area); cattle (47.5%), goats (15.8%), buffaloes (12.3%) and sheep (10.4%). The livestock density per 100 ha net sown area in the NW Himalayas is 916 and in the NE Himalayas is 499 against 341 for the country as a whole (Table 4). Per caput milk production and availability in the NWR is particularly high, in Jammu & Kashmir the availability is over 300 ml/day. The mountains have a niche for
livestock based livelihoods that one finds in the large areas under rangelands and highland pastures. A large proportion of livestock species is raised under mixed cropping systems. The land holdings are small and livestock substantially supplement the family income and livelihood security. Further, livestock are major source of fuel energy and manure (animal dung and bedding material) or else the number of wood (fuel) headloads carried everyday for heating the pot would increase considerably. An integrated crop-livestock-forest farming system thus holds the key for sustained development of the hill agro-ecosystem.

Table 4. Socio-economic indicators

<table>
<thead>
<tr>
<th>Indicators</th>
<th>North Western Hills</th>
<th>North Eastern Hills</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural workers as % of all workers (2001)</td>
<td>59.29</td>
<td>57.95</td>
<td>58.41</td>
</tr>
<tr>
<td>Share of Agri. in NSDP at 1993-94 prices</td>
<td>25.89</td>
<td>22.18</td>
<td>22.10</td>
</tr>
<tr>
<td>Per capita income (Rs.) (at 1993-94 prices)</td>
<td>9263</td>
<td>9735</td>
<td>10964</td>
</tr>
<tr>
<td>Percent irrigation of NSA (2002-03)</td>
<td>37.97</td>
<td>20.37</td>
<td>38.75</td>
</tr>
<tr>
<td>Foodgrain prod/capita (kg)</td>
<td>158</td>
<td>152</td>
<td>169</td>
</tr>
<tr>
<td>Milk prod/capita (kg)</td>
<td>118</td>
<td>27</td>
<td>82</td>
</tr>
<tr>
<td>Fruits prod/capita (kg)</td>
<td>66</td>
<td>67</td>
<td>42</td>
</tr>
<tr>
<td>Vegetable prod/ capita (kg)</td>
<td>85</td>
<td>105</td>
<td>84</td>
</tr>
<tr>
<td>Fertilizer use (2002-03)</td>
<td>64.76</td>
<td>25.27</td>
<td>88.93</td>
</tr>
<tr>
<td>Institutional credit (Rs. per person) (2002-03)</td>
<td>283</td>
<td>158</td>
<td>374</td>
</tr>
<tr>
<td>% of operational holding up to 1 ha (1995-96)</td>
<td>72.62</td>
<td>58.60</td>
<td>61.58</td>
</tr>
<tr>
<td>Av. size of holdings (ha)</td>
<td>0.97</td>
<td>1.92</td>
<td>1.41</td>
</tr>
<tr>
<td>Livestock/’00 ha NSA</td>
<td>916</td>
<td>499</td>
<td>341</td>
</tr>
</tbody>
</table>

NSDP= Net State Domestic Product; NSA= Net Sown Area; Source: Statistical Abstract of India; Agricultural Statistics at a Glance; NSSO (1996), CSO, CMIE Agriculture; Livestock Census

4.1.1.15 Over the past one decade, the number of cattle has started declining while the buffalo population is increasing. Similarly, the number of sheeps is declining but the number of goats is increasing. Many reports have been indicating a declining trend in the livestock holding per household but because of increased families overall numbers may not have changed much. The indicators have therefore an important message – the
recognition by hill farmers that maintaining larger livestock holding is no longer profitable. When herd size is reduced there also has been simultaneous shift from local breeds to hybrid cattle and other animals, which induced widespread stall feeding.

4.1.1.16 **Fish potential largely underexploited:** Fish and fisheries, representing more than 100 species and various water body systems such as reservoirs, rivers and lakes and aquaculture involving air breathing fishes are important sources of proteinaceous food, employment and additional income in the hills. However, these resources have remained highly under exploited and there is atleast 4-5 times gap between the potential and the realized yield. For each group of fisheries, specific strategies for enhanced productivity and income should be developed. For instance, the development of open water fisheries involving ranching of hatchery produced seed of Golden Mahseer, Snow trout and Brown trout in the potential stretches of river and the development of lakes of these fishes at mid to high hill altitudes would constitute an important agro-economic activity.

4.1.1.17 A four-fold strategy involving preservation of existing fish stocks, promotion of natural propagation, artificial propagation of selected fish and promotion of fisheries cooperatives would greatly improve development of open water fisheries. Further, integrated fish-cum-livestock farming can yield up to 4-5 tons/ha/year of fish, thus constituting a substantial supplementary food and income. Special areas of interest in hill fisheries should include culture of Exotic trouts, culture of Snow trout and Mahseer, seed production of Mahseer, Snow trout and Rainbow trout, running water culture of common carp, ranching of seed of Mahseer, Snow trout and Exotic trouts in natural waters, Sport fisheries, Ornamental fisheries, high density culture in cages and pens in reservoirs and conservation of important fishes in lakes and rivers. Attention has to be paid to proper seed and feed production, as well as to the efficient management of cubic volumes of water.
Poverty and Undernutrition still high in NER and in Uttaranchal:
Among the 25 million people that inhabit the North Western Himalayas, a large percentage are hill, mountain and highland farming communities. They sustain largely on subsistence farming which they practice on marginal rainfed and some irrigated farmlands occupying 14.5 percent of the total area of the North West Himalayas. Rest of the Himalayan landscape, includes rangelands, pastures, wasteland, the so called bush land - the grazing areas and the forests; all these account for nearly 70 percent of the North West Himalayan area. Another about 15 percent is under permanent snow cover and rocky mountains and serves as perennial source of clean water to the hill people as well as to the rest of the nation.

Agriculture accounts for about 26 percent of NSDP in the NW Region (Table 4). Nearly 60 percent of the people in the NWR are dependent on agriculture for their employment. Average land holding in Himachal Pradesh is about 1.2 ha, followed by 1.0 ha in Uttaranchal and 0.8 ha in Jammu and Kashmir.

The North Eastern Region (NER) has average land holding of 1.92 ha (Table 4), ranging from 0.6 ha in Tripura to 4.82 ha in Nagaland, against the national average of 1.41 ha. The NER has remained underdeveloped and inspite of interventions at the national level, speedy socio-economic development has not taken place. About 65% of the NER is covered with hills and basins, 22% by Brahmaputra valley and 13% by Meghalaya plateau. The Region has a total population of over 39 million, with Assam accounting for 70 percent of the Region’s population. Nearly 58 percent of the total workforce is in agriculture and the sector accounts for 22.2 percent of the NSDP (Table 4), analogous to the corresponding national averages. A large proportion of the population in the NER is tribal and depends on agriculture and land-based activities.

Although per capita income in the hills was only slightly lower than in the rest of the country, there were significant differences between the two regions in poverty and hunger levels. While for the country as a whole, the poverty level dropped from
about 36 percent in 1993 to 26 percent in 1999/2000, in the Jammu and Kashmir and Himachal Pradesh it dropped sharply by about 22 and 21 percentage points, but remained stubbornly high in the NER, dropping only by about 5 percentage points and exceeded 33 percent in 6 of the 8 NER States as also in Uttaranchal. **The level of hunger (% of undernourished populations) followed the poverty pattern (Table 5), in being particularly high in the NE States.**

Table 5. Economy of India’s Hill States/Regions

<table>
<thead>
<tr>
<th>State/region</th>
<th>% of population below poverty line</th>
<th>Change</th>
<th>Undernourished Population (%) 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>28.44</td>
<td>7.63</td>
<td>-20.81</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>25.17</td>
<td>3.48</td>
<td>-21.69</td>
</tr>
<tr>
<td>Uttarakhand Hills</td>
<td>36.00</td>
<td>31*</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Eastern Hill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>39.35</td>
<td>33.47</td>
<td>-5.88</td>
</tr>
<tr>
<td>Assam</td>
<td>40.86</td>
<td>36.09</td>
<td>-4.77</td>
</tr>
<tr>
<td>Manipur</td>
<td>33.78</td>
<td>28.54</td>
<td>-5.24</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>37.92</td>
<td>33.87</td>
<td>-4.05</td>
</tr>
<tr>
<td>Mizoram</td>
<td>25.66</td>
<td>19.47</td>
<td>-6.19</td>
</tr>
<tr>
<td>Nagaland</td>
<td>37.92</td>
<td>32.67</td>
<td>-5.25</td>
</tr>
<tr>
<td>Sikkim</td>
<td>41.43</td>
<td>36.55</td>
<td>-4.88</td>
</tr>
<tr>
<td>Tripura</td>
<td>39.01</td>
<td>34.44</td>
<td>-4.57</td>
</tr>
<tr>
<td>Total</td>
<td>35.97</td>
<td>26.10</td>
<td>-9.87</td>
</tr>
</tbody>
</table>


4.1.1.22 **The potential of agriculture in the NER remains largely unrealized.**

The agricultural production system is predominantly rainfed, mono-cropped at subsistence level. Shifting cultivation (Jhum) is practiced in all the States, except Sikkim, in steep hill slopes with a shifting cycle of 2-3 years. Crop production practices fall under two broad categories viz. (a) settled farming in the plains, valleys and terraced slopes and
(b) shifting cultivation in unterraced hill slopes with “slash & burn” method. Modernization of agriculture has escaped as evidenced from the poor adoption of modern technologies, low consumption of fertilizers and other indicators. In addition to sluggish growth in agriculture, resource degradation and environmental safety issues have also become major concerns of the planners and policy makers. Out of the constraints to agriculture development, the following are unique to the region:

- Primitive agro-economic system in hilly terrain under shifting cultivation leading to land degradation. Limited exploitable water balance in the plains and low ground water potential in the hills have resulted in low level of irrigation. The management of land and water resources, therefore, assumes enormous importance in improving the agricultural economy in the region.

- Inappropriate land tenure (community land for Jhum) and private property rights system in the hilly areas discourage investment and private sector participation in agriculture development. High cost of infrastructure development and relatively low return delays modernization. Such concerns are essentially linked with policies on land reforms, institutional reform, banking and credit and effective governance.

4.1.1.23 In the NER, shifting cultivation or “jhum” accounts for 85 percent of the cultivated area and supports over 2.2 million people, largely tribal communities. The tribal families once food self sufficient, are now barely able to produce enough food for the whole year. The swidden farming is a response to the ecological limitations of humid tropical region and it exhibits a successful human adaptation mechanism to farming in the humid tropics. The swiddeners have developed an agroecosystem that is diverse and is able to respond successfully to the microclimatic diversities and climatic uncertainties.

**Despite advocacy and promotion of Jhum substitution technology packages, the system continues. The ecological prudence of Jhum farming families should be combined with techniques which could help enhance the productivity and sustainability of the system.**
Western Ghat Development Programme

4.1.1.24 The Western Ghat Development Programmes (WGDP) have been in operation from the Fifth Five Year Plan in designated hill areas/ Western Ghat talukas. Under these programmes, Special Central Assistance (SCA) is given to the designated areas in order to supplement the efforts of the State Governments in the development of these ecologically fragile areas. The 161 Ghat talukas - 62 in Maharashtra, 40 in Karnataka, 31 in Kerala, 25 in Tamil Nadu, and 3 in Goa (Table 6), covering an area of 187,144 sq. km., account for 5.7 percent of the country’s total geographical area.

Table 6. Salient features of the Western Ghat area

<table>
<thead>
<tr>
<th>State</th>
<th>No. of Talukas</th>
<th>Total area (sq. kms.)</th>
<th>In terms of State area (%)</th>
<th>Population (Lakh)</th>
<th>Population density (per sq. kms.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goa</td>
<td>3</td>
<td>1721</td>
<td>47</td>
<td>1.72</td>
<td>100</td>
</tr>
<tr>
<td>Karnataka</td>
<td>40</td>
<td>46029</td>
<td>24</td>
<td>87.99</td>
<td>191</td>
</tr>
<tr>
<td>Kerala</td>
<td>31</td>
<td>27981</td>
<td>72</td>
<td>158.00</td>
<td>565</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>62</td>
<td>58400</td>
<td>18</td>
<td>124.20</td>
<td>213</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>25</td>
<td>26000</td>
<td>20</td>
<td>75.83</td>
<td>292</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>160131</td>
<td>447.74</td>
<td></td>
<td>280</td>
</tr>
</tbody>
</table>

4.1.1.25 The approach and strategy of the programme have evolved through the Plans. During the Fifth Five Year Plan, the emphasis of the programme was on the economic well being of the population in hill areas and exploitation of resources of the hilly region. During the Sixth Plan the emphasis was shifted to eco-development. Apart from the shift in the emphasis from beneficiary oriented schemes to eco-conservation and eco-development, a notable step initiated by the Planning Commission was the involvement of universities and research institutions located in the Western Ghats region in the programme.

4.1.1.26 During the Eight Five Year Plan, the programme focused on involvement of the people and meeting their basic needs through improved management of their land and water resources. Presently, the WGDP operates on the following principles:
• Maintenance of ecological balance,
• Preservation of genetic diversity,
• Restoration of ecological damage caused by human interaction, and
• Creation of awareness among the people about ecological degradation and securing their active participation for the eco-development schemes.

The programmes and activities undertaken over the years are summarised below.

4.1.1.27 Development of cultivable wasteland: One of the main objectives of this scheme is to develop cultivable wastelands in the Western Ghats Region, which are lying unused and when reclaimed will be brought under cultivation of horticultural/plantation crops. The development of land under this sector will be confined to the lower region where scarce wild vegetation exists, without disturbing the ecology in the region, so that immediate benefit could be derived by farming community from land development and plantation of horticultural crops. The following schemes are under implementation: (i) land improvement for soil and water conservation, (ii) assistance for promotion of horticulture crops, (iii) stone wall fencing, (iv) dryland horticulture, and (v) homestead gardens.

4.1.1.28 Conservation activities: Soil conservation aspects on watershed basis receive maximum attention. Maharashtra has initiated the process of implementing the Western Ghat Development Programme on the basis of integrated development of watersheds from 1983-84, which include: (i) land development activities, (ii) water harvesting and erosion control structures, (iii) soil conservation, (iv) water conservation, (v) drainage line treatment, and (vi) plantation.

4.1.1.29 Animal husbandry: The role of the animal husbandry sector in the overall development of the Western Ghats is to complement the eco-conservation and eco-restoration efforts and also to open new avenues of self-employment generation through improved animal husbandry practices. The various programmes which are being undertaken under this sector are: (i) incentives to dairy farmers for renovation of cattle
sheds, (ii) incentives for green fodder cultivation, (iii) supply of fodder mini kits, (iv) animal health cover and breeding, (v) training facilities to dairy farmers, (vi) financial assistance for purchase of milch animals in the watershed area, (vii) opening of artificial insemination centres, (viii) poultry (establishment of backyard poultry), piggery and rabbit development, and (ix) artificial insemination for upgrading cattle and distribution of cross bred bulls and cows.

4.1.1.30 **Fisheries:** The Western Ghats with their innumerable water bodies, small and large, offer good scope for inland fisheries including riverine fishery. Development of fisheries in reservoirs and big and minor tanks and renovation of ponds are some of the important programmes included under fisheries sector. The programmes implemented are: (i) construction of fish ponds, (ii) subsidy to new ponds construction, (iii) development of fisheries in reservoirs, tanks, (iv) renovation of ponds, (v) riverine fishery development, (vi) assistance to fish cooperatives, and (vii) developing infrastructure etc.

4.1.1.31 **Horticulture:** Horticulture assumes greater importance in view of the limited water availability, and also from the viewpoint of economic development and protection of the environment. Under WGDP, the objective of horticulture development activities is to bring the vast stretch of drylands under perennial crops thereby developing the eco-system and upliftment of the socio-economic status of the poor farmers. Various horticulture programmes are being implemented, depending upon the needs and demands in the local areas. The important programmes are: (i) supply of horticultural plants, (ii) training of farmers in horticulture, (iii) establishment of school gardens and community gardens, and (iv) mushroom production and spices project.

4.1.1.32 **Forestry:** Denudation of the thick forests in Western Ghats has been a serious problem. Construction of huge irrigation / hydro-electric projects and expansion of agriculture without commensurate afforestation has adversely affected the ecology in that area. Therefore, the accent of the forestry programmes has been on afforestation in forest lands as well as on private lands. The main programmes under forestry sector are: (i) eco preservation of forests, (ii) heterogeneous forest vegetation by profuse mixed
seedlings, (iii) conservation and protection of degraded forests, (iv) medicinal plant conservation, and (v) wild life management.

4.1.1.33 **Minor irrigation:** The objective of this programme is to ensure proper and regular supply of water for irrigation so as to raise living standards and economic condition of the people by helping to increase their agricultural productivity and production. There is ample scope for developing minor irrigation sources in this region. Constructions of pickups, vented dams etc. can create irrigation potential and consequently bring more area under irrigation. Creation of Openwells, Borewells / Tubewells and Lift Irrigation schemes are the main works.

4.1.1.34 **Infrastructure development:** With a difficult terrain compounded by high rainfall, many places in the Western Ghats become inaccessible due to swollen rivers, land slides, slushy mud roads etc. during the rainy season. The main demand of the population in the area is for all weather roads and foot bridges. The lack of communicational facilities obviously hampers timely attendance of health and educational services. The movement of local produce and other consumer items to these villages is also hampered. Construction of bridges and construction and improvement of rural roads have been the major programmes.

4.1.1.35 **Sericulture:** Sericulture was included as a scheme in the Western Ghats Development Programme during the Sixth Five Year Plan. Limited infrastructure facilities like basic seed farms, industrial silkworm seed grainage, establishment of chawkie rearing centres, pilot extension-cum-training centres and demonstration-cum-training centres have been created. Although still inadequate, these facilities have generated awareness about the Sericulture programme in the rural areas resulting in a larger number of farmers enthusiastically adopting sericulture activities.

4.1.1.36 **Village and Small industries:** In order to generate employment opportunities for the people in the Western Ghats, various schemes are being undertaken through different NGOs. Some of the schemes include employment generation activities
for rural women, establishment of small and micro enterprises in the foot hill regions, dairy, poultry, bee-keeping, curry powder units, vegetable cultivation and tailoring etc.

4.1.1.37 **Non-conventional sources of energy:** This programme was taken up in 1993-94 with a view to promoting non-conventional sources of energy in the Western Ghats as this would to some extent relieve the pressure on forests for fire wood. Devices like solar water heater, solar lanterns, installation of bio-gas plants, wind mills, smokeless choolhas, improved kerosene stove etc. are being promoted under this programme.

**Eastern Ghats Development Programme (EGDP)**

4.1.1.38 The Eastern Ghats region is a part of the Peninsular Plateau comprising the Western Ghats, Eastern Ghats, North Deccan Plateau, South Deccan Plateau and Eastern Plateau. The region is a broken chain of hills that extends from Orissa to Tamil Nadu. The Tamil Nadu part of Eastern Ghats is divided into three physiographic areas: coastal, central and southern spanning three districts in coastal Eastern Ghats, 9 districts in central Eastern Ghats and four districts in southern Eastern Ghats. The major hills in Eastern Ghats are: a) Javadhi hills (Vellore district), b) Pachaimalais (Trichy & Salem districts), c) Kollimalais, Servarayans and Bodamalais (Salem district), d) Kalrayanhills (Salem and Villupuram district), Chitteris and Melagiris (Dharmapuri).

4.1.1.39 The Eastern Ghats cut through by the four major rivers of southern India, the Godavari, Mahanadi, Krishna, and Cauveri. The Ponnaiyar and Palar rivers flow from headwaters on the Kolar Plateau eastward through gaps in the Ghats. The Eastern Ghats is prone to very strong rainfall in the NE monsoon. **Traditional water harvesting structures to conserve the rainwater abound in the Eastern Ghats.** One such example is the Korambu, temporary dam stretching across the mouth of channels, made of brushwood, mud and grass. It is constructed to raise the water level in the canal and to divert the water into field channels for irrigation.
4.1.1.40 The Eastern Ghat is highly significant in terms of its bio-diversity. Extensive field and literature survey of trees in Eastern Ghats yielded 528 tree taxa under 271 genera belonging to 75 families out of the total 2500 species of flowering plants. Medicinal plant diversity is also very high. Out of the total flora of Andhra Pradesh, 1800 are estimated to be medicinal plants, 685 of which are located in certain areas which have been earmarked as Medicinal Plant Conservation Areas. There is also rich diversity in landraces of several food crops. The Eastern Ghat districts of Khammam and West-Godavari in Andhra Pradesh are rich in sorghum diversity, particularly landraces. The Eastern Ghats are rich also in mineral resources, but intensive mining is destroying large parts of the agricultural land. Various economic activities should be balanced to ensure sustainabilities.

4.1.1.41 Because the hills and the surrounding plains are densely populated, accessibility to the forests is rather easy. The forests in the Eastern Ghats are the most affected, compared to the Western Ghats and Himalayas, as they are experiencing heavy demographic pressure. A study featuring the forest degradation in Kolli hills which is a part of the Eastern Ghats revealed an observed loss of about 25 ha in dry evergreen forest; and about 35 and 1306 ha loss was observed in the semi-evergreen and dry deciduous forests, respectively. About 69% of the present forest area is under low risk category, 25% is under medium risk category and about 2% (581 ha) is under the high-risk category. Severe fuel-wood extraction, illegal felling and intensive grazing are the main reasons for this change.

4.1.1.42 An ethnobotanical study was carried out during 1995-2001 in the Eastern Ghats region of Andhra Pradesh covering the districts of Chittoor, Cuddapah, East and West Godavari, Guntur, Khammam, Krishna, Kurnool and Visakhapatnam. The study revealed the tribal populations of Chenchus, Erukalas, Koyas, Konda Reddis, Lambadas (Sugalis), Naikpods, Nukadoras, Valmikis and Yanadis. The tribal communities are associated with cultivation and use of several endemic species and have discovered the ethnic uses of 9 epiphytic and 11 terrestrial orchids. A total of 29 accessions of local landraces of Sorghum were collected most of which was used for food.
conserving the useful flora can be done only with the close cooperation of these tribal communities.

The Deccan Plateau Development Programme (DPDP)

4.1.1.43 Deccan Plateau covering 644910 sq. km, about 20 percent of the country’s total area, stretches across Andhra Pradesh, Karnataka, Southern Maharashtra, Southern MP and TN. About 70 per cent of the population work in agriculture. Nearly half of these are small farmers cultivating as little as two acres. The other half work as hired agricultural labourers for larger farmers. Poor soils and low and erratic rainfall have resulted in poor productivity in the region.

4.1.1.44 In the Deccan plateau, the areas that fall in the rain shadow regions of both the Western and the Eastern Ghats, ensuring adequate availability and quality of water is a major priority. Rainfall is lesser than many other areas of the country, coming to as low as 500mm a year; its pattern fluctuates widely and its spread is also very erratic.

4.1.1.45 However, to survive the erratic water availability, the traditional communities have developed a network of water harvesting structures and intricate irrigation networks. For instance, the Kohlis, who are a small group of cultivators residing in the district of Bhandara, Maharashtra, built some 43,381 water tanks over several centuries. which formed the backbone of successful irrigation in the area. So is the community managed Phad Irrigation system that existed in Maharashtra.

4.1.1.46 There is also considerable diversity in crops and crop sequences where traditional crops such as millets and cumbu met the nutritional as well as cultural requirements of the local communities. However, they are being replaced steadily by cash crops to meet the market requirements. Replacement of cultures and traditions has replaced local and adapted agro biodiversity as well.
4.11.47 The following development programmes deserve high priority both for Eastern Ghats and Deccan Plateau:

a) **Judicious water management of surface water and groundwater and re-vitalisation of traditional water harvesting structures and water saving measures have to be identified and upscaled.** Irrigation measures to supplement rainfall are very important for crop production stability. Watershed development needs to be more holistic and should integrate should biodiversity conservation. Floods and droughts occur frequently in the Eastern Ghats, which should be managed with adequate knowledge through early warning systems and flood mitigation measures.

b) **Soil conservation** should be followed encompassing (i) adequate soil cover to prevent exposure to direct sun, rain and wind, (ii) mixed farming, (iii) rainwater conservation and (iv) adequate regenerative capacity of the soil so that it could manure itself.

c) Instead of focusing only on hydroelectric power, **alternate measures of energy development** – wind, sunlight, need to be identified and upscaled. The development and use of **biofuels** generating crops as part of wasteland development is highly recommended.

d) The shift away from crops such as sorghum and millets which are ideal for the dry parts of the Deccan and which used to be a part of the consumption pattern of the residing population needs to be rectified. The increased emphasis on rice and wheat (brought about by the wide scale availability through the PDS) must be corrected by **diversifying the PDS through the inclusion of locally-produced grains.** Adequate market access is essential to revitalize crops such as the millets which are disappearing from the food basket.
e) **Agro-biodiversity exploration, conservation and enhancement are a top priority** both in the Deccan and the Eastern Ghats. This has to be set in the context of local cultures and traditions.

f) **Involve the local people and local governance mechanisms**, particularly the Panchayats, for conservation through community action by the formation of cooperatives and groups and for realization of the Farmers’ Rights provisions.

### 4.1.2.0 Horticulture-led Transformation of Hill Agriculture

4.1.2.1 As seen from **Table 3**, between 1990-91 and 2003-04, percentage areas under fruits and vegetables in the NW Himalayas increased from 12.5 to 15.9 and from 4.01 to 5.06, respectively. In the NE Himalayas, the corresponding area percentage increases for fruits were from 3.8 to 4.8 and for vegetables from 6.12 to 8.14. These increases in relative terms were much higher in the hills than in the plains. As seen from **Table 4**, per caput production of fruits in the Himalayas is thus now about 60 percent higher than that in the rest of the country. Likewise, per caput vegetable production in the NER is about 25 percent higher than that in the country as a whole.

4.1.2.2 **The entire Himalayan range is a favourable agro-ecosystem for growing a wide range of fruits, vegetables, medicinal and aromatic plants and other cash crops.** Small areas with their own micro climatic conditions provide suitable sites for growing particular crops, such as apples, citrus fruits, walnuts, plums, peaches, bananas, mangoes and pineapples; vegetables such as tomatoes, radish, potatoes, cabbage, cauliflower and several local and introduced temperate vegetables, other cash crops like ginger, chillies, cardamom and saffron; and flowers such as orchids, gladioli, marigolds and chrysanthemums. The fruits and vegetables cover around 16% of the crop land. **The present trends towards rapid expansion of horticultural crops will have positive implications for improving food and economic security of hill farmers.**
4.1.2.3 In some of the States, in Himachal Pradesh for instance, apple accounts for 76 percent of the State’s total fruit production, horticulture will lead the future agricultural and economic growth. The fruit-based production system has helped alleviate poverty of many hill farmers of Himachal. Over 86% of the population is now literate and there is almost 100% literacy below 14 years. From the viewpoint of employment and income generation, fruit and vegetable farming are high quality options for hill farmers. The high quality of production options is also evident from the backward and forward linkages generated by them. Fruit crops farming in Himachal has helped convert the non-viable subsistent farming into viable farming through harnessing of appropriate niche potentials of marginal mountain lands. However, the overdependence on apple may not be desirable.

4.1.2.4 With the diversification of farming in the hills, however, many second generation issues of unsustainability, ecological compatibility and social, gender, ethnicity and equity sensitivity are emerging. The landmark study “Warning signals from the apple valleys”, analyses one such problem of pollination failures making a dent on productivity of apples in Himachal. But, this has also brightened the prospect of installing honeybee hives in and around the orchards, not only increasing pollination and fruit set in apples, but also generating substantial additional income, employment and nutrition through enhanced honey production thus converting challenges into opportunities. In fact, honey production in Himachal Pradesh has increased to about 1,200 tonnes annually and it has become an important source of income and employment also in Jammu & Kashmir and in Uttarakhand.

4.1.2.5 Among plantation crops, the development of smallholder tea cultivation in Assam spread over 40 thousand ha is an emerging phenomenon in the NE region, which has potential for converting to ‘Organic Tea’. Large cardamom farming as an understorey crop in hill slopes of Sikkim is a unique traditional production system conferring high ecological stability. As a high value cash crop in Sikkim, it generates employment for 80-100 days per ha (Box 1). Popularisation of seabuckthorn in cold arid Himalayas and in China is yet another success story (Box 2). These success stories are quite replicable and
detailed location-specific plans and activities for their replication, involving various stakeholders, should be formulated and implemented.

4.1.2.6 Loose skin mandarin orange is a unique high value crop in the NER. Broadly named as ‘Khasi orange’, it grows well both in Assam valley as well as in the hill slopes. The fruit quality is excellent, and unlike Nagpur orange which is entirely on budded plants, the plantations in the NER are raised from seedlings only. Due to neglect, the orange trees are suffering from malnutrition and disease and insect infestations, resulting to severe decline. Still in certain pockets trees are highly productive, and if due care is taken, orange industry can revive back with a real boost to the agricultural economy of the region. Under the Horticulture Technology Mission, considerable expansion of passion fruit area (3885 ha) has taken place, particularly in Mizoram, Sikkim and Nagaland. Processed passion fruit has a good export market and a few processing units have also been established.

**Box 1**

**Forest Floor Farming of Cardamom in the forests of Sikkim**

The subsistence dry land farming on sloping crop lands of north Sikkim should be presenting the poverty cum resource degradation scenario for farmers. However, ethnic mountain farming communities of Sikkim had chosen a wild high value spice – cardamom for barter and cash income source. The farmers started farming it under the forest floor like any perennial crop. For decades now, cardmom is their high value cash crop grown under the shade of natural forests as well as under alder afforestation.

Almost 75% farmers of north Sikkim have replaced the food grain agriculture on their farmlands with cardamom and alder tree plantations. Cardamom-alder forestry plantation provided permanent green cover to thousands of hectares i.e. 23% of farmland. The contribution of cardamom farming to livelihoods ranges between 40-88%. Four key factors which make cardamom farming on marginal sloping lands useful are:

- It is ecologically adapted to farming on sloping lands and forestry system and the plants maintain permanent green cover on forest floor.
- Cardamom farming ensures ecological stability to fragile mountain slopes by requiring farmers to maintain a good forest cover of nitrogen fixing alder trees.
- Cardamom is farmer domesticated, low volume-high value cash crop and it generates employment for minimum of 80-100 days per hectare.
- Globally almost 90% of cardamom is produced in Sikkim and its neighbouring valleys of Nepal and Bhutan alone, therefore, the region is the
4.1.2.7 Apple was introduced in rain shadow belts of Arunachal Pradesh, mainly in Kameng district where annual rainfall is around 900 mm. It is reported that about 5000 ha was brought under apple and quality of fruits was excellent. Unfortunately, there was no after care and science-based back stopping, resulting in poor performance. Under high rainfall condition even at 6000 to 7000 ft altitude of NEH (upper Shillong in Meghalaya, Phutsero of Nagaland etc) apple was not a successful crop and therefore the niche found in Arunachal Pradesh needs to be nurtured to meet the demand of local market. Apple industry in Bhutan with a new set of varieties is showing promise. Snow clad dry hills of Sikkim are also suitable for apple production.

Box 2

**Forest as an orchard**

Seabuckthorn provided a breakthrough in combining strategic desert conservation needs of China with local economic needs in north and northwest China. Seabuckthorn plantations and R &D in post harvest processing of wild fruit into variety of valuable products including medicines, have made marvellous impact on both the household and regional economy. China has now well managed seabuckthorn forests covering more than one million hectares and by the end of 2004, seabuckthorn agroenterprise was a multi billion agroenterprise in China.

Seabuckthorn success story is one of the outstanding examples of development approaches for hills which combine horticulture and forestry to promote an economically and ecologically productive hill farm economy. A forest of wild seabuckthorn bushes represents characteristics of a good forest on the sloping lands and river valleys, as well as economically productive features of a fruit orchard. Local farmers of the areas have strong economic interest in maintaining the seabuckthorn forests and government institutions have long term strategic (ecological) interests in promoting it.

LEH BERRY brand name in India, is a result of replication of the Chinese success story. Ten years of efforts of international agencies and encouraging private investment has led to the establishment of RS 100 crore LEH BERRY brand agro-enterprise in India since the year 2001, benefiting farmers of Ladakh (Nubra valley) in J&K and tribal districts of Himachal Pradesh.
4.1.2.8 It is very essential to plan for development of those crops only which are easy to grow and are well adapted in the prevailing agro-climate. An analysis of productivity of major fruit crops in different States and other comparative advantages in terms of market accessibility and demand should be taken as the basis/criteria while formulating the area expansion programmes. For example, crops like banana, pineapple and orange are grown in all the North East States. But the productivity of these crops vary vastly in different areas. Perusal of yield data and other parameters like net income per ha, market demand, peak season of arrivals and price trend in major markets should be kept in mind to regulate the production-marketing chain.

4.1.2.9 Ginger is already a well established cash crop in Meghalaya and Mizoram and the crop received developmental support to possible extent. Large-scale seed production of improved varieties like Nadia in Meghalaya, and marketing support in Mizoram encouraged ginger cultivation. There is still a good scope for improving the productivity in ginger and some processing support (dehydrated ginger of low fibre containing variety) may boost the crop further. Ginger should be encouraged in Assam and Arunachal Pradesh, where productivity is quite good and ample scope for its improvement remains. Sikkim has come up well with ginger production in more recent years. APEDA report shows that ginger export from NER has already started and during 2001-02 about 1640 mt were exported. Export-led growth of ginger deserves focused joint attention of the concerned State Governments, SPS and quality assurance authorities, private sector and NABARD and other banking institutions to particularly promote WSHG activities.

4.1.2.10 Out of all vegetables, potato is the most important one. Potato yield is quite high in Tripura and the State has already achieved the distinction of commercially producing TPS. In the plains, potato is harvested in winter months (Dec.-Jan.), but in the hills of Meghalaya harvesting takes place in the months of July-September. Price trend in Kolkata market clearly shows that although maximum arrival takes place in November-December, maximum price is realized during the period of June to November. The yield of potato in Assam is about 8 t/ha, against about 26 t/ha in West Bengal. But the advantage of off-season harvest needs to be exploited to the maximum extent and potato
cultivation should be encouraged in mid-high hills of NER. A good number of improved varieties and suitable management practices have already been worked out by the CPRI Station in Meghalaya and NEC support has been provided for seed multiplication locally. Potato is an important cash crop in the hill districts. It shows positive growth throughout the period and the yield has doubled during the last 30 years and the trend needs to be accelerated through improved extension, irrigation expansion and input and market supports.

4.1.2.11 In case of vegetable crops, improved production should be possible much faster. Unlike in the case of fruits, in vegetables research information and farmers’ rich experiences are available in case of most of the vegetable crops. Intensive vegetable cultivation in Nowgang district of Assam, growing of climbing beans in mixed stand with maize in hills, raising locally good quality seeds of radish and cauliflower, are some of the examples which show farmers’ interest and skill in vegetable cultivation in the hills. New improved varieties and hybrids should cover larger areas in flat and valley lands in the hills. Vegetable production has improved considerably Horticulture Technology Mission claims to have brought 9000 ha additional area under different vegetable crops, especially in paddy fallows as the second crop.

4.1.2.12 Vegetable farming has particularly helped small and marginal hill farmers come out of poverty trap. The often quoted off season vegetable farming in the hills signifies intensive use of small landholdings of hill farmers using their family labour most productively (generating better employment for the family on farm). It has already transformed livelihoods of millions of families across the Himalayas. The concerns of such families today is sustainability of the option and not the alternative. Indeed, vegetable farming is most promising option for small farming families, but it is ecologically highly unsustainable; the cost of cultivation keeps rising year after year. The need for excessive use of fertilizers and pesticides is a continuing concern both for the farmers as well as the consumers. The private companies and market forces have replaced the role of research and technology institutions as sources of new varieties and inputs for vegetable farming. Therefore, the public institutions, ICAR system including the agriculture universities need to reform and strengthen themselves for new roles as
technological innovators and back up supporters for hill resources management and profitability of hill farmers through a participatory mode. The KVKs and ATMAs can play an important role in this direction by undertaking location-specific activities rather than dumping on the hill farmers the technologies developed in distant plains of India and elsewhere.

4.1.2.13 In flowers, orchids, particularly the temperate orchid Cymbidium, is the specialty of the NE region. Although sporadic attempts have been made to commercialise orchid cultivation in Sikkim, Darjeeling district of West Bengal and Arunachal Pradesh with Cymbidium, full potentiality is yet to be exploited. Of late, big units with protected cultivation structures are coming up mainly in Sikkim. M/s India Carbon Ltd., Guwahati, took to commercial production of tropical orchids, but only with limited success. Cluster of small farmers / SHGs may approach M/s Indian Carbon Ltd., Guwahati, M/s Nagami Nursery, Dimapur, NRC for Orchids, Pakyong, Sikkim, and the like, for sourcing quality planting materials and for possible tie up for marketing arrangement, including appropriate contract farming arrangements, as common in Thailand and other South East Asian countries.

4.1.2.14 Anthurium, another crop of cut flower value, is also coming up well in some of the hill States. Commercial scale production from Mizoram is reported and some marketing arrangements have also been established. Private initiatives to develop contract growing for orchids and Anthurium, organizing training on floriculture, setting up tissue culture hardening facility and others are in the pipeline. The Government of Assam has targeted Kamrup district as a floriculture district of Assam. Among Medicinal and Aromatic Plants, Citronella grass cultivation for aromatic oil was extended to a reasonably large area, including in the unutilized lands of tea gardens. RRL, Jorhat of the CSIR has identified suitable strains and assisted in establishing distillation units. Due to good rainfall and rich soil, the vegetative growth of aromatic grasses is luxurious, particularly in the valley lands. But, the potential remains highly underexploited and the necessary synergistic push of the stakeholders is missing.
4.1.2.15 Patchouli (*Pogostemon cablin*) has been identified as a suitable essential oil bearing aromatic plant with immense export potential. Patchouli oil production could be a rural based, labour intensive, low cost agro based cottage industry in the NER. Due to active support of NEDFi (North Eastern Development Finance Corporation Ltd) for production of patchouli oil on commercial basis under a buy back guarantee, already about 1800 acres have been covered under Patchouli. Patchouli cultivation is being promoted also in the plains of Assam, while another essential oil bearing ‘Geranium’ is considered for the hills. **NEDFi micro-finance scheme is aiming to support NGOs / SHGs for promotion of medicinal and aromatic plants, which definitely enjoy a niche in the NER.**

4.1.3.0 Issues and Challenges of Hill Agriculture and Concerns of Hill Farmers

4.1.3.1 **Lack of fact-based rational understanding and of knowledge-led development approaches have been the main reasons for the poor state of hill agriculture and deprivation of the hill people.** Hill area development in India has been based on the perceptions of *Land Degradation Theory* that was so widely dramatized in 1970s through the book *“the Himalayan Dilemma: Land Degradation and Human Poverty”* by Ives and Messerli. The vicious cycle of poverty-land degradation-food insecurity-poverty was coined during that period. It blamed hill farmers for the forest denudation and land degradation problems leading to downstream floods, siltation and desert like situation. It predicted dooms day for the Himalayan farmers by the end of 2000. The fundamentals of the theory were that Himalayan farmers are causing large scale soil erosion and land degradation in the Himalayas and their farming cultures are the root cause of floods in Bangladesh, large scale forest denudation and land degradation and siltation of dams, rivers and even the Bay of Bengal. The theory linked their poor livelihoods to all these evil processes. **Without verification, everyone accepted the theory.** More data was generated by other agencies in further support of these observations. The aid agencies, both multilateral and bilateral, the World Bank and Asian Development Bank and others, made countries of the region think and act accordingly. Several government programmes such as stricter forest policing and forest laws for
conservation with little concern for livelihood security of people in and around forests, were outcome of this process. The muddiness of the current debate on the rights of the tribal people could, to a certain extent, be ascribed to the Ives-Messerli theory.

4.1.3.2 After about four decades, we have a situation where the hill farmers, the villains of the theory and real victims of the counter measures, are in crisis. New evidence is now available to explain that the Himalayan degradation theory was a mis-judgement of nature’s processes and that Himalayan farmers have suffered over the decades because of the international and national initiatives on pro conservation policies and investments. The world over unrest in the mountains, that emerged during this period, has been attributed to policies and interventions made during this period, which denied or restricted rights and access of hill people to their livelihood resources, be it the tribals of NE India, the tribals of northern Thailand, Myanmar, Bangladesh or the Andean Indians of Latin America, or be it the sheeps of the Valley of Flowers in India. The new findings observe that, unfortunately, today the Governments and institutions in the affected countries are not ready to listen to the new findings. There is so much of vested interest within these national systems (conservation lobby) that new findings are being fiercely resisted and dubbed wrong (Box 3).

4.1.3.3 These findings have great implications for shaping the course of events for the hill farmers. It calls for unloading the soil erosion and degradation loaded mind sets of researchers and development thinkers and seeks revisit of the whole issue in the light of new knowledge and information to verify the situation and make necessary changes at whatever level they will be needed - policy, development programmes, research and even academia. The new findings highlight the need for pro hill people policies rather than putting priority on conservation of resources over people. New mantra is – “Given the opportunity and supportive conditions hill people are masters in conserving resources.” Governments only need to create an enabling environment, in place of whole range of restrictive regimes which have alienated hill farmers from their own environment making them refugees in their own surroundings.

4.1.3.4 Another major knowledge gap exists for reliable estimates of total forest area and areas under different forest categories. The geographic areas of hill States have
been calculated long ago using available means and these tools had limitation of not being able to calculate the area under verticality of hills and mountains. This means that official geographic area of all hill States is as if they are plain, and it does not include area created due to verticality factor. The new tools i.e. GIS based digital elevation models and other tools now help us calculate the area correctly. For example, the official area of Himachal Pradesh is 55,000 sq.km but when new tools were used the actual area turned out to be 88,000 sq.km. A difference of 33,000 sq km is huge indeed. This extra land holds the key to solving many problems of hill farmers. This extra land is not crop land, because crop land is measured and recorded in the revenue records. Then it may be the forest land, and if that is true, it should facilitate major policy decisions about need for land use adjustments.

4.1.3.5 **Besides the main issue discussed above, hill agriculture has some inherent challenges of remoteness and inaccessibility, lack of connectivity of production areas with all weather link roads, marginality, and fragility in terms of moisture stress, depleting soil fertility and the poor soil conditions and a short growing season. Added to these are socio-economic constraints such as small and fragmented holdings, poor productivity, labour shortages, poor post production management, poor marketing and networks (lack of market development) and lack of entrepreneurship. All these have led to underutilization of resource bases in the hills and the limited generation of surpluses and low returns to the farmers.**

4.1.3.6 **With few exceptions, constraints to improved agricultural production in the Himalayas include poor management practices, inferior quality and inadequate quantity of planting material, seeds, and other inputs, little access to extension services and marketing. Crop damage due to unpredictable weather as well as from wild and astray animals is a major deterrent. Across the Himalayan region, farmers face problems in accessing market information, post harvest processing and value adding skills and opportunities. Because of the lack of regular markets and reliable marketing and due to the high marketing costs, hill farmers in many areas are finding it too risky to diversify into more lucrative high value crops.**
4.1.3.7 Shortage of fodder and feed is rampant in the hills. “Livestock fodder problem is more acute than human food problem in the hills”. The rangelands and grasslands are operating at one fourth of their productive potential. Most of the fodder and grazing areas have been infested by non-palatable invasive species, such as lantana, eupatorium and congress grass. As an estimate, about 40-60% shortage of fodder is being faced by the Himalayan farmers.
Box 3

Forests and Floods  
*Drowning in fiction or thriving on facts?*

Flood processes in Asia are highly complex. Only integrated approaches take this complexity sufficiently into account and lead to adaptive and effective flood management. An improved approach to watershed and floodplain management integrates land management in the uplands with land-use planning, engineering solutions, flood preparedness and emergency management in the lowlands. This requires good understanding of all the physical processes involved, as well as the social behaviour and culture of local residents. Furthermore, this approach should draw upon the best available scientific knowledge about the environmental, social and economic impacts of floods and the environmental, social and economic effects of interventions.

The myths and misperceptions about the causes of flooding that have misguided decision-makers, planners and managers alike need to be replaced by rational understanding based on facts. Too many local, national and international agencies have used ‘conventional wisdom’ and unsupported claims to advance their own institutional interests and because it has been politically advantageous to channel aid funds to upland reforestation and conservation projects. The media has unfortunately perpetuated many of the myths regarding forests and floods out of a well-intentioned, but ill-informed, desire to protect the environment, especially the forests of upper watersheds.

It should be clear that large-scale reforestation programmes, the adoption of soil and water conservation technologies in agriculture, logging bans and the resettlement of upland people to lowland areas will not significantly reduce the incidence or severity of catastrophic floods. Positive environmental impacts from these interventions will be of a local nature, while the negative social and economic impacts are likely to be more widespread.

Importantly, the habit of blaming upland inhabitants for catastrophic floods of whole river basins must be abandoned. Instead, practical solutions are needed to redress watershed degradation caused by unsustainable land-management practices, including poor logging practices and inappropriate infrastructure development. While refraining from exaggerating the negative impacts that mountain people have on the environment, we should also not overstate the positive impacts of their participation in watershed management programmes, as is happening with some recent attempts to develop markets for the environmental services that forests may provide. Moreover, policy-makers and development agencies have a moral and ethical responsibility to ensure that regulatory and project approaches are based on the best available scientific knowledge and do not unnecessarily place upland communities at risk of further impoverishment.

While the ability of forests to prevent catastrophic floods is limited, watershed management should definitely not be abandoned. Forests provide a variety of environmental services, which need to be protected and nurtured for the benefit of today’s and tomorrow’s upland and lowland populations. Watershed management needs to consider the needs and interests of local populations, but should also account for the needs of the wider society. The most effective approaches to reducing damage caused by catastrophic floods require a strong focus on downstream areas and flood plains. People in these areas need to ‘learn to live with rivers’, as the UK Institution of Civil Engineers entitled its 2001 report on flood mitigation measures. At the same time, politicians and policymakers need to abandon their belief in quick fixes for flood-related problems. While the high costs of floods in the lowlands of Asia are evident, it is important that the beneficial aspects of floods are also acknowledged. It is only by promoting and supporting comprehensive integrated watershed and floodplain management that the needs and aspirations of all residents — uplanders and lowlanders — can be adequately addressed.

FAO, 2005
4.1.3.8 Livelihoods of majority of the population in the Himalayan region revolve around agriculture, land being the nucleus of all socio-economic activities. For majority of the small and marginal farmers, their wealth and poverty is associated with the ownership of the size of land holdings. The great majority of the farming households are marginal (below 0.5 ha) and small (0.5 to 1.0 ha) landholders. The situation is particularly unsatisfactory in the North West and in Tripura. For instance, by 2010, nearly 90 percent of the holdings in Himachal Pradesh, and over 96 percent in Jammu and Kashmir will be less than 2.0 ha in size. Sometimes, land ceiling laws prohibit bigger holdings, which may need to be reviewed while promoting contract farming.

4.1.3.9 Shrinking cropland holdings is a key concern for managing food and livelihoods. Rural development efforts across the Himalayan region face a serious challenge of finding a solution to this problem. The per capita available cropland in hilly areas across Indian Himalayan states is already too little to sustain livelihoods. The consequences of this situation to sustaining livelihoods and management of land resources are serious indeed. The Himalayan cropland which is about 4.3 percent of the country’s cropland has to support livelihoods of disproportionately large number of mountain people, who account for 6.2 percent of the nation’s population. Moreover, the hill and mountain cropland is divided into a range of flat and sloping land types. While 37% of the cropland is sloping land of various degrees, the Himalayan farmers are cropping sloping lands even beyond 25 and 30 degrees. Down in the valleys, new human settlements, urbanisation, industrialisation and government infrastructure development activities, all are competing for converting the valley crop land into non farm use. For instance, in Himachal Pradesh, net cropped area decreased from 5.82 lakh ha in 1990-91 to 5.49 lakh ha in 2001-02.

4.1.3.10 Implications of cropland scarcity in hills are manifold in the form of indicators of unsustainability of hill agriculture in respect of land resources, production and livelihood (Table 7). The unsustainability indicators are in fact hidden responses of farmers to the lack of access to cropland of adequate size and quality. The state of croplands in the hill region and its impact on the food insecurity and continuing poverty paint a grim picture for sustainable hill agriculture. The key issues that emerge are,
shrinking size of land holdings, erosion from sloping farmlands and decline in soil fertility and, above all, strengthening of the nexus cycle of inadequate food production-food insecurity-poverty-resource degradation. It highlights the fact that unless solution is found to cropland scarcity, agriculture as a source of sustenance for the small and marginal farmers may lose its significance.

4.1.3.11 All across the Himalayas, declining size of landholdings has seen virtual invasion of farming communities on the non-farm CPR land, wasteland, rangeland, forest areas etc. for conversion into cropland. Many areas, particularly Uttaranchal, are witnessing increasing out-migration of males. It has created a unique situation in which sizable percentage of women are today heading farming households and economy of these households is at best known as money order economy. Thus, the already leading role of women in hill agriculture is further enhanced. Further, the outmigration of males beyond a certain proportion may be detrimental to hill agricultural economy in the long run and should be checked by creating in situ employment opportunities for them.

4.1.3.12 Several hill States present success stories of agricultural diversification through fruit and vegetable farming which have helped improve the livelihoods of small and marginal farmers. The diversification is, however, already facing second generation problems and the challenge of sustaining and widening benefits of hill agricultural diversification is beset with range of new problems such as:

- Large proportion of marginal farmers are yet to benefit from agricultural diversification
- Cash crop farming is facing pricing, marketing and sustainability problems
- New generation of farmers, the educated unemployed youths, are keen to explore entrepreneurship opportunities, but not with much success. (Millions of educated unemployed youth across the Himalayan States, mostly from the farming families are waiting for jobs. Even though many of these educated unemployed youth have acquired traditional knowledge of farming from their families, they need to be equipped with necessary knowledge and skill in farming, entrepreneurship and agribusiness).
• Unexplored comparative advantages of hill agriculture
• Constrained livelihoods because of biological degradation of support lands – the waste lands
• The hill and mountain farmers lack appreciation of climate change, and
• Weak mountain agricultural research and extension support services.

Table 7: Indicators of unsustainability of hill farming and livelihoods
(Time Frame 1954-1991 = 37 Years Approx.)

<table>
<thead>
<tr>
<th>Indicators Reflecting Problems Relating to Resource Base / Production Flow and Resource Management</th>
<th>Range of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Soil Erosion Rates on Sloping Lands</td>
<td>+20 to 30 %</td>
</tr>
<tr>
<td>4. Abandonment of Agricultural Land due to decline in soil fertility</td>
<td>+3 to 11%</td>
</tr>
<tr>
<td>5. Appearance of Stones / Rocks on Cultivated Land</td>
<td>+130 to 100 %</td>
</tr>
<tr>
<td>6. Size of Livestock Holding per Family (LSU)</td>
<td>-20 to 55%</td>
</tr>
<tr>
<td>7. Area of Farmland per Household</td>
<td>-30 to 10%</td>
</tr>
<tr>
<td>8. Forest Area</td>
<td>-15 to 85%</td>
</tr>
<tr>
<td>9. Pasture/ Grazing Area</td>
<td>-25 to 90%</td>
</tr>
<tr>
<td>10. Good Vegetative Cover on Common Property Land</td>
<td>-25 to 30 %</td>
</tr>
<tr>
<td>11. Fragmentation of Household Farmland (in number of parcels)</td>
<td>+20 to 30 %</td>
</tr>
<tr>
<td>12. Size of Land Parcels of Families</td>
<td>-20 to 30 %</td>
</tr>
<tr>
<td>13. Distance between Farmland Parcel and Home</td>
<td>+25 to 60%</td>
</tr>
<tr>
<td>14. Food grain Production and Self- Sufficiency</td>
<td>-30 to 60%</td>
</tr>
<tr>
<td>15. Permanent Out migration of Families</td>
<td>None to 5%</td>
</tr>
<tr>
<td>16. Seasonal Migration</td>
<td>High to High</td>
</tr>
<tr>
<td>17. Conversion of Irrigated Land into dry land farming due to water scarcity</td>
<td>+7 to 15 %</td>
</tr>
<tr>
<td>18. Average Crop Yields on Sloping Lands</td>
<td>-9 to 15%</td>
</tr>
<tr>
<td>a. Maize and Wheat</td>
<td>-10 to 72%</td>
</tr>
<tr>
<td>b. Millets</td>
<td></td>
</tr>
<tr>
<td>19. New Land Under Cultivation</td>
<td>+5 to 15%</td>
</tr>
<tr>
<td>20. Human Population</td>
<td>+60 to 65%</td>
</tr>
<tr>
<td>21. Application of Compost (organic manure)</td>
<td>-25 to 35%</td>
</tr>
<tr>
<td>22. Labour Demand for Falling Productivity</td>
<td>+35 to 40%</td>
</tr>
<tr>
<td>23. Forestry Farming Linkages</td>
<td>Weak to Weak</td>
</tr>
<tr>
<td>24. Food grain Purchases from Shops</td>
<td>+30 to 50 %</td>
</tr>
<tr>
<td>25. External Inputs’ needs for Crop Production</td>
<td>High to Medium</td>
</tr>
<tr>
<td>26. Fuel wood Fodder Scarcity in terms of time spent in collection</td>
<td>+45 to 200%</td>
</tr>
<tr>
<td>27. Fodder Supply from</td>
<td></td>
</tr>
<tr>
<td>a. Common Land</td>
<td>-60 to 85%</td>
</tr>
<tr>
<td>b. Private Land</td>
<td>+130 to 150%</td>
</tr>
<tr>
<td>28. Emphasis on Monocropping</td>
<td>High to High</td>
</tr>
<tr>
<td>29. Steep Slope Cultivation (above 30 %)</td>
<td>+10 to 15%</td>
</tr>
<tr>
<td>30. Weed and Crop Herbaceous Products’ used as Fuel wood</td>
<td>+200 to 230 %</td>
</tr>
<tr>
<td>31. Conversion of Marginal Land into Cultivation</td>
<td>+15 to 40%</td>
</tr>
<tr>
<td>32. Fallow Periods</td>
<td>From 6 to 3 months</td>
</tr>
</tbody>
</table>

Note: A positive sign (+) means increase and negative sign (-) means decline/ decrease
4.1.4.0 Opportunities in Hill Agriculture: Transforming the Vast Marginal Hill Lands into the Lands of Opportunities

4.1.4.1 Hill agriculture and the Himalayan areas have specific advantages that can be harnessed to good effect, in particular the wide diversity and the presence of niches particularly suited to certain crops e.g. apples in Himachal and saffron in Soppore Valley of Kashmir, pashmina goats and yak in the highlands of Ladakh or mithun in Arunachal Pradesh. It offers hope to develop these comparative advantages, promote investment in such niche areas as part of the efforts to improve farm economy in sustainable ways.

4.1.4.2 Apple farming on marginal farmlands in Himachal Pradesh, cardamom plantations in the forests as well as conversion of sloping farmlands into forests for planting cardamom, and afforestation of barren land with seabuckthorn in Ladakh and China, constitute the technological options which reflect better understanding of niche perspective — the real niches consider use of local biodiversity as priority. In these examples, marginal land was adopted as a given condition and agricultural development options were searched accordingly. The commonalities among these examples are productive use of marginal farmlands, support for land, soil and water management and harnessing of specific niches.

4.1.4.3 The three examples convey a message that marginal lands are not constraints to productivity if appropriate technological choices are made. Marginal lands have specific niches(comparative advantages). A proper understanding of the niches can provide clue to the potentials of marginal lands under given agro ecological environment. The three production systems use perennial plantations of different types with equal advantage - be it modern varieties of apples or a farmer domesticated perennial spice cardamom or a wild thorny shrub - seabuckthorn. All the three production systems aim at combining economic sustainability with ecological stability of the landscape and local environment.

4.1.4.4 Cardamom farming highlights two points, one is that local biodiversity can be a good source of niche based crops for marginal lands. The perspective behind the marginal
land crops is that these are the plant resources adapted to edaphic and climatic conditions of marginal lands. These may not be the crops coming from experimental stations of research institutions but local plants whose economic potentials have been determined by the market or industry. Seabuckthorn story provides insights to technological scope for combining soil and water conservation efforts on marginal and fragile land with food security and poverty alleviation. Seabuckthorn case is a unique example, which explains that forestry systems can be designed in such a way that while serving the purpose of good forests they can also provide benefits of horticulture plantation to local people. Seabuckthorn initiative also explains how forests can be made to serve as fruit tree farm in terms of offering livelihood opportunities.

4.1.4.5 The experiences described above add a new dimension to the thinking process about linking marginal land management to improving livelihoods. The trends unfolded by these case examples define a role for biodiversity/agro biodiversity in enhancing use value of marginal lands for sustainable hill development strategies. The core message of the three technological successes is that a change in the development thinking from “considering marginal hill lands as constraints to livelihood opportunities and poverty alleviation to that of lands of opportunities” is bound to synergise ecological and economic gains in hill agriculture leading to sustained livelihood security of the hill people.

4.1.4.6 A few other promising trends have emerged in recent years which should be consolidated to achieve the ultimate goal of happy hill farming families. For instance, in the NER, out of the total area of 2.2 million ha of Jhum lands, about 17.5% is cultivated at any one point of time, involving about 4.5 lakh Jhumia families. Of late, with increasing awareness of disadvantages of shifting cultivation, the farmers in certain areas have started adopting settled cultivation. Some of the pilot projects like (a) Permanent settlement of Jhum cultivation through development of plantation crops in Karbi Anglong and N.C.Hills of Assam, (b) Providing 2.0 ha of terraced land to Jhumia families along with inputs and financial help for settled cultivation in Meghalaya, (c) Land reclamation and provision of production inputs for horticulture and cash crops in Mizoram, and (d)
Encouragement for terrace cultivation in Nagaland and others are already showing some positive impact towards settled cultivation.

4.1.4.7 Also, emergence of a trend of land concentration in the hands of a few and privatisation of land holdings have been reported from some areas. In the name of tribals, some ‘smart’ tribals are cornering community lands in their personal names. Such pitfalls should be warded off. Presently, the valley lands, terrace lands, homestead lands and short-fallows are being recognized as private lands for all practical purposes. In Assam, the State has proper land records, particularly in the plains, while in Manipur the entire valley has been covered under permanent ownership. The Land Reform Act, 1960 of Tripura is perhaps the most comprehensive one, in which (i) land ceiling, (ii) prevention of fragmentation of land, (iii) restrictions of land transfers from tribals to non-tribals, and (iv) non-eviction of share croppers in general have been covered.

4.1.4.8 Crop diversification and commercialization of agriculture are yet to emerge in economy scale, except in certain plantation (tea), spice (ginger, large cardamom) and tuber (potato) crops. As per estimates of the National Horticulture Board (2003), the NER produces 2.6 million tonnes of fruits from 0.287 million ha and 4.00 million tonnes of vegetables from another 0.38 million ha. Three plantation crops viz. tea, coffee and rubber cover 3.33 lakh ha area. Rubber with an area coverage of about 45 thousand ha and coffee with about 10 thousand ha are recent introductions, thanks to the efforts of respective Commodity Boards. Small scale cultivation of tea in Assam spreading over 40 thousand ha is a new innovation integrating small landholders in tea production system. Rubber with an area of over 25 thousand ha is already a source of revenue to the State economy of Tripura. Tea, Coffee and Rubber Boards have planned a number of schemes to promote these crops under small-holder sector.

4.1.4.9 Hills and mountains of varying altitudes and temperature regimes provide excellent niches for production of quality seeds of temperate and sub-tropical vegetables. Women Self Help Groups for vegetable seed production in the hills should be formed, trained and empowered to undertake commercial production and distribution of vegetables seeds. Leading seed companies, which could provide backward linkages
with technologies and inputs and forward linkages with processing, packaging and marketing, should join hands with the producer groups under a transparent contract farming arrangement. NABARD and other financial institutions should particularly be interested in promoting such initiatives.

4.1.4.10 Himalayas are great reservoirs of biodiversity. For instance, the NER is considered as the Centre of Origin of certain species of mango, citrus and banana. Many wild species and primitive land forms of tropical vegetables like cucumber, brinjal, gourds, beans and bhindi are available in the region. Rich genetic diversity has also been reported for crops like yams (Dioscorea spp.), ginger, medicinal and aromatic plants like Aconitum, Penax, Terminalias, Cymbopogon, Cinnamomum etc. A large number of ornamentals and flowers are found to grow in wild and semi-wild conditions and about 600 species of orchids are flourishing in the region. The cold deserts of NW States also possess unique biodiversity of livestock (Yak), cold fishes, temperate fruits, medicinal plants and microbes, which is largely underexploited.

4.1.4.11 Most of the indigenous species of different horticultural crops have not been exploited fully. Certain polyembryonic mango types have been reported from Manipur and Tripura but no serious effort has been made for their use. Seeded banana has been domesticated and consumed locally. Some of them have high baby food value. In citrus, ‘Assam Lemon’, a lemon-citron type, is grown largely but the Satkara (C. macropertera), ginger flavoured ‘Adajamir’. (Cassamsensis- Dutta and Bhatta), ‘Soh-Jew’ (a probable sour mutant of C. limettoiodes) and the acidulously sweet citrus types like Soh – Nairiang and Soh-bitara of Meghalaya and Tasi of Arunachal Pardesh are enjoying only very limited commercial value. They need to be exploited more both for table as well as processing purposes.

4.1.4.12 Several indigenous vegetables, not common in other parts of the country, are consumed locally by the tribals. Tree-bean (Parkia roxburgi), known locally as ‘young chak’ is in good demand in Manipur, while the tribals of Tripura grow a species of Vigna (V.uexilata) for edible pods and tubers. Winged bean (Psophocarpus tetragonolobus) are liked in Mizoram, Nagaland and Manipur, while the roots of a
tropical legume (*Flemingia vestita*) known as ‘Soh-Phlang’ is often consumed by the Khasis in raw forms. Medicinal plants like *Rauvolfia serpentina*, *Solanum rhasianum*, *Dioscorea prazeri*, *Coptis teeta* are widely available in the region but not fully exploited commercially. Orchids as medicinal agents have been used by the tribals of the region and in the Khasi and Jaintia hills of Meghalaya alone about 50 species of orchids are reported to be used for different ailments. The crushed leaves of *Cymbodium giganteum* is used for clotting of blood, while the juice of *Vanda coerulea* flower is used as eyedrop for cure of glaucoma. **The wisdom and long experience of local tribals have hardly been gainfully used and not much has been done to refine the indigenous knowledge through scientific experimentations, let alone the poor documentation of the indigenous and traditional knowledge.**

4.1.4.13 The perennial horticulture and plantation crops are high value crops and help in checking soil degradation in the hill slopes. Soils of hills and mountains being rich in organic matter and certain other plant nutrients, some horticultural and plantation crops can be grown organically with minimal use of chemicals. The programme to produce organic tea in certain areas may help add further value to the produce and prove to be economically more remunerative.

4.1.4.14 The North East Hill region has unique advantage of geographic proximity to South and South – East Asian markets like Bangladesh, Maynmar, Nepal, Bhutan, Singapore, China and Thailand. The proposed “The India – Thailand Highway” through Myanmar will enhance sub-regional co-operation and the large markets of S.E.Asia will be much closer to NER. **Cross-border integration through promotion of conducive market oriented agriculture must be aimed.** This calls for definite plan and strategy for development including programme prioritization, integration and implementation.

4.14.15 The creation of the Ministry of Development in North Eastern Region signifies the commitment of the Government of India to accelerate the pace of socio-economic development of the region. As per the work allocation of the Ministry, the North Eastern Council (NER) and North Eastern Regional Agricultural Marketing Corporation Limited (NERAMC) are directly involved in activities related to agriculture
development in the region. In addition, other nodal Departments of Ministries of Agriculture, Commerce and Food Processing Industries are directly involved in promoting agriculture through developing and funding various projects. The technology mission for integrated development of horticulture in the NER is one such plan programme of DAC of MOA in the recent past. A significant amount is already assured by earmarking 10 percent of the Plan Outlay of the Central Government. Notwithstanding the substantial support of the Central Government to the North East and to Jammu and Kashmir in the North West Himalayas, often for obvious political reasons, **the States have generally failed to plan systematically and allocate necessary financial and other resources to agriculture and rural development from their own exchequer.** The paucity of adequately trained human resources is further aggravated by the prevalent non judicious deployment of the resources. It all boils down to the issues related to transparent governance ensuring rational investment in development and timely flow of adequate funds and other resources to the action site without transmission loss.

4.1.4.16 The NABARD has developed a special package for the North East, both for production credit and investment credit, including concessional rate of interest and higher allowance for refinance (upto 25 % of NPA as against 15 % in the country as a whole and for thrust areas even 100 % refinance allowed). NABARD’s current activities cover many items such as CAT (Capacity building for Adoption of Technology), SHG programmes, Organic farming etc. which are highly relevant for NER. Similar packages are available for the individual NWR States.

4.1.4.17 For Assam, the Regional office, NABARD has formulated model bankable schemes on Patchouli, Safed Musli, vermi compost, Jatropha biodiesel plantation and others. It has also proposed organization of SHGs for hill people. The roles of VDBs in the hill districts in identification of borrowers and recovery of loans have been emphasized by NABARD, since VDBs have considerable influence over the villagers. Earlier NABARD had tried to channelise credit for rehabilitation of Jhum lands in Mizoram through Teak Plantation Forestry but did not succeed due to non-availability of land records. Credit deposit ratio is generally low in the NER and credit outcome need to be measured, for which NABARD should institute studies through its R &D sector.
4.1.4.18 The North Eastern Development Finance Corporation Limited (NEDFi), a premier financial institution of the country, also helps in development of agriculture in NER. It has micro-finance schemes for providing financial assistance to NGOs and SHGs. Similarly, North East Equity Fund (NEEF) has also been created to help first-generation entrepreneurs. NEDFi has taken up initiatives in promoting medicinal and aromatic plants in NER. Due to NEDFi support, Patchouli cultivation has spread over 1800 acres. It has so far financed 222 projects in agriculture and allied sectors with an estimated project cost over Rs. 26 crore. Under micro-finance, it has supported almost 25 NGOs and over 2000 SGHs. NEDFi’s future programmes cover financing contract farming and rural micro-enterprise development.

4.1.4.19 APEDA is providing airfreight subsidy for transportation of horticultural commodities from any State of NER to Kolkata. For floriculture crops, the freight subsidy is even upto 90 % of the fare. All other APEDAs export promotional schemes are equally applicable for the NER. APEDA has already developed ‘Agri-Export Zone for Orchids’ in Sikkim, in which all concessional provisions are available.

4.1.4.20 NEC provides project finances to NGOs and SHGs to promote floriculture sector, while to develop high quality commercial horticultural farms the promoters may avail credit linked back ended subsidy from National Horticulture Board (NHB) @ 20 % of the total project cost with a maximum limit of Rs.30.0 lakh per project. United Bank of India (UBI) is mainly financing tea gardens and has special schemes for transport subsidy upto Kolkata. The State Bank of India (SBI) targets to cover one lakh families in NER and considers SHGs as a preferred way for bank credit flow as the risk is comparatively low. SBI has provided financial support for passion fruit cultivation and for floriculture (Anthurium) projects in Nagaland. Further, it is contemplating to provide support to apple and Kiwi cultivation in Arunachal Pradesh.
4.1.5.0 Pathways for an Agriculture-led Sustained Prosperity, Peace and Happiness of Hill People

4.1.5.1 The Green revolution has failed to climb the Himalayan heights and agriculture in Indian hills has, by and large, remained at subsistence level. Majority of the hill States have relatively high concentration of poor and malnourished people. This is ascribed mainly to wrong policies, scarcity of cultivated land, increasing demographic pressure and poor access to technology, credit, market and infrastructure. Immediate measures are required to address these constraints towards sustainably improving livelihood security of hill people and for arresting and bridging the widening socio-economic gaps between the “lowlands” and the “uplands.”

Call for a Major Paradigm Shift towards Knowledge-based Development of Hill Agriculture and Hill People

4.1.5.2 Much of the development efforts made in the hills in the past were based on poor understanding of the hill/mountain conditions, resources, environment and the socio-cultural settings of the people. The mainstream thinking was dominated by the degraded marginal sloping lands, biases against hill farming, marginal land based limitations, forest conservation as priority and the like. The hillside development policies focusing on forest cover through regulation had excluded local users across a wide range of ecological and socio-economic regimes. Many of these perceptions were perhaps unfounded. To put the things in right perspective, our overriding recommendation is to undertake fresh interdisciplinary studies on the Himalayas to generate new data and information about the state of the development process to guide the new efforts on improving livelihoods of hill farmers.

4.1.5.3 The sustainability prospects for mountain agriculture remain bleak unless the mainstream perceptions about the problems are changed. While the development thinking in the hills views marginal mountain lands as a constraint, for the hill farmers marginal lands are a given condition and diversified livelihood options have been evolved to capture the niches and comparative advantages of available natural resources, namely, mixed farming, nomadism, swidden farming, ecotourism, etc.
4.1.5.4 Farming alone is unable to meet the food and livelihood needs of the families inhabiting hills; therefore they employ multiple livelihood strategies through diversification of household activities. However, these options are also giving diminishing returns and hill farmers are looking for new alternatives. **Unemployment is widespread particularly across the Himalayan States—large force of educated unemployed rural youth from farming families is waiting for opportunities.** On the one hand, demographic pressure on cultivated land is increasing, rendering the already small holdings still more fragmented, uneconomical and unsustainable. Through educating and sensitizing people, **while population growth rate must be reduced, off-farm and non-farm employment opportunities must be created to reduce the pressure.** Off-farm employment should be a major policy element, especially for retaining the young educated masses in rural areas.

4.1.5.5 The development of sustainable hill agriculture systems requires that development planning processes follow certain guiding principles. **The best model of hill area development is to have its sustainability embedded in ecological protection, cultural heritage and human development,** encompassing the following guidelines:

- **Recognize diversity of land, water and bioresource use opportunities**
- Identify and harness location-specific niches
- Hills are less suited for uni-dimensional land use, but more suited to multiple strategies that consider unique characters of smaller sites within the whole landscape; ensuring a balanced relationship between people and land resources
- Productivity is not only based in the biophysical characteristics of hill lands, but also depends on the socio-economic parameters and cultural milieu of a hill environment
- Marginality of mountain and hilly areas is not a static concept, it is a dynamic process; technologies may be known but the other necessary incentives, institutions, or inputs may be missing and need to be dynamically adjusted.

4.1.5.6 It must be stated that much of the woes of hill farmers, apart from poor access to resources, are due to inappropriate technological research and extension interventions.
Only if we take bold steps to restructure and reform agricultural research and technology efforts to bring them in line with the needs of hill farmers—most of the woes of hill farmers would have been solved. **No amount of policy reforms and enhanced plan allocations and investment will make much difference unless right technological pool of options is offered to farmers.** Let it be said that hill farming has added to degradation of water and land only in areas where new technologies were introduced and adopted in a straight-jacketed fashion. Indian agricultural institutions fall much behind in perceptions of hill farming — the integrated approach, planning technological research that is need-based and in providing technological options which are both ecologically and economically desirable. There is in fact little ecology in agricultural science of India today and this gap has shown adverse effect in more marginal areas. **Ecotechnologies for alleviation of ecological poverty and hunger should particularly be emphasized for agriculture-led development of hill people and agro-ecology should be emphasized particularly in the hill agricultural universities’ curricula.**

**New Policy on Hill Agriculture**

4.1.5.7 At the national level there is need to adopt a differentiated approach to hill area development. Hill areas agricultural development objectives in particular and overall hill area development in general are definitely different from plains area goals. The strategic national needs from hills are both products and services. Services are largely relating to conservation of physical resources in the national interest and there is little appreciation of the humanware. The present policy and planning perspective has a major drawback in the sense that there is no recognition of the fact that hill people play important role in providing ecological services to the nation – conserving land, water and most important biodiversity. **There has to be a national policy on compensating citizens for their ecological services they provide to the civic society.** Tools are now available to calculate the economics of ecological services offered by a community, a regional government and state government or even by a farmer. WTO also supports this strategy of compensation and that is what Switzerland and European Union is doing under its new agricultural policy. The new EU policy frame supports compensation for farmers who
contribute to maintain ecological balance through good agricultural practices, keeping land water and air clean.

4.1.5.8 Keeping in view the unique and special agro-ecological and socio-economic settings and recognizing that hill agriculture has not benefited to the desired extent from the various technological and developmental efforts, the National Policy on Agriculture should have a special parallel, yet integrated, window on hill agriculture so that commensurate strategies, programmes and activities for hill agriculture production, research, technology development, extension, human resources and product development and marketing geared towards socio-economic and agro ecological synergy leading to well being and happiness of hill farmers could be established. Mountain-specific agriculture-led developmental approach should be the main point of hill States’ relationship with the Government of India.

4.1.5.9 The Consultations held in the NER (Shillong) and NWR (Shimla), as also in New Delhi, emphasizing the various issues and opportunities discussed above, strongly recommended formulation of a sustainable hill agriculture and mountain development policy at the national level in which central role of agriculture is duly elaborated and harmonized with environmental and livelihood security. While efficiencies of the various programmes such as the Western Ghats Development, Eastern Ghats Development, Deccan Plateau Development as well as the Ministry of DONER, etc. should be enhanced, their outcome could be synergised by creating a National Programme on Hill and Mountain Agro-Ecosystem to coordinate all the concerned programmes of the Government of India. The Coordination Mechanism should preferably be housed in the office of the Prime Minister, with close linkages and interactions with the Ministry of Agriculture, Ministry of Development of the North East Region, Ministry of Environment and Forests, Ministry of Rural Development as well as with the National Development Council. The various existing funding and financing mechanisms such as NABARD, NEDFi, NERC, etc. should be coordinated and synergized and their scope expanded under this umbrella as a National Hill and Mountain Agro-Ecosystem and Livelihood Development Fund.
4.1.5.10 The interdependency and synergy between all sectors of agriculture *viz.* crops, horticulture, livestock, fisheries, forestry and the associated natural resources should be strengthened. One cannot be excluded by the other. Explicit policies on rights of tribal people on forests and forest lands should be formulated. In doing so, the positive role of the forest dwellers in forest and ecosystem conservation, such as the Chipko Movement, should not be ignored.

4.1.5.11 Given the poor accessibility, necessary structural and management changes should be effected towards sustained self-reliance of hill villages to attain true Gram Swaraj of Mahatma Gandhi. Policy changes are equally needed in the management of wild life and tree harvesting, agro-forestry and utilization of non-timber forest produce. The policy statement should explicitly mention that socio economic and cultural milieu and indigenous knowledge of hill people should constitute the basic fabric of the efforts towards sustainable livelihood security of hill people.

4.1.5.12 More secure land rights may be one of the necessary preconditions to stimulate investments among farmers. The rights must equally be granted also to women farmers who often shoulder the bulk of the agricultural work. An enabling policy environment is essential in order to recognize and to strengthen potential developed at the grassroots’ level and to encourage people-based initiatives in different areas. Changes are needed in law where it denies access to and use of sloping land resources that are basic to the livelihoods of local people. Shifting cultivators and agro-pastoral communities need that attention more than any one else.

4.1.5.13 Investments and capital formation in agriculture are at an all-time low, adversely affecting agricultural growth and development. The situation is particularly unsatisfactory in most hill States, especially in view of high costs of provisions of infrastructure and services inherently associated with hill regions. Policy to ensure additional investments in research for creating necessary infrastructure and also technology development is required to create a basket of choices of suitable production systems capturing every niche and for strengthening livelihood security. The concerned
State Governments must enhance their investments in improving and sustaining the agro-ecosystems.

4.1.5.14 Explicit policies are called for utilization of fallow, degraded wastelands and deforested areas and for promotion of PPP in judicious equitable and sustained use of these resources. Policy guidance on Jhuming will need to be made much more farmer friendly. Land tenureship and right issues should be sorted out as soon as possible.

4.1.5.15 The New Policy on Hill Agro-Ecosystem and Mountain Development should capture commonalities and comparative advantages, synergy and scale of economy options and geo-political consideration. In this context, we may look east and learn from Japanese and South Korean experiences on strengthening hill agriculture. Japan’s new policy on agriculture “considers declining hill agriculture as a national loss”. The thrust of the new policy and the newly enacted Mountain Village Development Act is on reversing the trend of declining mountain farming communities and conserving hill agriculture, rather than forests (Box 4). Likewise, the South Korean Marginal Land Improvement Programme (MALIP) for hilly and mountain areas under its Farmland Law emphasizes the necessity of both ecological and economic considerations (Box 5).

Food, Nutrition and Income Security

4.1.5.16 The hill regions are characterized by small and marginal holdings and resource-poor farm families. Employment security is also poor. The smaller the farm, the greater is the need for marketable surplus, so that the farm family will have some cash income. Therefore, accelerated progress in enhancing the productivity, profitability and sustainability of the major farming systems is the best safetynet against hunger and poverty. The major objectives of the agricultural strategies in the hills should be nutrition security of every child, woman and man, income security of farm families and enhancement of ecological foundations.
Box 4

The mountain people and policies in Japan

Japan has over 68% of its total area as hilly area, which 30 per cent contained of the cropland of the nation. After decades of neglect and biased against hills, agriculture and people inhabiting the hills faced uncertain future. Hill agriculture in Japan faced difficulties of social nature. Alarming rate of households were abandoning hill farmland and over 3.8 per cent of the nation’s farming area was abandoned by 1998. As a result, hill-farming communities of Japan faced problem of extinction due to decrease in agriculture and increase in forest area, depopulation and aging of residents. As industrial growth offered ample job opportunities for younger generation of hill farmers, they seemed no longer interested to continue farming their family land.

The factors responsible for declining hill farming in Japan included: decline in the number of farmers and their advanced age; concerns over future prospects of liberalized agriculture trade; decline in job opportunities; delay in social capital infrastructure development; small land parcels making mechanization difficult; intricate topography and small size of land holdings; lack of adequate access roads limiting use of farm machines; higher costs of land grading, irrigation etc. The implications of the rising rate of abandoned farming included increasing national food insecurity; loss of crop resources; and loss of indigenous knowledge of hill farming, threatening Japan’s long term national food security interests and posing the question as to, who will know how to farm the hill lands tomorrow?

Having realized the gravity of the situation, Japan made a turn around. Today, “as a matter of new policy, Japan considers declining hill agriculture scenario as a national loss.” It is making serious efforts to reverse this trend. The Depopulated Areas Emergency Act and the Mountain Villages Development Act have been put into effect for conserving hill agriculture, rather than forests. The policy aims to realize balanced development of industry through improving the environment, social welfare and traditional agriculture. To support niches based high value farming and income generating options for the hill farming communities R&D support is focusing on: vegetable farming and floriculture with special highland products; animal husbandry on grasslands; labour intensive organic farming; developing forestry; micro enterprises development – food processing etc adding value to the local farm produce; changing tourism development approach to build stronger tourism-farming linkages “farming for tourism”. The Shikoku National Agricultural Research Station has been mandated to focus its research on “slope land agriculture”. The thrust has been on reversing the trend of declining mountain farming communities and conserving hill agriculture.
Korea has 66 per cent of its total area as hill areas which contain 33 per cent of the farmland of the nation. Korea has been promoting the policy of “Agricultural Promotion Area (APA)”, which favoured only plain areas for agricultural investment priority. Hill agriculture falling under “Less Favoured Areas (LFA)” was thus neglected for investment. As a result, Korean farmers living in the hills found it harder to survive under poor production conditions. The quality of life in the hills was certainly lower than that in cities, encouraging younger generation of farming families to leave farming and farmland for jobs and better livelihoods in the cities. The hardship of upland farmers was further compounded by the shortage of farm labour because of job-induced migration of young upland folks to urban areas. It was a key factor that contributed to accelerated abandonment of agriculture and farmland in the Korean uplands. As an example, in 1993 alone over 66,500 hectares of cropland was abandoned, which was 3.2% of the country’s total cropland. By this rate nearly half a million hectares of cropland in the hills would have become abandoned by the year 2000.

Korea made a shift in its policies, considering that even if hills are less productive, continuing farming on these lands may yield higher positive externality to society than favourable production condition areas. Higher the positive externality of these marginal areas, higher will be the price and percentage of tax payers “Willingness To Pay (WTP)”, so as to maintain farming in the marginal upland areas. The trend has encouraged the government to consider reshaping of the policy of agricultural promotion zone for investment and now it has included hill areas also in it. Thus, Korea has adopted a unique tax policy for city dwellers, called “Willingness to Pay” and uses the revenue generated for improving farming and livelihoods in the hills.

Farmland Law of 1994 and Rural Improvement Law of 1994 were other steps taken by the government. One of the more relevant programmes was – “the Marginal Land Improvement Programme (MALIP)” for hilly and mountain areas. It was two-dimensional. One, it was to improve the use of marginal upland as productive land; two, it was to promote use of marginal upland for other farm and non-farm purposes; such as, rural resorts, livestock farming, fruit farming, and industrial development. Further, a scheme for compensating mountain farmers through direct cash payment to continue farming their farmlands was also introduced. It had two key objectives, increase food supply and preserve traditional farming areas on hill landscapes.

The lessons of the Korean experience may be summed up by as when the agricultural policies and measures consider only economic values, they are not sustainable and future generations may suffer access to resource base. Therefore, the policies favouring direct and indirect support to maintain hill farming are necessitated by both ecological and economic considerations.”

4.1.5.17 A whole life cycle approach to the implementation of all nutrition support programmes should be introduced, and horizontal linkages should be established among numerous vertically structured programmes which are currently being
implemented. SHGs can be enabled to establish at least 500 Community Food Banks using locally grown grains as well as grains of under-utilized crops such as millets. Such SHGs should establish forward linkages with markets and backward linkages with Agricultural Universities and Research Institutions, so that they can become technically competitive and economically sustainable.

4.1.5.18 The Hill States should take full advantage of the National Employment Guarantee Scheme (NEGS) along with the Food for Work Programme (FWP) to achieve comprehensive food and nutrition security under the proposed National Food Guarantee Act. The NEGS must be used for creating productive assets and encourage capital formation. In order to achieve greater employment security, both skilled and unskilled employment should be promoted. Tourism, especially health, spiritual and adventure tourism, holds great promise in the hills and mountains and should be actively promoted. For ensuring convergence and synergy among various ongoing programmes, it will be useful to set up a Hill Farmers’ Council for Sustainable Food and Livelihood Security as a consultative and monitoring body on food and livelihood security which could be a part of the national alliance for elimination of hunger and poverty.

**Bridging Information Gaps on Key Indicators and Establishing Village Knowledge Centres**

4.1.5.19 Deploying latest GIS techniques, areas of hills/mountains, the existing land use patterns, including those of different gradients of slopes, under various categories of forests and degraded lands, and the like, should be measured and delineated as the highest priority. In the absence of up-to-date and accurate information on such vital aspects, policies, strategies, plans and programmes on hill development and on hill agriculture will be elusive and misleading. With the increasing population pressure on hill lands and hopefully with the prospects of rights of tribals to own at least the degraded forest lands (which may be helpful in checking further degradation), the stipulated information is a prerequisite for undertaking knowledge-based allocation and deployment of natural resources to the needy people. Public action is urgently needed to create task forces and research groups, involving major stakeholders, and to provide
necessary facilities to such groups to undertake participatory research to analyze the cause-effect relationships among the various agro-ecological factors and status of soil and water loss/erosion, overall environmental and ecological degradation and deforestation, etc. This work is urgently required to enable the country to correct and avoid the past “mistakes” and to formulate and implement **people-centric** policies and programmes. This will also help promote synergy and convergence among agriculture, forestry, ecology and economy.

4.1.5.20 Under the national movement for creating each village as a knowledge centre, and with the passage of the Bill on Right to Information, especially realizing the geographic isolation, inaccessibility, remoteness and poor connectivity in the hills and mountains, high priority should be given to the creation of Village Knowledge Centres (Chapter VIII in the First Report of the NCF). Contents of the information package, besides being dynamic, relevant and user-friendly, should have up-to-date information on markets, trade, prices, new technologies especially on organic agriculture, biodiversity management, traditional knowledge, medicinal and aromatic plants, and weather outlook and risk management. SHGs, especially WSHGs, and the rural youth should particularly be associated with this movement. The public sector and financial institutions should supplement necessary funding requirements, at least in early stages, and help develop human resources. The National Alliance for Rural Knowledge Centres, NABARD, the North Eastern Space Applications Centre and similar establishments in the North West Himalayas, such as the DRDO Centre in the Cold Arid Zone of Ladakh should work together for establishing Rural Knowledge Centres in the hills.

**Location-specific Planning and Monitoring**

4.1.5.21 Action plan to suit different physiographic and agro climatic zones should be drawn up. In the different regions, action plans should be based on the following five major agro climatic zones – Tropical, Sub-tropical, Temperate, Intermediate and Cold Arid. The objective of the Action Plan should be to maximize the benefits from the different agro-climatic endowments of the States and minimize hazards and risks. Also, a strategy should be designed to promote job-led economic growth through greater
attention to agro-processing and agribusiness. The Hill State’s comparative advantage lies in their ability to grow a wide range of fruits, nuts, ornamentals and specialty crops including olive, apricot, apple, walnut, kiwi fruit, avocado and medicinal plants. This advantage must be capitalized through creating specialized groups and adopting an end-to-end approach, linking production with marketing. Restructured Land Use Boards, matching agro-ecological, socio-economic and marketing capabilities and opportunities, should play an important role in advising the farmers about the prospects of different crops/varieties, livestock/breeds, etc.

4.1.5.22 **The State Governments should revitalize their Land Use Boards to play the much needed proactive advisory role.** It must be emphasised that land use decisions are also water use decisions. Therefore, in order to be able to provide an integrated advice, meteorological, ecological and marketing (domestic and export) factors would have to be considered simultaneously and interactively. Such a Board could be located in an Agricultural University and through a virtual college should give proactive advice on the choice of crops and farming systems, so as to achieve a match between demand and supply in farm commodities and to ensure that the most efficient crops are grown in different agro-climatic and agro-ecological regions.

4.1.5.23 The various Hill Area Development Programmes (HADP), including EGDP, WGDP and DPD, have met with varying successes in the different States. Lack of proper planning and judicious use of local resources have resulted in poor outcomes. The impact of the Programmes should be critically evaluated and reviewed to: (i) identify achievements and failures, clearly identifying the elements of successes and failures, (ii) suggest strategies and measures for wide adoption of the successful experiences and propose effective and easy-to-adopt evaluation and monitoring mechanisms and necessary remedial measures for avoiding the failures, (iii) undertake detailed agro-ecological and socio-economic studies in different agro-ecosystems and (iv) recommend policy framework and governance mechanism, including State-Centre coordination, flow of funds to the action site and accountability and increased commitment of the States for meeting the aspirations of the people of such disadvantaged areas. Since a large number
of schemes sponsored by Government of India are operational and funds from various sources are supposed to converge at the same action site, an institutional mechanism should be established or empowered, if not already existing, such as PRIs, to ensure synergy.

4.1.5.24 **Under the HADP, the level of satisfaction among the population with the pace of development is rather poor.** In view of the poor allocation of funds to these areas, the expenditure tends to be thinly spread without creating any serious impact in the ecology and environment of the area. **While the States must have the necessary flexibility to design programmes under the various special area development programmes, there is a need to prepare a perspective plan for these areas over a ten-year programme so that at least at the end of that period, these areas can be brought on par with the rest of the State.** On the implementation side, it is absolutely necessary to ensure people’s participation primarily through the Panchayati Raj institutions at the local level. The assistance of credible NGOs wherever available could be tapped. In the Western Ghat region, there is a need to plan and implement a comprehensive integrated watershed development programme in a time-bound fashion rather than continuing with the present practice of thinly allocating the available resources by taking up so many sporadic programmes in different sectors and areas of the region, as mentioned earlier.

4.1.5.25 Hill farmers in border areas are subjected to additional vagaries of war and tension. Under the Border Area Development Programme (BADP), Special Central Assistance is provided as 100% grant for execution of approved schemes in border blocks. Often, the works are implemented largely in the block headquarters. In order to ensure that the villages which are actually on the border benefit from this programme, a change in the spatial unit of the programme to border village Panchayats instead of the border blocks may have to be considered. To ensure that the schemes are not taken up every year on an *ad hoc* basis, there is a need to draw up a perspective plan for implementation under BADP, keeping in view the flow of funds under both the normal
State Plans and the BADP. The decision-making process also has to be decentralized by involving the representatives of the Panchayati Raj institutions at the appropriate level.

Jal Swaraj: Hydrological Balance and Water Security

4.1.5.26 The Himalayas, with snow cover varying from about 1 to 3 million km$^2$ and around 100,000 km$^2$ glacier cover, constitute the water towers of India. Recent model studies show that, without the present Himalayas, the temperature over Southern Asia would have been 12$^0$C higher and there would have been no Indian monsoon. Moreover, the glaciers melt water contributes 400 to 800 km$^3$/year water to Indus-Ganga-Brahmaputra river system - the life line of agricultural security of the country. With such a favourable hydrological regime, one would expect Himalayas and water basins of its rivers to be fully water-secure. But unfortunately, this is not the case; per capita water availability in the country is likely to go below the scarcity level by 2025.

4.1.5.27 The normal rainfall in the Himalayas varies from 900 mm in J&K to more than 3000 mm in Assam and Meghalaya. Although abundant, the rainfall is highly erratic both in time and space, and most of it falls in less than 100 hrs as a result of which less than 30 per cent is retained and the rest is lost as run off etc. Cherrapunjee, located in the State of Meghalaya, has the world’s highest average annual rainfall of over 11,000 mm. Paradoxically, this wettest place in the world experiences scarcity of drinking water in the summer months. This harsh reality highlights the most obvious need to conserve and harvest the rainwater.

4.1.5.28 Another limitation of the hill region is that the hill soils are shallow, thus prone to erosion. This does not permit higher retention of water by soil, leading to run off, siltation of dams and floods. Harvesting of rainfall becomes essential also for reducing the run off which also removes the nutrient enriched topsoil.

4.1.5.29 Against the backdrop of the huge water resources, less than 20 per cent of the cultivated area in the hills is irrigated, as compared to the national average of about 40 per cent. Hence, there is need and scope for increasing irrigated area in the hills for
enhancing productivity and income. **Hill water policy thus must emphasise the integration of farm level, watershed level, agro-ecological zone level and the national level water security.** In this context, we have to address two major interdependent issues towards achieving our jal swaraj (water self-reliance). The first one relates to the harvesting of rainwater, groundwater recharge and judicious and sustainable use of the water. The second one (of long-term consequences and implications) relates to the hydrological balance in the Himalayas as dictated by the snow and glacier regimes and the climate change.

4.1.5.30 As regards the first issue, there are several mutually reiterative approaches to address it. **One of the options is to create water harvesting structures.** It is proposed that water storage tanks of 15 cu m capacity with or without water delivery systems can easily bring one ha under irrigation. Perennial streams which are a major feature in these regions can be tapped to feed the tanks. The approximate cost of these structures are given in (Table 8). These tanks can best be used for gravity based pressurized drip/micro sprinkler systems.

**Table 8. Cost estimates of providing water using 15 cubic meter water harvesting structures with drip irrigation system**

<table>
<thead>
<tr>
<th>State</th>
<th>Cost of tanks of 15 cubic meter capacity without distribution @ 17000 per unit in Lakh Rupees</th>
<th>Cost of tanks of 15 cubic meter capacity with distribution system @ 45000 in Lakh Rupees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>5,648.4</td>
<td>1,4951.7</td>
</tr>
<tr>
<td>Assam</td>
<td>91,938.0</td>
<td>243,365.4</td>
</tr>
<tr>
<td>Manipur</td>
<td>4,753.2</td>
<td>12,582.0</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>8,160.0</td>
<td>21,600.0</td>
</tr>
<tr>
<td>Nagaland</td>
<td>8,857.2</td>
<td>23,445.5</td>
</tr>
<tr>
<td>Sikkim</td>
<td>3,223.2</td>
<td>8,532.0</td>
</tr>
<tr>
<td>Mizoram</td>
<td>3,095.4</td>
<td>8,193.6</td>
</tr>
<tr>
<td>Tripura</td>
<td>9,401.3</td>
<td>24,885.9</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>18,722.9</td>
<td>49,560.8</td>
</tr>
<tr>
<td>J &amp; K</td>
<td>24,875.9</td>
<td>65,848.1</td>
</tr>
<tr>
<td>Uttaranchal</td>
<td>26,970.2</td>
<td>71,391.62</td>
</tr>
</tbody>
</table>
4.1.5.31 Rain water harvesting in small lined farm ponds and the storage tanks need to be taken up more vigorously. The farmers must be educated and trained accordingly and should be provided with adequate need-based subsidy for the construction and maintenance of lined farm ponds and tanks. Another simple method of harvesting and utilizing rain water for domestic and agricultural purposes is the roof-top water harvesting, which should be made mandatory in already constructed as well as in the buildings to be constructed in future. Further, the State Governments must take necessary steps to improve the efficiency of the existing Lift Irrigation Schemes (LIS) and to extend it to new potential areas.

4.1.5.32 *Kuhl* (small gravity streams) irrigation is the age-old practice and the major irrigation system in hill states. For instance, it covers about 92% of the irrigated area in Himachal Pradesh. Specific measures to enhance the potential of the existing *kuhl* irrigation system need to be implemented. At site specific locations new *kuhl* structures are required to be laid to increase the area under irrigation. Varabandi (fixation of time) system of water distribution needs to be strictly taken up in the *kuhl* irrigation system, as the farmers at the tail end do not get their share of water while the farmers located at the head reach generally over-irrigate their fields. *Water User Associations*, with active involvement of PRIs, should be established to ensure equitable distribution and effective maintenance of the water system.

4.1.5.33 For the most judicious use of irrigation water, thrust has to be laid on pressurized irrigation systems, which would help not only in covering wider areas in the characteristic undulating farm lands, but will also increase the water use efficiency in crop production. It is proposed to cover 200,000 ha under micro-irrigation in the Himalayas during the next 7 years. Hilly regions are tailor-made for promotion of high value horticultural and plantation crops, and, as these crops are ideally suited for drip/micro- sprinkler systems, there is high complementarily between the hill cropping system and the micro-irrigation/ fertigation system. The hill States have generally failed to benefit from the GOIs programmes and financial supports to micro-irrigation.
Wherever adopted, the systems have not performed well due to faulty hardwares supplied under subsidy-supported programmes. This sluggishness and opaqueness should be remedied urgently. Strict quality control measures should be adhered to maintain the efficiency and credibility of the system.

4.1.5.34 Activities such as road construction, mining, tunnelling, building construction, deposition of spoil/debris, blasting etc., if taken up non-scientifically, change the hydrology of the region and generally disrupt the availability of natural water resources, such as springs, wells, nullahs, kuhls etc., besides damaging the environment. While taking up such activities the concerned Government agencies must interact and intervene (if required) considering the hydrological repercussions.

4.1.5.35 Special steps will have to be taken to rehabilitate hydrologic “hot spots” and water bodies like Dal and Wular lakes and in J&K. Low Water Parks should be established to demonstrate as to how to increase income per litre of water. There is scope for groundwater exploitation in the hill, but this is expensive. Low Water Parks involving both the cultivation of high value but low volume and low water requiring crops and the use of fertigation and micro-irrigation techniques will help foster water literacy, increase water use efficiency and save the precious water. The approach has to be a watershed plus system. Low cost greenhouses using fertigation techniques should be popularized. The National and State level bodies, especially the Land Use Boards, should render proactive advice to stakeholders on crop planning in accordance with meteorological and marketing factors.

4.1.5.36 The role of agricultural implements and machines in enhancing water and labour use efficiency has remained negligible, and this drawback needs to be urgently corrected. Fortunately, precipitation harvesting technologies have already been developed but need to be promoted with due consideration to the stability of slopes and erosion problems. Water harvesting and storage involving use of pond lining materials will also promote fisheries in the hills to further augment food, nutritional and employment security.
4.1.5.37 The declining ground water table is likely to become a serious issue in hills as well. To check the problem, appropriate groundwater recharge measures must be enforced by all stakeholders. The traditional systems of rain water harvesting, groundwater recharging and water use, such as the system of the Kohlis and the Phad irrigation systems of Maharashtra and the Korambu system of the Eastern Ghats, should be protected, popularized and further improved.

4.1.5.38 There must be nodal agencies at State and National levels to develop databases on water resource availability and utilization. **Water banks** should be established and operated in areas which are highly vulnerable to water shortages and stresses. Panchayats, SHGs, Water Associations should play the leading role in implementing this programme. The Village Knowledge Centres should be actively associated with increasing water literacy and in promotion of judicious conservation and utilization of the resource.

4.1.5.39 Human resource development will play a key role in implementation of the suggested measures and spreading the message of the importance and awareness of water conservation. Training courses for farmers as well as for personnel of various levels in the water management systems should be an important component of all water development programmes, including micro-irrigation. Interactions with the field workers can also help in identification of low-cost indigenous technologies already prevalent in the hills. Water harvesting is not only essential for agricultural usage alone, it is equally vital for meeting the domestic and industrial water requirement. These demands increase in greater proportions compared to agricultural requirements with increase in the pace of development of a region. Therefore, the water associations and bodies should have representation and active participation of wide range of CSOs, NGOs and other peoples’ organizations towards our goal to achieve and sustain full *jal swaraj*.

4.1.5.40 Turning to the big picture, it has now been conclusively established both through remote sensing and ground truth based investigations that **the glaciers and the snowfields in the Himalayas are on the decline**. The rate of retreat of the snout of
Gangotri glacier demonstrated a sharp rise in the 20th Century. Recently, it has been reported that the Parbati glacier has retreated by 578 metres between 1990 and 2001 (a retreat of 52 metres per year). Excessive melting of the glacier may have a short term impact of making more water available but it will reduce the river flow in the future thus adversely affecting the hydropower projects on the rivers fed by these glaciers. The sudden melting of glaciers can also lead to glacial lake outburst floods and flash flood tragedies as happened in the recent past. The hydrological balance in the hilly regions has a direct bearing on the water resources of the adjoining regions particularly the Indo-Gangetic Basin, having very far-reaching consequences on the nation’s food, economic and ecological security.

4.1.5.41 Global scientific interest in the study of Himalayan snow has been in progress for several years. Expedition mode researches are reported by several investigators, but a systematic scientific exploration of these vast snow and ice fields needs a committed approach. A National Centre on Glaciology should be established following ICU/UNESCO/WMO supported centres on glaciology at Colorado (USA), Moscow (Russia), Cambridge (UK), Zurich (Switzerland) for collection, storage and dissemination of information on status of seasonal/perennial snow and ice. The centre should undertake research on understanding the interaction amongst biological processes, physical environment and the climatic change and develop early, medium and long term warning systems to enable appropriate and timely responses at various levels. The centre, in collaboration with other similar centres, including those on climatology and climate change in the world, should in particular play a proactive role in advising trends of water availability and overall hydrological situation in the medium and long term to enable necessary adjustments in farming system and germplasm utilization.

4.1.5.42 Notwithstanding the centrality of the adoption of integrated water, watershed and farming development systems, the need for integrating uplands with lowlands and pursuing an integrated approach to river basin management can hardly be overemphasized. Such an integrated management system is the result of an iterative process (Figure 1). Under the integrated approach, the objective for the
management of the basin are initially formulated for both the lower and upper basin areas. These objectives should be based on local and national priorities, prevailing land uses and unique characteristic of each basin’s natural resources, thus linking the watershed and flood plain. Such an integrated approach will help not only enriching the natural watersheds and local hydrological endowments, but would also seek a rethinking on the proposed national plan of physically linking all the major rivers of the country.

Objectives are formulated for the management of the entire basin (watershed and floodplain) on the basis of local and national needs by means of intensive stakeholder consultation.

A plan for management of the basin is formulated on the basis of the objectives, the land-use and resource management needs of the area. This is done through intensive stakeholders participation.

The plan is implemented by all landowners and concerned stakeholders under the guidance of a management board supported by appropriate policy instruments and innovative financing.

Implementation of the plan is closely monitored to assess the impact of interventions and policies, if necessary, interventions can be adapted on the basis of the monitoring results.

The implementation of the plan is evaluated on a regular basis to ensure that the objectives are being achieved. If necessary, the objectives can be adjusted in light of new knowledge or a change in user needs.

**Figure 1: The Iterative Process of Integrated Basin Management**

4.1.5.43 Since 1970, several legal systems related to water in India were formulated, such as the Model Groundwater Bill, the Model (Water) Bill, Central Groundwater Authority, Central Groundwater Board and National Water Resource
Council. But, none of these have been effective. A recent study of the Indian Academy of Agricultural Sciences (NAAS) has highlighted the serious gaps in implementation of the various legal provisions and in creating necessary institutions for equitable and sustainable management of water. The Academy has made a set of recommendations to overcome the problems, which along with the recommendations in the above paragraphs 5.29 to 5.41 should be implemented by concerned quarters (Policy Paper 32: Emerging Issues in Water Management – the Question of Ownership, NAAS, June, 2005).

Strengthen the Role of Agricultural Machines and Implements

4.1.5.44 Drudgery in agricultural operations and transport (carrying head load and backload strapped to forehead) should not be acceptable in the modern society. Prevalence of under-nutrition and lung diseases in the hills further aggravates the situation. Hill agriculture is further handicapped due to the lack of adequate engineering and technological inputs. The difficult terrain and climatic conditions do not permit direct transplantation of technologies from the plains. Moreover, women are predominant labour force in hill agriculture. And as we know, ergonomically female workers are not the same as male workers. But, this is seldom considered while designing agricultural machines and implements, causing greater drudgery to women workers.

4.1.5.45 The mechanical power requirements for the hills cannot be met with the existing tractors and power tillers because of difficulties in negotiating the hilly terrains. Light weight power tillers have been envisaged to fulfill the needs. Central Institute of Agricultural Engineering, Bhopal has made an effort to develop a light weight power tiller indigenously and it is being tested. Industrial support to manufacture these light weight prime movers is required along with financial incentives to promote this and other similar power sources. These light weight prime movers could also facilitate the transport of agricultural inputs and produce, as well as for transporting other materials, which are presently being done manually as head loads, with serious health consequences.
There is a need to understand and characterize the hill anthropometrics and accordingly design suitable devices, tools and machines to reduce human drudgery. Ergonomic interventions are essential in hill ecosystems to facilitate faster absorption of engineering inputs in agricultural operations. This will permit not only better work efficiency but also improve human health as the occupational health hazards would have been considerably reduced. The youth in hill ecosystems needs to be sensitized and encouraged to acquire relevant skills to pursue the above-mentioned activities. The SAUs in the region need to orient their curricula to include the appropriate courses on engineering skills required for the hill region.

The land holdings in hill ecosystems are not only small, they are ecologically fragile. Soil and water erosion problems are widespread. To obviate these difficulties, Protective Cultivation Technologies in the form of green houses, low tunnels, mulches and geo-textiles have proved to be effective and even extend the growing seasons in the hills with significantly higher productivities. Greater emphasis needs to be placed to develop regionally differentiated protected cultivation technologies and then promote them on mass scale to create a long lasting impact on agriculture and society.

Post harvest loss reduction and value addition activities are more relevant in hill ecosystems than anywhere else. The difficult terrain and consequent lack of transport infrastructure demands that the agricultural produce is managed well and value addition activities are undertaken in the production catchments so that the transport related problems are minimized. At the same time, the farm incomes and rural employment are enhanced significantly. The development of appropriate post harvest technologies and promotion of agro processing activities are needed to be carried out. For this necessary machines could be imported and/or locally produced and widely popularized. Unit operations that are endemic to hill agriculture and agro-processing should be identified and internalized in research and development activities in the hills, including adaptive alterations in the available machines, tools and implements.
With the above backdrop, R & D institutional support for hill ecosystems should be considered critical. The early establishment of the College of Post Harvest Engineering in Sikkim under Central Agricultural University will go a long way in addressing the issues. This institution along with the Central Institute of Agricultural Engineering, Bhopal; Central Institute for Post Harvest Engineering and Technology, Ludhiana; ICAR Research Complex, Barapani and other existing ICAR units located in the hill ecosystems could be expected to provide the necessary R & D support. Besides, State Agricultural Universities located in hill ecosystems need to be strengthened in terms of appropriate human resource and infrastructure to undertake Agricultural Engineering related activities for the local conditions.

The state Governments need to have effective delivery mechanisms to translate the R&D outputs into outcomes. Specifically, it involves creating agricultural Engineering Directorates in the hill states to assimilate the technological developments and effectively translating them into action. Bases for manufacture, maintenance and supply of farm and agroprocessing equipment should be created in the hills. Networks of custom servicing and agro-service centres run by rural entrepreneurs and SHGs and duly supported by NABARD and other financial institutions should be established. An All India Coordinated ICAR Project on Mechanisation of Hill Agriculture should be launched. The agro processing activities undertaken by farmer and their dependents in the production catchments should be considered as part of agricultural activities, thereby, not inviting taxation.

**Correcting Soil Fertility Imbalances**

Upto 80 percent of soils sampled in the hills show medium to severe micronutrient deficiencies resulting in decline in the growth rate of total factor productivity and in increase of environmental pollution. This hidden soil hunger must be corrected through large-scale adoption of micronutrient supplementation of integrated plant nutrient management system based on soil test. Soil testing facilities should be established at strategic locations, including at KVKs, ATMAs and agriclinics.
and should be duly staffed and equipped to undertake timely and accurate soil testing (see First Report of the NCF). Soil health cards should be issued to the farmers to facilitate judicious adoption of recommended technologies and to monitor soil health. Communities’ Land Care Movement involving local people should be promoted by all stakeholders. The extension agents and farmers should be trained in IPNS and necessary life-saving-support should be provided to the farmers, the SHGs and local communities involved in conserving and judiciously utilizing the natural resources.

**Conservation and Enhancement of Biodiversity**

4.1.5.52 The National Bioresources Development Board, NBPRGR and other concerned organisations should help chronicle and prepare digital inventories of the bioresources of Hill States, covering plants, animals, fish and microorganisms. In addition, these should assist in the sustainable use of the germplasm of medicinal plants, ornamentals and olives, apricots, seabuckthorn, saffron, *kala jeera*, Pashmina goats and yak. Genome clubs should be organised in schools to promote genetic literacy among students. Hill’s unique biological wealth will have to be converted into economic wealth on a sustainable basis.

4.1.5.53 In several hilly areas commercialization of resources is confronting conservation plans. For these farming communities there is need to work out a package of compensation for rendering conservation services. As yet there has been no practice of compensating custodian hill farmers for maintaining the great hill agrobiodiversity. The PVPFR Bill, passed in 2001, should be implemented and hill communities should be empowered to realize the Farmers’ Rights.

4.1.5.54 Although commercialization of forest products can help mountain communities achieve sustainable livelihoods, sustainable use of these bio resources, should be ensured through appropriate institutional support and awareness raising. Panchayati Raj Institutions should be suitably strengthened to mobilize local communities to lead the conservation and utilization. Gene sanctuaries for selected species, using participatory, IK and TK and scientific approaches, should be established
and judiciously managed. The local communities should be a partner in the conservation process and duly compensated.

4.1.5.55 Hill farmers traditional practices unfold significant knowledge and information about the multiple roles of biodiversity and agro-biodiversity in using marginal lands productivity and livelihood security. The indigenous and traditional knowledge systems should be duly protected under the PPVFR. The Village Knowledge Centres should actively promote gene literacy.

Diversification for Enhanced and Congruent Economic, Employment and Ecological Security

4.1.5.56 The farming-based livelihoods in the Himalayas today present a landscape of scenarios, ranging from total diversification and better off farming communities to still continuing subsistence farming, poverty and extreme distress situations of unsustainable farming and livelihood conditions. Lessons of the experiences indicate that besides several other options, such as generating non-farm employment opportunities through infrastructure development for tourism etc, farming will remain the basis for alleviating poverty of the most distressed farming communities. Priority focus on most distressed class of hill farmers is emphasized to avoid further alienation and disparities which are becoming wider. Thus, the next round of hill agriculture diversification interventions (such as the horticulture mission) need to aim at new set of thrusts to synergistically integrate economics, employment and ecology over wide range of farming conditions by forging backward linkages to agrobiodiversity / biodiversity and local people and forward linkages with agroprocessing, agribusiness and marketing.

4.1.5.57 At national level there has been a general lack of recognition of the niches that hilly and mountain areas offer to increase income generation opportunities without any serious damage to environment. Therefore, there has been lack of appropriate policies to promote such activities. Much efforts are needed to identify the dormant niches of hill agriculture across the Himalayas. The production niches and biodiversity have potentials to convert marginal uplands and water bodies into productive production systems. There are areas in the Himalayan region that in fact have a significant potential
for research-driven productivity increases, and that the returns on investment in these areas may even surpass favoured areas in the plains. Agroforestry involving high value species such as *Arjun* trees for *Tasar* silk production, Jatropa and other fuel trees, oil-bearing trees and bushes, such as olives in J&K, nitrogen fixing fertilizer trees and other soil health enhancing trees should be promoted in so called degraded lands. Only proven genetically superior planting materials should be used for these plantations. Similar opportunities exist for livestock and fisheries, in solo and/or integrated crop-horticulture-agroforestry-livestock-fisheries farming systems.

4.1.5.58 **Horticulture-led transformation:** While there will not be any dispute on priority to horticulture, the choice of most appropriate crops should get priority attention. The Himalayan farmers will need a range of horticulture crops to be able to satisfy all kinds of needs, namely, agro-ecological niches, farmland types and socio-economic settings. The well known fruit crops i.e. apples, plums, peaches, pears, oranges, walnuts, kiwi, cherry, etc form one group of developed hybrid crops. In some States, however, there is high concentration of one or two fruit crops, which may not be advisable in the long run. For instance, in Himachal Pradesh, apple accounts for over 70 percent of the fruit production, although the apple yield and quality (of certain production systems) are not upto the mark, let alone the neglect of other equally or more promising fruit and even major food security crops. Several other States have also tried to replicate the Himachal’s experience but with less than desired outcome. Despite the increased population and distribution of domestic apples, in the post-WTO regime, import of apple from China, Australia and New Zealand is swelling fast because of superior quality and competitive prices. The various apple producing hill States should identify quality varieties most suited to their niches and their production peaks noncoinciding with the peaks in other States to ensure remunerative returns to the growers and prolonged availability of quality apple to the consumers.

4.1.5.59 The Himalayan farmlands and farmers also hold very special niches for other lesser known but native / indigenous horticulture crops, which if promoted will provide exclusive comparative advantage over markets and ecological suitability. Based on market research and agro-ecological mapping and matching, through inter-State
consultation, commercial production and distribution of selected priority species should be systematically undertaken by commodity-specific SHGs or SFEs or through contract farming. High value crops like saffron and *Kala Zeera*, with due R & D support, can prove much more remunerative. Besides the major temperate fruits like apple, pear, walnut, seabuckthorn in cold arid zone, cardamom in Sikkim, organic tea in SFEs of Assam, passion fruit in Mizoram, Sikkim, Nagaland and Arunachal Pradesh, ginger and turmeric in Meghalaya and Mizoram, deserve high priority. Considering profitability, low perishability and ecological compatibility, **greater attention should be paid to the production and marketing of fruit nuts** viz. walnut, pecan and hazelnut. Anthuriums and orchids, through group farming and marketing, could become major commercial enterprises in the Himalayas. The Land Use Boards, NHM and NHB and the proposed National Hill Coordinating Centre should play a proactive role in delineation of production regimes and promotion of marketing to create win-win situation for all the partners.

4.1.5.60 Diversification of hill farming to medicinal and aromatic plants has a distinct advantage, but has remained largely underexploited and unorganized. However, so far the opportunity remains locked up for the hill farmers in the institutional framework. Steps require revisiting sensitive issues of conservation, restricting rights to wild harvesting, removing restrictions on marketing of cultivated produce rather making farming more remunerative, and even enhancing access to land resources to particular ethnic communities. A separate **National Mission on Medicinal and Aromatic Plants (NMMAP)** should be established (see First Report and Chapter 4.5 of this Report).

4.1.5.61 Sustainable economic activities, proven technological interventions, timely institutional support and effective partnerships (public-private partnership) should fortify ecological – economic interactions and interdependence. Greater emphasis should be placed on strengthening the links between the producer, the industry and the consumer. Grassroot institutions, including SHGs and cooperatives, should be established and suitably empowered by financial assistance, information flow and skill development for strengthening production–post harvest handling–processing–value
addition--marketing chain. Good experiences of NDDB and sugarcane cooperatives in Maharashtra should be widely shared. Panchayati Raj Institutions should play a leading role especially in mobilizing community actions for conservation and improvement of natural resource base. SMEs should be supported, including through enhancing their access to adequate formal credit, to establish and effectively run agribusinesses in rural areas. Income enhancement and profit margins of farmers, especially of small and marginal farmers, should be a major consideration along with ecological security concerns. The successful experiences of one hill State could be easily replicated in another hill State. Creation of clientele clusters with integration of production – processing - marketing, as practiced for apple in Himachal, will be helpful in generating meaningful employment and retaining the Uttarakhand males in their villages linked with their lands and families rather than migrating to cities in large numbers. It is proposed to train 300,000 farmers and 500 trainers at various levels in specialized areas to promote production, processing and marketing of the priority species.

4.1.5.62 New crops from the Himalayan wild biodiversity constitute the greatest strength of the medicinal plants farming sector. These are wild plants most suited to the local environment and qualify as new crops without years of scientific inputs to convert them into cultivated crops. It is revolution of a kind for creating new cash crops, most suited to hills and not thought of in the food sector. The wild source factor also holds the key to niche and comparative advantage. This sector is highly significant from the angle of both national strategic interests of conservation and local economic needs. Identifying and developing backward and forward linkages for these new crops of the Himalayas will need to be worked out before putting them on promotion path, especially keeping in view the interest of the smallholders.

4.1.5.63 We also need new generation of institutional support for this sector to succeed. For instance, the Institute of Himalayan Bioresources Technology (IHBT), Palampur, Himachal Pradesh, which is working on developing the whole chain---identifying the source of new crop from the wild, to developing cultivation protocols, to post harvest processing including the prototypes of machines for each household or
village scale to market linkages, the complete solution package. The IHBT is a rare example of new generation institutions with whole range of new crops of this category from the NW Himalayas waiting to be harnessed for the benefit of the Himalayan farmers. IHBT also provides the clue as to what kind of institutions are needed and as to what should be the strategy to restructure and reform research and extension institutions to enhance their excellence, relevance and responsiveness to the dynamic national and international agricultural and trade scenarios.

4.1.5.64 **Integration of livestock for livelihood security:** Livestock has been the basis of subsistence livelihood of the hill farmers. It has potential to transform into one of the most viable options of agricultural diversification, along with horticulture. Unfortunately, some of the practices such as nomadism, bakarwals and Gujjars’ buffalo herds have been facing stiff regulatory controls and find it hard to continue any longer—the distress calls from them are for real. Livestock based livelihood options of these most marginalized and underprivileged people should be seen in right perspective so that regulatory mechanisms are modified to the extent that the farmers are saved from abandoning these options. In view of the increasing domestic demand and export potential for meat, the national capacity should be strengthened for hygienic production, processing and marketing of meat. In some of the hill States, such as Jammu and Kashmir, there is serious shortage of meat, which could be mitigated by rearing of more efficient meat producing animals such as rabbits, lamas and alpacas.

4.1.5.65 Along with the use of most promising and adapted breeds, modern diagnostic and disease management, priority support is needed to reduce acute fodder scarcity and to ensure feed and nutritional security of livestock. Both productive grazing lands and fodder for stall feeding need attention. While the alien invasive weed species should be completely weeded out, quarantine measures should be strictly adhered to avoid further infestation as well as good grazing practices should be enforced. Each State should establish **State Livestock Food Corporation** for comprehensively addressing the livestock nutrition problem. To begin with, in line with the proposed Livestock Food Corporation of India (see Chapter 10 of the First Report). SHG-based 1,000 fodder and
feed banks should be strategically located and supported both by public and private financial and service centres

4.1.5.66 Fisheries for nutritional and income adequacy: Science-based integrated fisheries development in the hills can greatly help in bridging the nutritional and income gaps. The NER States should strengthen their capacities to harness their huge fisheries, production, potential, thus minimise their daily costly imports from distant places in the country. Development of markets, especially export markets, through the creation or expansion of Export Zones, for speciality fishes is essential for stimulating domestic distribution as well as exports. SPS and TBT concerns must be addressed effectively to realize gains from the technological advances in fisheries product diversification and value addition, which should be supported also by appropriate fiscal and regulatory policies. Concerted effort is needed to eliminate fish diseases, particularly in the coldwater fishes. Vigorous efforts will be needed to educate producers, processors and exporters in clean and safe production. The private sector is also showing great interest in promoting fisheries in the hills but this must be done with care keeping in mind the equity and environmental sustainability considerations. Necessary research, extension and training back-up is essential to harness the potential (see Chapter 3).

Organic Farming: More of a Necessity and Less of a Choice

4.1.5.67 Organic farming is ideally suited to hill agriculture, especially for MAP and horticultural species and to jhuming. Uttarakhal leads the Himalayan States in adopting organic farming for harnessing the ecology-economics synergy and has declared itself as an Organic State (Box 6). Himachal Pradesh, Sikkim, Nagaland and Manipur have also taken several steps towards mainstreaming organic farming.

4.1.5.68 Around 50 tonnes of different varieties of organic spices were produced annually under the auspices of the Spices Board which has formulated well-developed protocols for organic production of spice crops, their certification system and market links. To begin with, the hill States should concentrate on production of organic spices (ginger, turmeric, black pepper, large cardamom) and different medicinal and aromatic
plants. Assuming that a market growth of organic spices in Europe, US and Japan is approximately 10% per annum, export of organic spice will get a significant production boost in the coming years. Same is the case of organic tea, where international demand is very high and smallholders’ organic tea gardens promise high socio-economic returns. About 25,000 model Organic Villages or contract farms of the strategic commodities should be developed in the hills during the next seven years.

Box 6

Uttaranchal: an Organic State

Organic Farming is identified as sine qua non for mountain farming in the State

The three pronged strategy comprises of:
- Dissemination of suitable technology.
- Development of appropriate certification regime.
- Building marketing networks.

Institutional framework put in place
- Uttarakhal Organic Commodities Board established in 2003.
- Three Centres of Excellence opened in 2003.
- Uttarakhal Seeds and Organic Produce Certification Agency came into being in 2003 which is first such agency to obtain ISO9001:2000 and ISO 65 accreditation from DET NORKSE VERITAS of Netherlands.

Multi agency extension approach adopted
The extension agencies are:
- Grass root level para workers
- Self Help Groups/Farmers Interest Groups
- Agripreneurs/Agriclinicians
- Department of Agriculture

New Concepts evolved and translated into practice successfully
- Model bio-villages (1200 in number covering 20000 farmers/19000 hectares)
- Convergence of pre-harvest and post-harvest practices at farm/village level
- Finger Millets hitherto the most neglected crop now mainstreamed in export quality baby food (Now being exported to Japan/procured for ICDS programme)

Long Term Agenda
- Mapping, in situ conservation and propagation of crop bio diversity
- Integration of ITK in development of package of agronomic practices
- Building a Brand Equity for Uttarakhal products
- Exploring new income generation with outreach programmes
- Networking with other mountain States and working as role model.
Although the GOI has already taken steps to have indigenous certification system to help small and marginal growers and to issue valid organic certificates through certifying agencies accredited by APEDA / Coffee Board / Tea Board / Spices Board, the situation is far from satisfactory. A focused national movement on organic agriculture with a credible certification of the process and produce, coupled with quality and trade awareness and literacy is a sine qua non for mainstreaming and integrating organic farming in the national agricultural economy. It must be emphasized that establishing and running credible organic farming systems is much more complex and demanding than the usual inorganic-based agriculture. But, it is do-able and should be done for harnessing the unique opportunities in India and abroad.

Debate on institutional back up support for organic farming to succeed in the hills should be widened and intensified. R&D institutions are still very weak and States will need to work out policies providing enabling environment for promoting organic farming. Also organic agriculture research and technology generation is changing the whole concept of innovators. So far in India farmers have become leaders in innovations and scientific fraternity is looking from the sides. Much of the Green Revolution technology protocols, methodologies and perspectives, to which scientists are used to, are inappropriate for organic agriculture. Organic agriculture may also lead to farmer scientist partnership and real on-farm technology development and refinement. Organic agriculture is about following ecological principles in farming and its technological options are therefore sensitive to ecological conditions of a farm. This implies that outside technological solutions will always take second place to on-farm innovations, contrary to conventional Green Revolution technological practices.

In an estimated US $ 30 billion global market of organic products, India’s share is hardly 0.1%, the huge potential notwithstanding. The wide gap is due to poor market research, the lack of certification capacity to ensure quality and brand labelling and the lack of research and development support, including an effective monitoring and technology transfer system. The Ministry of Agriculture, alongwith NABARD, should urgently bridge this gap by initiating the much-needed market and policy research. The National Programme for Organic Production (NPOP) having
internationally agreed standards for products and labelling as India Organic was started in May 2000. The hill States should not only be linked with the NPOP, but should be given priority because of the obvious comparative advantages.

**Reorientation of Research, Technology Development and Extension and Harnessing of Group Dynamics**

4.1.5.72 Agricultural development in the hills should become a knowledge intensive business. Right niche identification, technological support and access to institutional support are the important factors affecting the level of transformation of hill farming. The lack of skilled agricultural work force and poor technology transfer mechanisms in most hill States emphasises the urgent need for a strong technology policy in each State and revamping of the research and extension systems.

4.1.5.73 Productivity of hill agriculture is comparatively low and is declining. Greater attention is therefore needed to alleviate the constraints by synergizing economic and ecological values, sometimes promoting services and programmes which bring better economic value even at lower productivity. **Genetically improved strains combining productivity, quality and resistance to biotic and abiotic stresses, IPM and IPNS evolved through farmers’ participation should be the pith of the technology packages. Farmer Participatory Research and Knowledge Management Systems should be used for harnessing the rich indigenous genetic heterogeneity for optimizing the benefits of agro-ecological and socio-cultural variability, such as the development of New Hill Rices. Post harvest primary processing, value addition (reducing volume and increasing value) and prevention of post harvest losses by establishing appropriate backward and forward linkages is another priority area awaiting concerted attention and effort.** The status of agro-based industries in the Himalayas is not very satisfactory despite high potential. **The KVKs and ATMA should include strong components of trainings on value addition, rural processing and marketing, and should be restructured accordingly.**
4.1.5.74 Hills being inherently marginal in terms of their natural endowment, simple talk of improving productivity and production of conventional crops and systems prevalent in the plains will not be of much help in the hills. Several public sector Institutes, Universities, coupled with the State Governments’ research and technology development institutions have evolved technologies but there is a serious gap in diffusion and adoption of the technologies. There is a need for reskilling and retooling research and extension personnel. Alternative extension tools, such as farmer to farmer extension, market-led extension, producer-consumer partnership will need to be refined and popularized. Over 10,000 farm schools should be established during the next seven Years. The integrated farming system strategy for hills need to be revisited and fine-tuned to capture the location-specific needs and opportunities The recommendations made by the Swaminathan Committee for strengthening research, technology and human resources development in the North Eastern region, especially the setting up of a separate cadre of agriculture researchers should be adopted and implemented without delay.

4.1.5.75 Skill upgradation and capacity building of tribal farmers through intensive training should be seen as the first step before taking up programmes like area expansion of new crops. A structured two-tier training programme needs to be institutionalised. Firstly, the departmental experts and extension agents should be trained by R & D Staff. Secondly, the advanced technologies need to be demonstrated in farmers’ fields on selected basis involving the local R & D institutions. A paradigm shift from unskilled to skilled work and enhancing access to quality (sanitary and phytosanitary measures) and trade (quality, price, market, etc) literacy with reference to home and external markets are essential.

4.1.5.76 The Agro-horti-silvi-pastoral system developed by ICAR has been identified as economically viable, eco-friendly and sustainable land use system for the NEH region. Technology transfer for valleys and plains has taken place to a limited extent but the models suggested as alternates to Jhuming have not been replicated and adopted. Similarly, the package of practices for rejuvenation of declined orange orchards developed by ICAR have not spread extensively. Such technology transfer gaps should
be analysed and their redressal mechanism found in a participatory mode by creating a consortium involving the ICAR institutes, SAUs, other Universities, private sector, NGOs and farmers.

4.1.5.77 **Farming has to become knowledge intensive** if it is to become competitive for which retooling and retraining of extension personnel and establishment of rural knowledge centres are essential. For remote tribal areas groups extension through formation of SHGs is perhaps the best option and it should be easier to organize training of the members of the SHGs. This process empowers the poor and enables them to control direction of own development by identifying their felt needs. Assam has some experience in formation of SHGs and channelling micro-finance through these Groups. Group approach to extension through SHG should aim improvement of agricultural production system of the niche crops and associated support services such as marketing, primary processing and reduction of post harvest losses. The small farmers SHGs should be helped to organize establishment of Small Farmers Estates (SFE) covering an area of 100-200 ha each to capture the economies of scale. It is proposed to establish 25,000 SFEs in hill area during the next seven years.

**Supply of Quality Planting Materials and other Inputs**

4.1.5.78 Inferior and spurious input supply, specially poor quality seeds and planting materials, fertilizers and pesticides, is a common issue of hill farmers across the Himalayan States. Much needs to be done in this area. One of the main reasons for stagnating yields and low productivity of apple orchards in Himachal Pradesh and Uttarakhand has been the poor planting materials used in the past and non-availability of quality materials for new and replantings. Therefore, it is suggested that as the highest priority, the public as well as the private sectors should join hands in establishing and maintaining quality mother plant nurseries both for root stocks and desired scion materials. State Plans for flow of quality planting materials of apples and other priority crops should be number one priority of Himachal Pradesh and Uttaranchal. The recently launched National Horticulture Mission should, in close consultation with the stakeholders, allocate desired financial and technical supports to this most critical area.
4.1.5.79 Although seed production and distribution should primarily be in hands of (enlightened) private sector, there are certain “orphan” commodities and geographic areas where effective leadership and indulgence of the public sector and public-private partnership is essential. In a public-private partnership mode, as beginning to happen in some of the hill States, Seed Villages, Horticulture and Plantation Crop Rural Nurseries, Seed and Planting Material Self Help Groups, especially Women Self Help Groups, should be organized and supported. At least 30,00 such units should be established and should constitute the national grid of certified mother nurseries. Their stocks should be inventorised and the list should be available for general use. Incentives should be provided to the private sector atleast in the early stages. Individual institutions, Universities - public or private, and Government Departments should be responsible and duly empowered to timely supply breeder and mother planting materials and foundation seeds. Each State should develop annual plan for timely, quality adequate and rationally priced production and distribution of seeds and other planting materials and should have a credible system of monitoring and correcting the unhindered flow of quality seed from the breeder/originator to the farmers.

Credit and other Institutional Support

4.1.5.80 In general, access to finance and cheaper credit have not helped hill farmers. Banks favour credit to those who can generate surplus and to small scale enterprises for cost effectiveness and profitability, rather than to small and marginal hill farmers. Average credit received by a hill farmer is 40 percent of that received by his counterpart in the plains. As mentioned earlier, NABARD and other banks have come up with credit packages specifically designed for hill farmers, but the actual delivery is dismal. Infact, the formal credit squeeze upon hill agriculture is presently acute. It may mean revival of private money-lending in hilly areas. The credit regulations are not in conformity with the land tenure systems of NE and therefore the most needy tribal farmers and women-headed households have never been able to benefit from the credit system. The Kisan Credit Cards scheme has helped only a handful of farmers, and
the women farmers and women-headed households have generally been left out. The issues of land rights and credit access should be addressed urgently.

4.1.5.81 Service costs and creation of infrastructure, such as constructing an irrigation device or facility are costlier in hills than in the plains. These differences should be considered while deciding the credit level. Credit should also support SMEs to also strengthen marketing, storage and value addition chains. New innovations are needed in credit and finance system to make the products pro-small and pro-marginal hill farmers. Small farmers have small surpluses for market and that is not seen as viable opportunity by credit and finance systems. Keeping in mind the problems of hill farmers, attitude of the credit institutions towards the poor will need to be adjusted. The public sector should assist the banks in covering their undue risks in hill areas and in designing and delivering credit products suitable for hill farmers. Insurance coverage of the hill farmer is almost negligible. Special insurance products and dispensation mechanism, duly supported by the Central Government, will be needed.

4.1.5.82 As mentioned earlier, NER has been receiving liberal financial assistance and special schemes for promotion of horticulture and overall agriculture through GOI funded projects and supports of other financial institutions. Shyness of the people, lack of skilled agricultural workforce, inappropriate land tenure system and ineffective governance are some of the socio-cultural constraints coming in the way of proper utilization of funds. The apathy of State Governments towards investing in agriculture-led development notwithstanding, the absence of private sector participation in the developmental process has also hampered growth of institutional support in the hills. Land reforms and institutional reforms are interlinked with institutional support and therefore cannot be overlooked. The flow of credit and other financial supports to farmers in the NWR have not been as good as in the NER. Suitable institutional arrangements are needed to reduce this disparity. As noted in Section 3, NABARD, NEFDi and SCBs have several schemes to support hill farmers. But, their impact is localized and limited, and often short-lived. The Programmes should be critically evaluated and successful ones should be widely replicated. Lessons should also be learnt
from failed cases both for correcting and resurrecting the past mistakes and for avoiding the future pitfalls.

Central Place of Women in Hill Agriculture

4.1.5.83 Mountain women have traditionally been the invisible work force, the less acknowledged backbone of the family economy. In the hills, whether the men are in the household or have migrated elsewhere to supplement the family livelihood needs, the women have their major share of duties. Looking more closely at the type of work that women do, we can distinguish three main areas, all crucial to keeping the family and indeed the hill economy alive. These three areas are: survival tasks, work in the households and income generation.

4.1.5.84 In particular, hill women have been contributing substantially to the family budget through income generating activities. This is particularly the case for the growing number of female-headed households where men have to migrate in search of work. Even where a woman is not completely alone, contribution of women to the household budget is of utmost importance to the family, more so because women spend more of their income on family welfare. However, even though, women fulfil a great number of essential tasks, they have limited access to and control over income, credit, land, education, training and information. Further, hill women are not only the most important food producers, but are also custodians of rich traditional knowledge of farming practices, food, fuel, feed, fiber and medicinal values and uses of local and indigenous bioresources.

4.1.5.85 It is only recently that participation of women in development programs in hilly areas is being considered necessary. The extension approaches and tools may still be gender biased and therefore much needs to be done to encourage cooperation and partnership of women in hill development. The recent successful experiences with Mahila Mandals and SHGs in several hilly States is a reminder of the potential of partnership of women in hilly areas development. Women empowerment, as envisaged in the “New Deal for Women in Agriculture” (Chapter 4, First Report, NCF), assumes extremely high
priority in hill agriculture, especially enhanced access of hill women to land rights, credit, insurance, education, technology (drudgery-reducing tools and implements), training and skill development and information.

Completing the Unfinished Land Reforms

4.1.5.86 Traditionally, community ownership of land is prevalent in hill tribal communities, especially in the NER. Valley lands, terraced land, homestead land, short fallow lands are normally recognized as private lands for all practical purposes. Better productivity and higher economic returns from such privately owned land provide incentives for crop diversification and commercial horticulture. The prevalent land tenure system in Hill districts and absence of land records and legalized ownership rights hamper technology adoption, investment in land care and sustainability and the flow of bank credit. Land in the hills under shifting (Jhum) cultivation is essentially community land. The Jhuming cycle is getting reduced because of population pressure. If ownership rights on part of the community land presently under the Jhuming can be given, perennial horticultural crops can come up well as a viable alternative. The data on land utilization pattern in N.E.H. Region show that about 60% of the area is under forest and only 17.5% of the Jhum land comes under cultivation at one point of time. It is thus apparent that large part of the landed area in the region remains unutilized every year and expansion under seasonal horticultural crops including MAP should not therefore be constrained for want of land. The Village Knowledge Centres could be entrusted to prepare land records.

Marketing for Enhancing Farmers’ Income and Welfare

4.1.5.87 Farmer-centric marketing and pricing system is the most important factor in agriculture-led socio-economic and livelihood enhancement. An efficient agricultural marketing system is essential for the development of the agricultural sector and for providing incentives to the farmers for increasing production and also for commercialization of agriculture. In hills and mountains, the production-distribution
disconnect is very wide. For instance, in the entire Kashmir Valley and Ladakh, there is no foodgrain market.

4.1.5.88 Inaccessibility and high transport, packaging and storage costs result in unlevelled playing fields for hill farmers in securing remunerative returns for their produces. Therefore, development and use of necessary marketing infrastructures, rural warehouses, roads, market yards (mandis), cool chains, **transport and storages in hills should be subsidized to enhance pricing parity**. With increasing diversification of hill agriculture towards horticultural, plantation and medicinal and aromatic plants, the hill farmers will increasingly be trading high proportions of perishable commodities. The HPMC model of apple trading, the NERAMAC for horticultural products trading in the NER, the HOPCOM system of Bangalore, the NDDB marketing network for dairy *plus* horticultural products in various parts of the country alongwith Azadpur Mandi of Delhi have been operational for quite some time with varying successes. While the NDDB model has been most successful, the other models require significant improvement. The APMC reforms and the new Act including contract farming and creation of a Common Indian Market, are expected to suitably strengthen the producer-consumer and end-to-end linkages value addition for and to promote integrated use of processing facilities. Minimum Price Support and Insurance should greatly help the hill farmers and strengthen the agro industries partnerships.

4.1.5.89 Monopolistic practices and modalities have come in the way of free and competitive trade in agriculture-marketing, futures markets, use of latest technologies in post harvest technology, handling of exports, agro-based industries, warehousings, etc. There is also a need for downsizing the distribution chain and helping the farmers to get the better of the consumer price. Rural godowns to prevent distress sales, market exploitation and storage losses should be established. This is crucial. Then, there is also a question of huge infrastructural investments for modernizing our marketing systems. An Expert Committee set up by the Ministry of Agriculture had estimated that an investment of Rs 11, 172 crore in next 10 years would be necessary for infrastructural development for agriculture marketing. It would be reasonable to expect that a substantial part of this
investment may have to come from the private sector. Given the prevailing poor connectivity and highly inadequate market infrastructures in the hills, the hill States should receive relatively higher proportion of the proposed investment, say at least, 40 percent, that is, nearly Rs 300 crores during the next seven years.

4.1.5.90 The draft model APMC Act stipulates reforms to promote competitive markets in private and cooperative sector, to encourage direct marketing and contract farming, to facilitate industries and large trading companies to undertake procurement of agricultural produce directly from the growers and to eventually establish linkages between the producers and the consumers. Some of the States, especially the NWR States, have adopted the revised APMC Act, the remaining States should hasten the process. Support for infrastructures, including information system and for trained human resources should urgently be provided. Quality, biosafety and trade literacy of farmers and others in the production – processing – marketing chain should be improved.

4.1.5.91 Fortunately, for hill States, the NHM has substantial funds, including those for marketing, and post harvest development. But, these funds have so far not been used suitably. The National Director of the NHM should give highest priority to the marketing components rather than to disbursement of subsidies for new planting and production programmes. If necessary, within the overall provision under NHM, and also coordinating with other ongoing or planned projects, desired funds should be mobilized to adequately support the marketing modernization plans in the hills.

4.1.5.92 Space distribution of periodic markets and exploitation by the vested groups in the marketing sector are special features in the hills. Sale to pre-harvest contractors also prevail in certain areas. The marketing system is totally outdated and only a handful of traders cover most of the nearby markets which are essentially ‘buyers markets’. Private markets are yet to establish themselves at the areas of production. Due to thin spread of primary markets, the growers normally have to trek a long distance to bring the farm produce and normally sell the produce to the middlemen at a price dictated by them. Although, under the new APMC Act, the private sector is expected to invest in marketing infrastructures, but this may not happen for a long time in the often isolated
difficult-to-access mountain villages, resulting in widening of the socio-economic divides. **To bridge the divide and also to attract private sector investment, the public sector must invest initially in establishing rural market yards and collection points.** Such initiatives will also promote contract farming involving hitherto unreached farmers. **Bio-parks** on major commodities and **Food Parks** should be established by concerned Ministries to promote value-addition, product diversification and total bio-mass utilization.

4.1.5.93 In reality, modern marketing system for the horticultural commodity does not exist in the hills. The new concept of marketing which includes post-harvest handling, assembly, transport, storage, credit, packing and processing is not very easily achievable in the hilly terrains. The communication and transport system is weakly developed as a result of which very often market glut is experienced. In case of fruits like pineappple, where fruits can be harvested only at full maturity and the fruit is highly perishable and spoilage is very high, there is no integration of marketing of horticulture produce from hills to other parts of the country. Illegal trade of fruits and vegetables with Bangladesh and Myanmar is reported to be going on a substantial scale. Legislation of trade for perishable horticultural commodities with the adjoining countries, particularly Bangladesh, should be able to help in establishing markets in the border areas of most of the NER States for legal trading.

4.1.5.94 Keeping in view the difficult marketing and processing situation in the NER, the Government of India had set up the North Eastern Regional Agricultural Marketing Corporation (NERAMAC) in 1982. The major objectives of NERAMAC was to organise and promote marketing of major agri-horticultual produce and processed product in the region. The corporation has set up a big Fruit Juice Concentrate (FJC) plant in Nalkata in Tripura, a cashewnut processing unit at Agartala, and has opened a few retail outlets and Kiosks. NERAMAC is promoting procurement and marketing of horticultural produce and products to a limited scale. The presence of NERAMAC in marketing is still very negligible and it has to go a long way to make its presence felt for bringing significant improvement in the marketing sector. Under HTM, there is a provision to establish 29 whole sale markets, 199 rural primary markets, 26 Apni Mandis,
and 15 grading laboratories for mitigating the problems of marketing of horticulture produce. Also, NEDFi has established a buyer-seller platform in Guwahati. Such initiatives should be operationalised soonest to help improve income of the hill farmer.

4.1.5.95 As no market functions in isolation, isolated markets taken up for development may not be individually important but being collectively inter-linked make a significant contribution to a given commodity or a group of commodities. Thus, separate Regional Master Plans for Market Development should be prepared for the NWR and NER. This could serve as a bankable document assessing the State-wise development requirements, phasing out of programmes, indicating State-wise as well as regional order of priority for development, developing a regional commodity map, estimating market space requirement at different locations in different States, framing cost estimates and modernization proposal with strengthening legal and conceptual framework. Further, a campaign can be launched for development of Rural Periodic Markets (RPMs), Seasonal Markets, Daily markets and PRIs controlled markets preferably through the National Horticulture Mission. The NER could be integrated with South and South East Asian economy for converting the remote and isolated NER into the main route for trade and economic linkage of mainland India with South and S.E. Asia. Likewise, the NWR would be connected with the Near East Asian and North West African countries and with the European common market.

4.1.5.96 Finally, the power of scale in production–marketing chain must be harnessed. Specialised marketing SHGs, SFEs and marketing cooperatives should be promoted to undertake Group Marketing, linking the produce directly with the consumer (buyer). The Micro-capital Grant (MCG) support for post harvest management should be integrated with production practice and community based post harvest management facilities and through farmers training on marketing and awareness about price differential on quality, intra and inter seasonal price difference and market to market price difference. The trained marketing groups should be encouraged to avail MCG support for improved marketing of local produce. Seasonal storage as a marketing function for off-seasonal selling could very well be organized with little capital support.
4.1.6.0 Resource Allocation

4.1.6.1 Additional resources are sought for the remaining two years of the present Plan and the five years of the 11th Plan in the areas of resource management, namely, water security, soil health, biodiversity conservation and sharing; special institutional support (credit, insurance and life-saving catalytic interventions); human capital build-up to create skilled and trained human power and empowerment of farming and rural communities such as SHGs and SFEs and gender mainstreaming; services support through strengthened research, technology and extension mechanisms, including policy, management and marketing research towards need and knowledge-based policy changes, adequate and timely availability of quality planting materials; and market infrastructural development.

4.1.6.2 Investments are needed for creating and managing network of water harvesting and efficient water distribution and utilization system in the present and immediate future and a long-term strategy and programme for maintaining hydrological balance in the Himalayas. Factor-oriented (eg. micronutrient deficiencies, agricultural implements, etc) and system-oriented (crop-livestock-tree integration) demonstrations are needed through the mobilization of group power and dynamism by establishment and empowerment of SHGs, SFEs, etc. for integrating production, processing and marketing and creation of non-farm employment. Farm schools, mother nurseries and an effective system for ensuring timely flow of quality seed and planting materials especially for converting marginal and degraded lands into lands of opportunities, production and marketing of certified high quality organic products, including “doubly green” herbal medicinal and aromatic products, will need substantial additional resource allocations. Food, fodder/forage, seed and water banks are required for achieving food, nutritional and clean drinking water security.

4.1.6.3 An additional sum of Rs 2,265 crores, as detailed below, may be provided during the next seven years to cater to the above requirements:
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Requirements for the next five years</th>
<th>Rs., in crores</th>
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<tbody>
<tr>
<td>(i)</td>
<td>Water conservation tanks with and without distribution attachments @ Rs 17,000 without attachment and Rs 45,000 with attachment to be provided in the North-West and North-Eastern hill States, in the first phase covering only 50% of the requirement.</td>
<td>365.00</td>
</tr>
<tr>
<td>(ii)</td>
<td>Support to micro-irrigation, establishment and operation of water user associations, repair and maintenance of degraded irrigation systems, expansion of lift irrigation, development and promotion of suitable machines and implements to reduce drudgery and improve efficiency.</td>
<td>300.00</td>
</tr>
<tr>
<td>(iii)</td>
<td>Establishment and operation of National Centre on Glacierology</td>
<td>50.00</td>
</tr>
<tr>
<td>(iv)</td>
<td>Support to special credit and insurance products and provisions for transport subsidy for improvement of marketing cost parity</td>
<td>500.00</td>
</tr>
<tr>
<td>(v)</td>
<td>Marketing infrastructural development</td>
<td>300.00</td>
</tr>
<tr>
<td>(vi)</td>
<td>Promotion of organic products particularly for export markets through creation of credible certification system and establishment of 25,000 model organic villages/contract farms (to be partly supported by the Centre).</td>
<td>250.00</td>
</tr>
<tr>
<td>(vii)</td>
<td>Capacity building through training of 30,000 farmers, 500 trainers and development officials in specialized areas, creation of and support to 10,000 Farm Schools, Small Farmers Estates (10,000) and Self Help Groups (20,000), establishment and operation of foodgrains, fodder and seed banks, soil testing laboratories for micronutrients and strengthening of Village Knowledge Centre for digitizing land records, etc and promotion of production and distribution of quality planting materials by establishing 30,000 units throughout the hill zones.</td>
<td>500.00</td>
</tr>
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<td></td>
<td><strong>Grand total</strong></td>
<td><strong>Rs 2265.00</strong></td>
</tr>
</tbody>
</table>

4.1.6.4 Adequate financial and human resources should be made available to undertake in-depth studies on: (i) the interactions and implications of hydrological
processes, biological productivity, sustainability and climate change, (ii) interrelationships of forest conservation and protection, agricultural production, income, floods, lowland-upland linkages and integration of watersheds with river basins, (iii) land area delineation based on usual geographic surveys measuring only horizontal area and Sat- and GIS-based survey accounting for slopes and implications of the discrepancy between the two measurements, (iv) prospects of organic farming for harnessing unique agro-ecological settings of hills and mountains and the new export market opportunities, and (v) scope and mechanism of implementation of PVPFR Act and realization of farmers’ and communities’ rights and development of environmental indicators and their use in enhancing ecological sustainability and equity.

4.1.6.5 The inherent handicaps of inaccessibility, marginality, fragility and higher costs (as compared to plains) of product development, marketing, transport and service provisions, as well as the unique opportunities, should be kept in mind while making the allocations. The Central Government have been investing substantially in NER and the Planning Commission-managed Hill, Western Ghats, Eastern Ghats, Deccan Plateau and Border Area Development Programmes, but in a diffused and thinly distributed manner, resulting in poor outcomes and impacts. Focussed priority-based reallocations with clear-cut responsibility, authority and accountability is a must.

4.1.6.6 Horticulture-led diversification under the National Horticulture Mission should emphasise prevention of post-harvest losses, processing, value addition, cool chains and marketing and not subsidy-induced area expansion. Part of the investment in improving water conservation and recycling should be made from the multi-Ministry supported watershed projects in the country. As regards transfer of proven technologies through large-scale demonstrations, funds could be reallocated from the ongoing Mission Mode programmes. Part of the investments of the Ministry of Environment and Forests and the Ministry of Health related to biodiversity conservation and improvement of medicinal and aromatic plants as well as organic agriculture, should be diverted to meet the activities suggested in this Report.
4.1.6.7 In order to cater to the specialized needs of hill agriculture, the ICAR should allocate part of its resources for technology generation refinements and adoption and extension activities. The Council should establish a branch of the Central Arid Zone Research Institute (Jodhpur) in Ladakh to cater to the needs of cold arid agro eco-systems in the high mountains. The efforts of a consortium of institutions related with hill agriculture and mountain development comprising ICAR, CSIR and DRDO as well as agriculture and non-agriculture Universities in the Hills, in association with the International Centre for Integrated Mountain Development (ICIMOD), should be synergized through the proposed National Programme on Hill and Mountain Agro Ecosystem. Actually, often it is not the problem of paucity of funds but it is the problem of non-judicious and poorly-coordinated utilization of the resources, which must be rectified urgently.

Acknowledgement

This Report is based on extensive consultations at various levels and several desk studies. In particular, the National Commission on Farmers is indebted to the ICAR especially the nodal agency ICAR Research Complex for NEH Region, for organizing the Experts Consultation on North East Region Hill Agriculture on the 26th and 27th April, 2005 at Barapani. The Commission is also grateful to all the North Eastern State Governments, including Sikkim, and in particular the host Meghalaya, for deputing their experts and farmers of the States. The Commission also thanks the banks and financial institutions, ICAR Institutions, State Agricultural Universities, NGOs, SHGs, Cooperatives, industries, etc., for their active participation. Most gratefully, it acknowledges the valuable participation of farmers and their very useful contributions in this event.

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and in particular the host Himachal Pradesh, for deputing their experts and farmers of the States. The Commission also thanks the banks and financial institutions, ICAR Institutions, State Agricultural Universities, NGOs, SHGs, Cooperatives, industries, etc. in the region for their active participation. The valuable participation and contributions of farmers are most thankfully acknowledged.
CHAPTER - 4.2

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

ARID AGRO-ECOSYSTEM

4.2.1.0. Introduction

4.2.1.1 Arid and semi-arid regions occupy nearly 40% of geographical area of India (Figure 1). These areas primarily depend on low and erratic rainfall, but intensity of aridity and severity of problems like water scarcity, drought, fragility of natural resources, hardship, poverty and livelihood security are more in the one-third arid areas than in the two-third semiarid region. In arid ecosystem, the main issues relate to survival and livelihood security of nearly 9 million families and of about 45 million livestock whereas in semi-arid ecosystem the main issues relate to sustainability and productivity (Table 1).

Figure 1. Arid and semi-arid regions of India

Table 1. Differentiating characteristics of arid and semi-arid agro-ecosystems
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Arid</th>
<th>Semi-arid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall (mm)</td>
<td>&lt;450 cv &gt; 40%</td>
<td>450 – 850 cv 25-40%</td>
</tr>
<tr>
<td>ET (mm)</td>
<td>1500 - 2100</td>
<td>1000 - 1500</td>
</tr>
<tr>
<td>Moisture Index</td>
<td>&lt; -66.6%</td>
<td>-33.3 to -66.6</td>
</tr>
<tr>
<td>Aridity</td>
<td>Severe scarcity of drinking water</td>
<td>Moderate water shortage for crops</td>
</tr>
<tr>
<td>Drought</td>
<td>Chronically drought prone 1 in 2.5 Year</td>
<td>Drought prone 1 in 5 yr</td>
</tr>
<tr>
<td>Cropping</td>
<td>One in normal years</td>
<td>Potential for double cropping</td>
</tr>
<tr>
<td>Watershed–based Rainwater Harvesting</td>
<td>Limited scope of runoff harvesting, and use/recycling</td>
<td>Adequate scope</td>
</tr>
<tr>
<td>Issues</td>
<td>Survival, Livelihood</td>
<td>Sustainability, Productivity</td>
</tr>
</tbody>
</table>

\( cv = \text{Coefficient of variation} \)

4.2.1.2. The arid region receives <450 mm annual rainfall with 40% to 60% coefficient of variation against 450-850 mm rainfall in the semi-arid region. Evapotranspiration is four to five-fold higher than that of rainfall in the arid region, while it is only two times higher in semi-arid region. Therefore, severity of aridity, deficit water balance, scarcity of water and problems of drinking water are much more acute in the arid region. Natural resources like water, land, and vegetation in arid areas are very fragile, weak, and partly non-resilient, hence prone to irreversible degradation and desertification under excessive pressure of human and livestock population.

4.2.1.3. **Arable cropping is not a dependable proposition in arid region.** Only one crop can be taken in good rainfall year in arid region, while semi-arid regions reap one assured kharif crop and have good potential of double cropping. On an average, one year of good harvest is possible in arid region during a cycle of 5 years, while two are expected to have moderate crops and at least two failures are common. Arid region offers limited scope of water harvesting and its recycling, particularly on watershed basis, but in semi-arid region this has adequate potential. **Droughts are more frequent in arid region, leading to death of livestock in large numbers and near-famine situations.** Therefore, droughts in arid region often necessitate large-scale contingency relief measures and disaster management.
4.2.1.4. Considering the above issues, Govt. of India launched the Desert Development Programme (DDP) for arid region while majority of the semi-arid regions were covered under Drought Prone Area Programme (DPAP). Hence emphasis in arid regions has to be more on resource conservation, controlling of wind and water erosion, and sustainability of agriculture at optimum productivity level. Typical watersheds are uncommon to arid region. Therefore, the unit of execution of sustainable land management should be an index catchment, a cluster of villages or a dhani or even a watershed, if available.

4.2.1.5 Notwithstanding the harsh agro-ecological settings, arid zones are endowed with several distinct assets and opportunities. There is abundance of land, especially waste and degraded lands, which could be converted into productive systems. There is abundance also of solar and wind energy which may provide opportunities for harnessing renewable power for agricultural purposes, especially agroprocessing and small-scale irrigation. The cold arids are particularly suitable for production of off-season vegetables, flowers, fruits and seeds. The rich and unique biodiversity of crops, tree species, cattle and buffaloes and a large number of medicinal and aromatic plants gives unique opportunities for economic and employment diversification. Some of the rare animal breeds, such as Tharparkar, Gir, Sahiwal and Rathi cows, Surti, Zafarabadi and Murrah buffaloes and the famous Pashmina goats hold unparalleled opportunities for livestock-led development of Indian Agriculture. The rich traditional knowledge and wisdom of the local people of the arid zones constitute additional treasure. Therefore, the future development of arid zone is closely linked with the future prospects of growth of livestock and horticulture sub-sectors in these areas. The Government of India had stipulated a growth rate of 8 percent in both these sub-sectors in order to achieve an overall growth rate of 4 percent for agriculture as a whole. Given the huge gaps in transfer and adoption of proven technologies both in horticulture and livestock sub-sectors, there is ample scope for achieving and maintaining the projected growth rate during the next few years atleast in the horticulture and livestock sub-sectors of arid zones. Therefore, policies geared to the development of arid zone agriculture should give priority attention to horticulture and livestock.
4.2.1.6. The contrasting situations and differences in scale, severity and issues of livelihood in arid and semi-arid regions demand that arid regions be separated out for an exclusive policy for drought proofing, land management and livelihood security, and not clubbed together with the semi-arid regions to make policy decisions for the ‘rainfed areas’ as a whole. This study gives an analysis of the challenges, issues and opportunities exclusively in arid agro ecosystems and focuses on pathways to synergise livelihood security, sustainability and equity.

4.2.2.0 Distribution and Characteristics of Arid Agro Ecosystem

4.2.2.1. The arid agro eco-system is spread over 31.7 million ha under hot arid and 7 million ha under cold arid region, accounting for 12 percent of the geographical area of the country. The hot arid region mainly covers Rajasthan (19.6 m ha), Gujarat (6.2 m ha), Punjab (1.5 m ha), Haryana (1.3 m ha) and small pockets in Andhra Pradesh (2.1 m ha), Karnataka (0.9 m ha) and Maharashtra (0.1m ha) (Figure 2).

![Figure 2. Hot arid areas in India](image)

4.2.2.2. The hot arid zone is characterised by scarce natural resources and inhospitable climate. The annual rainfall varies from 100 mm to 400 mm with erratic distribution (9-21 spells) from July to September. The region experiences extremes of temperature (-2 to 480 C), high solar radiation incidence (450 to 500 cal per sq. cm/day)
and high wind velocity. Strong winds with sand storms are experienced during May-July, when southwest monsoon sets in. The soils are generally light textured (60-90% sand), single grained, dry for most part of the year having acidic moisture regime and hyperthermic thermal regime resulting in poor vegetation cover, high soil erosion and sand dune formation under arid regimes.

4.2.2.3. The cold arid zone (7m ha) is spread in the States of Jammu & Kashmir and Himachal Pradesh. Ladakh - Leh in Jammu & Kashmir and Lahul - Spiti in Himachal Pradesh are the main concentrated belts, characterized by long winters, with huge temperature variation between 40°C to -40°C and with little (about 90 mm annually) or no rains. The population density in the cold arid region is lowest in the country ranging from 2 to 5 persons per sq km.

4.2.2.4. Arid zones are the most disadvantaged areas in India. Coupled with the permanent negative moisture balance and meager availability of surface water, water stress for the crops, other plants and livestock is very high, and the biological productivity is much lower than in the adjoining semi-arid tracts. Associated with this is the low resilience capacity of the natural resources, high vulnerability to degradation processes, including wind and water erosion and salinization (nearly 41 to 85% groundwater being saline). Moreover, high human and livestock pressures on land in the hot arid areas make the region highly unsustainable and less productive.

4.2.2.5 Emphasis in arid zones must, therefore, be on resource conservation, controlling of wind and water erosion, and sustainable land management for attaining optimum productivity level from crop and livestock sectors. The concept of sustainable land management considers land as a matrix of all the parameters like soil, water, vegetation, topography and weather, and aims at maximizing economic yield through efficient use of inputs in relation to the amount and quality of outputs, but at the same time ensuring protection of the environment in the long term and social security of future generations. Diversified agriculture with emphasis on efficient use of the limited water for farming, and integration of economically important perennial trees/shrubs and grasses to stabilize
the production and sustain the livestock production system need to be given greater attention. Animal wealth provides sustainable support to livelihood, but not yet well organized.

4.2.2.6 The various ecological, environmental, institutional and infrastructural handicaps have exacerbated instability and livelihood insecurity problems in arid ecosystems. **Uncertainty and risk factors bear heavily on cultural and social behaviour, resource conservation and utilization and technology adoption.** The unholy nexus among the various handicaps must be broken by the synergistic force of policy, technology, skilled humanware, market, institutional credit and people’s participation. The core issues to be tackled in arid agro ecosystems are land, water and biodiversity security; fodder, feed, livestock and food security; and livelihood security (Figure 3).

**Figure 3. Reiterative forces of poverty and livelihood insecurity in**

4.2 3.0 **Changing Cropping Systems and Land Use Patterns**
4.2.3.1. Increased population pressure and socio-economic demands are forcing changes in farming systems in arid zone. For instance, the human population of western Rajasthan is 22.50 million, which is estimated to reach 27.5 million by 2010 and 33.9 million in 2020 with an increase in density from 108 to 132 to 165 persons per km². Average size of holding has declined from 17.77 ha in 1951 to about 6.00 ha now, and is likely to decline further to 4.00 ha by 2020. About 11% of the rural households own 50% of land in the region whereas 47% hold 10% and the rest are landless labour and nomads subsisting on grazing lands/wastelands. The livestock population being as large as the human population, the pressure on grazing lands is very high.

4.2.3.2. The demographic and socio-economic pressures have brought significant changes in land use pattern. The traditional values and practices like protecting trees and animals, sacred forests and grazing lands, water conservation through Khadins and Tanka, long fallow etc. have undergone rapid decline during the last few decades. Dryland farming integrated with animal husbandry has been the prominent land use in the region, where short and long-term fallowing of land, with emphasis on agro-forestry, was most common. New cropping and farming systems have emerged during the post-independence era.

4.2.3.3. Sensing satellite data suggest that wastelands with pastures of different kinds cover about 30% area, mostly sandy waste but there are also other categories of wastelands. These lands are ideally suitable for rangelands and silvi-pasture in less than 250 mm rainfall, and partly for agro-forestry, including cultivation of pearl millet, arid legumes, clusterbeans, etc. in 250-500mm rainfall zone. There has been an increase in intensity of cultivation across the region, and more and more fallow and marginal land are being brought under plough, so much so that 39% increase has been registered in net sown area during the last five decades, at the cost of 25% decline in fallow land. As more and more marginal lands are being brought under plough, grazing lands are also shrinking.

4.2.3.4. The major shift in arid zone agriculture was brought in by the introduction of the Indira Gandhi Nahar Pariyojana (IGNP) system. This has transformed the
agricultural scenario in the command areas of the canal, and has vastly improved crop production from the area, but at the same time it has resulted in degradation of the land, especially through waterlogging and salinization (> 190,000ha already affected and about 370,000 ha potentially sensitive). **The irrigation system was unfortunately unaccompanied with drainage system.** In the Banni area of Kachchh, which used to be regarded as the best and the largest natural grassland in Asia, invasion of salinity and *Prosopis juliflora* has degraded the grass communities beyond repair.

**4.2.3.5. Declining groundwater has been a major concern in recent times.** Due to over exploitation, use of crops with higher water requirement, intensive cropping and low rainfall, the groundwater is declining at an alarming rate of 20-40 cm per year. Nearly 75% area encompassing 60 blocks of western Rajasthan has become critical grey zone as it has been over-exploited with respect to groundwater and there has been almost negligible groundwater recharge. In addition, nearly 65 % area in Thar Desert has saline groundwater, having at places fluoride and nitrate levels beyond the permissible limits, thus compelling people to use scarce surface water storage for drinking. Ingress of soil salinity in coastal areas poses yet another serious problem.

**4.2.3.6. Cropping systems covering cereals, oilseeds, horticultural crops and cultivated fodders need major attention and focus in arid agriculture.** **About 90% of the cultivable land is being used for cropping.** The net sown area has risen from 38% in the late 1950s to 50% now. Double cropping has also spread in 7-8% area due to expansion in surface and groundwater irrigation facilities. However, **nearly 70 per cent of the sown area continues to remain under rainfed drylands.** About 21% farmers have an average farm size of >10 ha, 32% have 4-10 ha, 22% 2-4 ha, and 25% have less than 2 ha. The major crops in the region are pearl millet, clusterbean, green gram and sesamum, with average productivity of 150 to 250 kg grain and 500 to 1000 kg fodder ha\(^{-1}\). Under irrigated conditions the main rabi crops are cumin, isabgol, wheat and mustard.

**4.2.3.7. In western Rajasthan there has been a steady rise in the area under different crops and their productivity, excepting *kharif* pulses.** For example, pearl millet production has almost doubled between 1961 and 2000, while its productivity increased
by 123%. During this period, there was 35% fall in production of *kharif* pulses. In Rajasthan as a whole, *kharif* cereal production has increased from 17.5 lakh tonnes during the First Five Year Plan to 38.3 lakh tonnes during the Ninth Five Year Plan. There have been larger increases in production of *rabi* cereals, from 14.93 lakh tonnes to 68.8 lakh tonnes. Sharp increases were noticed in the case of oilseeds production. While *kharif* oilseed production in the State increased from 1.17 lakh tonnes during First Five Year Plan to 10.5 lakh tonnes during Ninth Five Year Plan, the *rabi* oilseeds production increased from 0.93 lakh tonnes to 20.86 lakh tonnes during the same period. The phenomenal increase in oilseeds production is attributed to the expansion of irrigation facilities, other technological breakthroughs, high market demands and high profit margins. Unfortunately, oilseed production demands irrigation, and the chief source of water over large area of its production is groundwater, which is falling rapidly in many areas of the arid region.

4.2.3.8. **Table 2** gives area and yield of main arid zone crops in Rajasthan (accounting for about 62% of the country’s arid area) *vis-à-vis* rest of India. It may be seen from the Table that *guar*, pearl millet and certain oilseeds are special crops of arid zones. Directed research and development attention to these crops should be a high priority to exploit the inherent abilities of these highly nutritious crops to contribute to nutritional adequacy, livelihood and sustainability of the inherently fragile ecosystems of arid zones.

4.2.3.9. Increases in coarse cereal production like pearl millet, in spite of its low market value, are largely due to its continued use for subsistence in the rural Rajasthan, as well as use of the non-grain parts as fodder for domestic animals. Development of short duration high yielding hybrids (65 days crop) has been instrumental in increasing pearl millet production in arid zones. Higher vulnerability to weather changes and volatile nature of pulse market did not show such trend inspite of government support. It has been observed that the **average productivity of major crops grown in the region can be further increased by 2 to 3 times with the adoption of improved production technological components** like efficient rainwater management, suitable timely tillage and sowing operations, selection of improved varieties, appropriate intercropping and
crop rotation systems, efficient soil fertility management, proper plant protection measures, including weed management, and contingency/alternate crop planning under aberrant weather situations. However, it is also realized that these technologies work during normal to mild drought years only.

Table 2. Area, yield and production of major arid zone crops in Rajasthan and in the Rest of India

<table>
<thead>
<tr>
<th>Crop</th>
<th>Arid Rajasthan</th>
<th>Rest of Rajasthan</th>
<th>Rest of India</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (‘000 ha)</td>
<td>Production (‘000 tons)</td>
<td>Yield (kg/ha)</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>12418 (14%)</td>
<td>9220 (14%)</td>
<td>742</td>
</tr>
<tr>
<td>Bajra</td>
<td>3709 (38%)</td>
<td>1259 (19%)</td>
<td>339</td>
</tr>
<tr>
<td>Guar</td>
<td>1896 (87%)</td>
<td>402 (48%)</td>
<td>212</td>
</tr>
<tr>
<td>Kharif Pulses</td>
<td>17341 (10%)</td>
<td>3220 (4%)</td>
<td>186</td>
</tr>
</tbody>
</table>

* Figures in parentheses indicate the percentages.

4.2.3.10. During abnormal years of moderate to severe droughts (like in 1988 and 2002), the risk of negative return from dryland crop cultivation is so high that the farmers are reluctant to adopt any improved dryland farming technology as a package. Although traditional land use systems like mixed cropping, agro-forestry with *Prosopis cineraria* and *Ziziphus nummularia* are still practiced, these need to be refined and placed in proper perspective for agricultural sustainability.

4.2.3.11. To cushion the adverse effect of drought, mixed sowing of seeds of various dryland crops, may be 2 or 3, is undertaken depending on micro-farming situation and need. Sowing of pearl millet, clusterbean, moth bean and sesame in an approximate ratio of 8:2:2:1, and thinning of pearl millet population during drought as per the needs and use it as green fodder are normal practices in the region. However, this practice hampers efficient crop management from sowing to harvest and threshing. Pearl millet being a staple food crop, farmers take it on more than 60% of the sown area, but the crop is more vulnerable to drought and late onset of monsoon (beyond 15th July).
4.2.3.12. Research results show that a reduction in the area under pearl millet to 40% and putting the rest 60% of the holding under kharif legumes (30%), oilseeds (15%) and forage crops (15%) could be profitable. For such crop diversification intercropping systems like mung bean/clusterbean + pearl millet (2:1), sesamum + mung bean/moth bean/cowpea (2:1), castor + moth bean (1:3) are helpful.

4.2.4.0 Horticulture-led Diversification

4.2.4.1. Arid zone horticulture and horticulture-based land use as means of diversification of traditional agriculture are being increasingly considered in developmental plans and policies both in arid and semi arid regions. The climatic conditions are conducive for production of quality fruits and vegetables. The sharp fluctuations in day and night temperatures during autumn, spring and summer help in development of sweetness in kinnow, sweet orange, ber and date palm and flesh colour and sweetness in pomegranate arils and mateera pulp. The intense solar radiation and high wind velocity can be utilized in various farming related activities. The fruits like aonla, custard apple, pomegranate and citrus (kinnow, sweet orange) are coming up well in arid climate. Medicinal plants like isabgol and seed spice cumin are already export items from Rajasthan and Gujarat. In this context, changing global policy environment due to WTO, the advantages of dry climate particularly in relation to quality and lesser incidence of diseases and pests should not be overlooked.

4.2.4.2. The cold arid region is suitable for quality production of temperate and rare fruits such as seabuckthorn, exotic vegetables and vegetable seeds. Apricot is a commercial crop in Ladakh and sold as dried apricot. Kargil area is well known for dried apricot. Top working of seedling trees of apricot with improved cultivars amenable for drying has been standardized. This will help in upgrading the quality of the produce from the existing orchards. Technologies for drying of apricot, tent drying and osmotic dehydration techniques have also been developed. But these have not been widely accepted, even though it is reported that osmotic dehydration results in increase of retail price of apricot by seven times (Rs. 140 per Kg against Rs.20 per Kg for traditionally dried pulp).
4.2.4.3. In vegetable crops, technology developed and popularized by DRDO laboratory in the high hills for vegetable growing under low cost polyhouses has become highly popular for higher yields, extending growing period and for production of good quality seeds of cole crops. The ‘trench technology’ developed under National Agricultural Technology Project (NATP) has also revolutionized off-season cultivation of vegetables (even in winter) due to higher conducive temperature in dug out trenches. Strawberry cultivation in trenches in Kargil area is gaining importance.

4.2.4.4. Among spice crops, identification of high yielding genotypes of Kala Zeera (SKUKZ- Shong; SKUA –BZ –8-6-1) and standardization of agro-techniques including propagation have helped its commercialization. Similarly, R&D efforts in standardising both production and post harvest technology in saffron have already started paying dividends by enhancing production and quality of saffron in J&K. Patent applications have also been filed for value added saffron pigment and flavour/concentrates based on research efforts.

4.2.4.5. The vast land resource, valuable genetic diversity, surplus family labour, increasing canal command area and developing infrastructure are the other prospects for development of arid zone horticulture. Besides, Central Government Organizations, State Departments of Horticulture and Agriculture, KVKs, NGOs etc; four ICAR institutes and eight SAUs along with setup of AICRP and AZF are providing a reasonable infrastructure for research on various aspects of arid horticulture. More than hundred scientific manpower is directly involved in the promotion of arid horticulture in the country.

4.2.4.6. At present only about 95 thousand ha and 110 thousand ha area in the arid zone is under fruits and vegetables, respectively, giving production of only 0.92 and 1.32 million tonnes. The projected requirements of 2.4 and 5.0 million tonnes by 2020 AD, therefore needs that the production of fruits be increased three times and that of vegetables four times of the current levels of production (Table 3). Moreover, export requirements of horticultural produce and products are expected to grow very fast in the
post–GATT scenario. The peculiar dry and warm blend in the arid region agroclimate offers opportunity for producing quality products of high health standards. This obviously would require R&D preparedness.

4.2.4.7. **Agroforestry plays vital social and economic roles in the fragile ecosystem of arid zones.** Apart from *Prosopis cineraria* (Khijri) and *Technomella indulata* (Marwar teak) based agroforestry models, *Ailanthus* has a very good economics of soft wood and green fodder during scarcity months. Shelter belt plantation along Indira Gandhi Canal has provided good dividends. *Prosopis juliflora* is flourishing in saline soils of Kutchchh in Gujarat – a problem from the point of view of grass pastures, but could be an opportunity to increase fuelwood production from the degraded land.

**Table 3. Fruit production in arid region of India**

<table>
<thead>
<tr>
<th>State</th>
<th>Production (‘000 tons)</th>
<th>Requirements (‘000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1984</td>
<td>1993-94</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>22.4</td>
<td>26.4</td>
</tr>
<tr>
<td>Gujarat</td>
<td>81.6</td>
<td>105.6</td>
</tr>
<tr>
<td>Punjab</td>
<td>34.0</td>
<td>54.0</td>
</tr>
<tr>
<td>Haryana</td>
<td>41.0</td>
<td>48.8</td>
</tr>
<tr>
<td>Peninsular Region</td>
<td>400.0</td>
<td>490.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>579.0</strong></td>
<td><strong>724.8</strong></td>
</tr>
</tbody>
</table>

**Source:** Central Institute of Arid Horticulture, Bikaner

4.2.4.8. Wastelands can be profitably used for growing medicinal and oil-bearing plants, which have high national and international demands. Many of the species growing wild (e.g., senna), or being threatened (e.g., guggal), and other species having very high survival rates in certain environments (e.g., *Aloe vera*), can be grown on the large wastelands of the region, which will not only stabilize the landscape, but will also provide good income to the farmers.

4.2.4.9. **Rajasthan is the leading State in production of seed spices** like coriander, cumin, fenugreek and chilli. There is wide scope to further increase the area
and production. The crops like fennel and ajwain also show good promise. The production of seed spices during 2000-2001 in coriander, cumin, fennel and fenugreek was 2.31, 0.39, 0.28 and 0.93 lakh tonnes, respectively. In case of chilli, Andhra Pradesh is the leading state with almost 49.1 percent of country’s total production, while the share of Rajasthan is about 6.2 percent. More than 90 percent of the spices produced are used in domestic market but there is a good demand in the export market both as raw and value added products.

4.2.4.10. Some of the Medicinal and Aromatic Plants (MAP) like Isabgol, Ashwagandha, Opium poppy, Senna, Guggal, Safed Musli, Henna (*Lawsonia inermis*) grow well in hot arid /semi-arid areas with high recovery of actual ingredients of medicinal value. Henna is known for the natural dye and its commercial export potential is about Rs. 80-100 crores. Already the spread of henna in Rajasthan and Gujarat is reported to cover 35000 ha. Similarly, senna, a medicinal plant is reported to cover about 11000 ha in Rajasthan and Gujarat, where both marketing associations have been formed and processing units established.

4.2.4.11. Isabgol, the seed coat which is known in trade as Psyllium husk or husk is medically important. The crop is cultivated in parts of Gujarat, Rajasthan and Madhya Pradesh as a *rabi* crop. The crop requires cool and dry climate and India is the sole exporter of Isabgol husk in the international market. Another important medicinal plant ‘Safed Musli’, the faciculated roots of which are used in preparation of many vital tonics, has become popular for cultivation and has immense commercial prospect. ‘Guggal’, categorized as an endangered species in the Red Data book, is naturally distributed in the drier parts of Gujarat and Rajasthan and offers good scope for commercial exploitation for its medicinal value. Standardization of propagation techniques of Guggal through stem cutting has enhanced its scope for large scale cultivation.

4.2.4.12. In the cold arid zone, *kala zeera* (*Bunium persicum*) is an important spice crop, growing wild. Due to R&D efforts, its cultivation had spread over 373 ha in Srinagar, Kinnaur, Lahul - spiti and Chamba districts. The benefit: cost ratio of this crop
is reported to be 2.39:1. The crop is likely to spread in larger areas. Saffron, the golden condiment, is the legendary crop of Kashmir and identification of high yielding clones and better post harvest technology have enhanced the scope of better income generation from this crop.

4.2.4.13. A good number of MAPs grow in wild habitat of cold desert region (Kinnaur and Spiti) of Himachal Pradesh. Surveys show illegal exploitation and marketing of medicinal plants from cold desert region. Some of the MAPs, namely, Sarlampanja (Dactylorhiza hatageria) and Atish (Aconitum heterophyllum) are reported to be highly priced items.

4.2.4.14. A National Seminar on Commercialization of Horticulture in non-traditional areas held on 5-6 Feb 2005, at the Central Institute for Arid Horticulture, Bikaner, has identified the following thrust areas for expansion of Arid Horticulture:

- **Mass multiplication of recommended varieties of fruits and vegetables** by National Seed Corporation, State Seed Cooperation and other line departments like Department of Horticulture, Agriculture and State Farm Corporation etc.
- **Promotion of nursery activities** by progressive farmers and nurserymen if efforts in item No. 1 need supplementation to meet the total requirement.
- **Large-scale demonstrations of crop diversification technologies** on farmers’ fields and promotion of animal based components for integration in crop diversification.
- **Promotion of pressurized irrigation and water harvesting structures for orchard establishment.**
- Promotion of **integrated nutrient management** including organic cultivation of arid horticultural crops.
- Emphasis on **IPM** and ensuring timely availability of quality agri inputs including agri-chemicals.
- Establishment of **pilot plants for commercialization of value added products.**
- Organizing **capacity building** programmes at different levels.
4.2.4.15. The recently announced National Horticulture Mission should have a specific window for Arid Horticulture to ensure integration of production, post harvest management, processing, value addition and marketing.

4.2.5.0 Livestock: The Anchor of Livelihood Security in the Arid Zone

4.2.5.1. Livestock provide income support to two-third of the population in arid Rajasthan and are the mainstay of desert people. Most importantly, **ownership of livestock in arid agro-ecosystem is positively egalitarian.** For instance, average number of buffaloes per ha holding for marginal and small farmers is about 2 animals whereas for medium and large farmers it is 0.44 and 0.13 animals, respectively (Table 4). Livestock rearing, integrated with crop farming, has proved to be the most viable option in the region, as it stabilizes farmer’s income during the poor rainfall years and **saves farmers from acute distresses, even from suicides** (so frequently reported from semi arid regions of Andhra Pradesh, Karnataka and Maharashtra).

Table 4. Category-wise ownership pattern of livestock in Rajasthan

<table>
<thead>
<tr>
<th>Category</th>
<th>Average number of animals per hectare holding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buffalo</td>
</tr>
<tr>
<td>Marginal</td>
<td>2.06</td>
</tr>
<tr>
<td>Small</td>
<td>1.42</td>
</tr>
<tr>
<td>Semi-med</td>
<td>0.80</td>
</tr>
<tr>
<td>Medium</td>
<td>0.44</td>
</tr>
<tr>
<td>Large</td>
<td>0.13</td>
</tr>
</tbody>
</table>

4.2.5.2. Rearing of cattle, sheep, goats and camels on cultivated land, common grazing land (including oran), etc., is prevalent. Recent animal census has revealed alarming decline in population of camel and sheep, while goat, which is more drought-hardy and is comfortable with the prevailing low amounts of browsing resources, did not decline much. Buffalo, which is exotic to the region, has shown doubling in population during the past 15 – 20 years (Figure 4). With the increase in productivity of individual animals, while the overall production of livestock has steadily been increasing, the
livestock density has decreased in the recent years, dropping from 160 livestock per sq km in 1997 to 143 in 2003 – a healthy change indeed.

4.2.5.3. Drought-hardy breeds of cattle, sheep and goats are required to be integrated in farming systems of the region, looking into the aspects of breeding, feeding and management of livestock. Farming systems involving animals + grasses + crops + trees + shrubs + horticulture, may bring about perceptible change in the life of people. Off-farm employment and per capita income of the rural people can be considerably increased through appropriate farming system.

4.2.5.4. The arid region constitutes 30 percent of total sheep, which produces around 40 per cent of total wool production of the country (Table 5). The sustainability of the sheep production is facing challenges as the pasture and common grazing lands are reducing everyday and there is increase in pressure on these lands. The sheep serves the need of food in the form of meat and milk, of clothing in winter in the form of wool and skin and of maintaining and enriching the soil fertility in the form of manure. Sheep farming is further facing decline with the reduction of pasture land due to advent of canal irrigation system in western Rajasthan. The sheep production system is required to be viable, sustainable and economically competitive with an objective to increase production per unit of land. **Intense effort is required to develop research**
based, regionally relevant, ecofriendly and economically viable sheep rearing practices, meat and wool technologies that could be adopted in different arid settings of the country with varying scale of inputs and investments.

Table 5. Arid zone sheep production

<table>
<thead>
<tr>
<th>Particulars</th>
<th>India</th>
<th>Arid region (approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheep population (million)</td>
<td>61.5</td>
<td>18.45</td>
</tr>
<tr>
<td>Wool production (m, kg)</td>
<td>47.6</td>
<td>19.04</td>
</tr>
<tr>
<td>Mutton production (m, kg)</td>
<td>230.9</td>
<td>92.36</td>
</tr>
<tr>
<td>Skin production (million)</td>
<td>22.8</td>
<td>9.12</td>
</tr>
<tr>
<td>Manure (m,kg)</td>
<td>9225</td>
<td>3690</td>
</tr>
</tbody>
</table>

4.2.5.5. The Central Sheep and Wool Research Institute, Avikanagar, in collaboration with the Department of Animal Husbandry, Govt. of Rajasthan, aims to transfer technologies for improving sheep production through breeding, nutrition, animal health, pasture development, wool utilization and techniracy. The emphasis is on Institute Village Link Programme to achieve an overall integrated development in adopted villages. Socio-economic studies are underway towards improving not only sheep production but also alleviating poverty of sheep farmers. Socio-economic survey of sheep and goat breeders are conducted to achieve this goal. The average annual real income of sheep breeders has been increasing by 8 percent per annum.

4.2.5.6. Arid agro ecosystem, with nearly 23 million goats, accounts for about 16 per cent of the country’s goat population, against 12 per cent of the total geographic area, highlighting relatively higher concentration of goats in arid agro ecosystems. In arid zone, a marginal farmer on per ha basis keeps nearly four goats as against two buffaloes and cattle. Goats in the cold arid contribute about 40 metric tonnes of Pashmina, the costliest animal fiber for garments. Goat meat has the advantage of being preferred by all the communities and the demand invariably exceeds the supply. The goat milk contributes more than 4 percent of total milk produced in India, yet its greatly dietary value and superior milk products have not been recognised and exploited for export. The
skins of Indian goats are considered to be of very high quality. The poor man’s cow, especially in arid zones and in isolated cold hilly regions, goats offer new opportunities due to:

- Preference of **lean meat** of goat by consumers in India and abroad.
- **Tailor-made foods from goat milk** to better fit the human needs.
- **Goat milk products are being recognized as important health foods** especially cheese, paneer and yogurt and these are parts of cottage industry.
- **Goat butter - a valued consumer item as it contains short and medium chain fatty acids.**
- Valued as the **best bio-organic manure producer.**

### 4.2.6.0 Challenges, Issues and Opportunities in Arid Agro-Ecosystem

4.2.6.1. The arid agro-ecosystem suffers from low and erratic rainfall, degraded soils and poor crop and livestock productivity. Coupled with poor socio economic base and infrastructure the small and marginal farmers living in these vast tracts are unable to improve their livelihood due to stagnant income and lack of alternate options of income generation. Acute shortage of fodder also limits the livestock productivity. Adoption rate of new technologies is low due to poor investment capacity, risk aversion and inadequate extension services. Rainwater is the critical input in determining the productivity in all these areas, but the inability of managing erratic and deficit rainwater through proper harvesting methods has always been a constraint in upgrading productivity. Soils are highly deficient in major and a few minor nutrients. The erosion of top soil by wind is a widespread problem. **The major challenges and constrains are:**

- **Low and erratic rainfall, high evapo-transpiration, extreme aridity**
- **Scarcity of water, frequent droughts and famines**
- **Sandy, saline and gypsiferous degraded soils with micronutrients deficiencies and low fertility; heavy wind erosion of top soil**
- **Water logging and salinization in command areas**
- **Deep, brackish (high fluoride and nitrate content) and declining ground water, ingressing sea water**
• Low and fluctuating crop and livestock yields and acute fodder shortage, degraded grazing lands
• Poor marketing, processing and value addition
• Poverty, illiteracy, conservative society, poor socio-economic base and infrastructure
• Risk aversion and poor adoption of new technologies.

Recurrent droughts are the main constraint with multiple adverse effects. For instance in Rajasthan, in the 2002 drought, separately nearly 45 million people and 45 million livestock were affected, loosing nearly US$ 1 billion worth agricultural products and over 6 million mandays of employment (Table 6). The worst victims of drought are livestock, as their numbers dip by a couple of millions in each severe drought (see Figure 4) year due to forced slaughter and death resulting from poor nutrition and starvation.

Table 6. Impact of drought in Rajasthan

<table>
<thead>
<tr>
<th>Criteria</th>
<th>1988</th>
<th>2000</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall Deficit (%)</td>
<td>-45%</td>
<td>-29%</td>
<td>-64%</td>
</tr>
<tr>
<td>Villages affected</td>
<td>36252</td>
<td>30583</td>
<td>40490</td>
</tr>
<tr>
<td>Population affected</td>
<td>31.74</td>
<td>33.04</td>
<td>44.8</td>
</tr>
<tr>
<td>Cattle affected (m)</td>
<td>57.23</td>
<td>39.97</td>
<td>45.2</td>
</tr>
<tr>
<td>Crop damage (m ha)</td>
<td>7.45</td>
<td>8.94</td>
<td>11.7</td>
</tr>
<tr>
<td>Value (m US $)</td>
<td>539.1</td>
<td>763.4</td>
<td>959.5</td>
</tr>
<tr>
<td>Loss in agril. Employment (m man days)</td>
<td>3.38</td>
<td>4.66</td>
<td>6.09</td>
</tr>
</tbody>
</table>

4.2.6.2. Against the above weaknesses, the arid agro ecosystem offers windows of opportunities to capitalize and increase income and livelihood of the rural people. The important endowments and opportunities are:

• Abundance of land and mineral resources
• **Abundance of solar and wind energy**
• **Rich biodiversity**, multipurpose tree species (MPTs), nutritious grasses and high quality snow water; rich genetic resources of fruits, vegetables, seed spices and medicinal and aromatic plants.
- Adapted human and **drought hardy animals**; Tharparker, Gir, Kankrej, Sahiwal, Rathi, Nagauri breeds of cattle (their purity although threatened); Mehsana, Surti, Jofrabadi, Murrah, Nagpuri and Khunni buffaloes, besides Pashmina goats of cold desert and other animal breeds are unique genetic treasures of Indian arid zones

- **Traditional wisdom and strong social structure.**

The different regions of the arid agro ecosystem have their specific challenges and opportunities, as described below.

**Hot Arid Zone**

4.2.6.3 The major challenge in this chronically drought-affected region is sustainable land management that ensures not only adequacy of food, fodder and drinking water, and livelihood support. Inclusiveness and guarantees both for on-farm and non-farm employment are important. Since the region is affected by recurrent drought, crop failure is a regular feature and farmers practice agro-forestry of different kinds and integrated livestock-crop farming. Such integration of crops with animals, trees, shrubs and grasses in a farming system mode helps not only in drought-proofing, but also provides multifarious food, animal, fruit, fodder, fuel and timber products.

4.2.6.4. Water is the most demanding resource in the region, especially during drought. Although the region has traditional wisdom on water harvesting, pipe water supply has gradually deteriorated many structures. Using new technologies developed by various ICAR institutes, SAUs and other NARIs, many of the tankas, nadis and khadins could be revived. For a successful and sustainable dryland farming enterprise, conservation of soil and water resources has to be willingly and religiously undertaken by farmers as an integral component of the production system practised by them.

4.2.6.5. Suitable intermixing of livestock with agroforestry systems can enhance the ability of desert dwellers to sustain under the unpredictable and harsh environment. Livestock farming, though a traditional practice, still lacks a proper scientific and holistic approach. The major bottlenecks in its progress are non-availability of fodder and
drinking water, and shifts in land uses towards extensive and intensive crop farming that have resulted in shrinking grazing resources. Also, infrastructures for mobility of the perishables, processing units for livestock products (e.g., dairy industry), and their marketing facilities, need serious attention.

4.2.6.6. An economic evaluation of the alternate landuse systems shows a benefit-cost ratio of 1.46-1.87 over 1.24 under the arable cropping. This proves the worth of crop-grass-tree-animal system over exclusive arable farming under arid ecosystem (Figure 5). Despite there being compelling scientific and economic reasoning in favour of agri-pasture, agro-forestry and silvi-pasture that can also enhance livestock production system, the average farmers in the region still have apathy towards agri-pasture or silvi-pasture. As mentioned earlier, the region is most suited for livestock-based farming system, yet developments in livestock production systems and their linkage with market economy have not progressed much.

![Figure 5. Benefit: Cost Ratio of different alternate landuse systems](image)

4.2.6.7. Another major issue is over-use of the scarce groundwater resource for growing high water-demanding crops. At the current rates of groundwater exploitation, large areas of double cropping will turn into either wastelands having saline-sodic soil, or will revert back to mono-cropping.
4.2.6.8. The third major issue is long-term management of drought, rather than ad-hoc contingency planning for relief, ensuring livelihood support and continued employment, possibly in non-farm sectors. Frameworks for a symbiotic relationship between farm and non-farm sectors need to be established. These complex socio-economic issues need environmentally sound, yet workable policy frameworks. Perhaps, the stakeholders, State, NGOs and GOs may have to work as a consortium for the desired results.

**Cold Arid Zone**

4.2.6.9. Cold arid zone is characterised by long frozen winter months and very low snow fall and rains and short growing period adversely affect agricultural growth of land-based economy in Ladakh and adjoining areas in stagnant. The soil and water resources have been shrinking and pastures have been declining. However, unique biodiversity, extreme temperature regime (−40 to + 40°c), low RH (40%), maximum sunny days (300 day / year) and pest and disease free environment are some of the rare features of cold desert eco-system which can be converted to opportunities, if planned properly.

4.2.6.10. In cold arid areas, **off-season production** (July–September) of vegetables and flowers for other areas can be successfully ventured. Use of **polyhouse** for vegetable cultivation has become quite common, giving the growers benefit of extended growing season, besides freedom form pests and diseases. Among fruits, apricot is a commercial crop in Ladakh area and sold as dried apricot, which is quite popular outside the region. Kargil area is famous for quality produce of black cumin (*kala zeera*) and seabuckthorn is being explored commercially. This zone is a **rich repository of medicinal herbs**, most of which are used in Tibetan system of medicine. The Lahul - Spiti belt is famous for production of disease free seeds of vegetable crops, including seed tuber of potato.

**Southern Arid Agro Ecological Setting**

4.2.6.11. The Southern Arid Zone is situated in the rain shadow region of SW monsoon along the leeward side of Sahyadris. The mean annual rainfall varies from 500
mm in Bellary to 573 mm in Bijapur (both in Karnataka) and 550 mm in Anantpur (Andhra Pradesh). A large number of seasonal crops (sorghum, pearl millet, castor, pigeon pea, groundnut, chickpea etc.) and perennial (ber, custard apple, pomegranate, aonla, mango in fruits and *Casuarina, Dalbergia sissoo, Acacia nilotica*, neem etc as tree species are grown in the region. Better rainwater management, tree crop-livestock interface, arid-horticulture, biodiversity plantations and livestock-based farming systems offer opportunities in the semi-arid region. Dry land orchards of mango, cashew, tamarind, jackfruit are receiving promotional support. With drip irrigation, grapes, pomegranate, acid lime and sweet orange are important commercial successes in this region.

4.2.6.12. The APEDA has developed a concept of Agri-Export Zones (AEZs) and AEZs focusing horticulture produce / products have already been set up in Andhra Pradesh and Karnataka. AEZs have been established for rose, onions and gherkins in Karnataka. Contract farming has been found to be successful in gherkins and it is reported that VST Natural Products Limited in Andhra Pradesh was able to have contracts with gherkin farmers by providing seeds, credit and other technical inputs for supplying raw gherkins which were processed and exported. Such models may work well for other export oriented crops. Semi-arid zones with provision of supplementary irrigation (micro-irrigation) can produce exportable commodities matching international quality standards by following hazard analysis and critical control point (HACCP) guidelines and Codex standards.

4.2.7.0 Pathways to Sustained Livelihood Security of Arid Zone People

4.2.7.1 In line with the priorities identified under the National Common Minimum Programme of the UPA Government, the Department of Agriculture and Cooperation of the Ministry of Agriculture has formulated a new scheme on “Enhancing Sustainability of Dryland Rainfed Farming Systems” and submitted it to the Planning Commission for approval. The proposed scheme aims at addressing issues like rainwater harvesting and its utilization; in situ soil moisture conservation; use of organics/organic manures; alternate land use; and adoption of improved dryland farming technologies in the arid and
semi-arid regions of the country. On a 100 percent funding from the Government of
India, during the Xth and XIth Plans, sums of Rs 2150 crore and Rs 7,000 crore,
respectively, are proposed for implementation of the scheme. At the national level, the
implementation of the scheme will be monitored by the National Monitoring Committee
chaired by Secretary DoA.

4.2.7.2 The above initiative is indeed a welcomed move. But, it has the risk of running
into the same shortcomings as all rainfed programmes in the past which had generally
failed to adequately address the farmers’ problems of survival and livelihood security
specific to the hot and cold arid regions and had drifted towards the relatively more
congenial settings of semi arid areas. Therefore, it is advisable not to club the arid
zone research and development programmes with those of the semi arid zone. This
report, thus, addresses the challenges and prospects exclusively of arid agro-ecosystems.

4.2.7.3 All efforts should be synergised and channeled to ensure survival and
livelihood security of farmers and rural people (as also of livestock) in arid zones
braving acute water scarcity, frequent droughts and near-famines. Congruence of
ecological, economic and employment securities should be ensured through the
participatory development and adoption of eco-technologies towards a rational
blend of productivity, sustainability, profitability and equity. Significant
adjustments, as discussed below, are required in the areas of policy actions and critical
interventions such as technologies, institutions, human resources, investments market and
infrastructure to achieve the goal.

A. Policy Actions

National Authority for Dryland Farming Areas: Convergence and Synergy

4.2.7.4 The greatest distress to farm and rural communities occurs in the drylands of the
arid and semi-arid regions of the country. Nearly 76% of the farmers committing suicide
were dependent on rainfed dryland agriculture. These areas primarily depend on low and
erratic rainfall, but intensity of aridity and severity of problems are more in the one-third
arid areas than in the two-third semi-arid region. The situation regarding groundwater
use and drawal, which accounts for nearly 70% of the total water used for crop production, is alarming. The principal constraints observed in reaping the full benefits from dryland farming research and development are the following:

- Lack of disaggregated and focused approach, gross operational overlaps among concerned Ministries and Departments with little monitoring and evaluation of emptye number of related programmes.
- Lack of integrated watersheds and sustainable land development approaches, with all members of the watershed and SLM community not working together to save and share water and land.
- Lack of social synergy in the area of land and water use planning, with little emphasis on collaborative efforts in both the production and post harvest phases of farming.
- Dry lands soils are both thirsty and hungry. It is important that steps are taken to overcome these two constraints by judicious water harvesting and use, and by applying to the soil the needed micro and macro-nutrients. The water crisis, especially the fast receding groundwater and quality, and hunger of the soil caused by micronutrient deficiencies need to be addressed on a priority basis.

4.2.7.5 With the above backdrop, as already stipulated in our First Report, we strongly recommend the establishment of a National Authority for Dryland Farming Areas (NADFA) (Figure 6). The Authority will be hosted by the Ministry of Agriculture, with synergistic horizontal linkages with all concerned Ministries and Departments. It should be a multistake-holder entity performing normative as well as policy development and implementation functions geared towards sustainable livelihood security of dryland area people. Its main functions may be:

(i) Formulation, updating and implementation of dryland agriculture research and development policy and programmes.

(ii) Priority setting, direction-giving, coordination, removal of gross duplications, monitoring and streamlining of fund allocations and utilization.
(iii) Supporting and sponsoring sustained institutional and social capital and human resources development and establishing and managing linkages.

(iv) Promoting enhanced water conservation, productivity, equity and sustainability.

(v) Improving post harvest technology, value addition to crop and animal products and developing end-to-end approach to link production with market, leading to enhanced and sustained income and food security.

Figure 6: National Authority for Dryland Farming Areas (NADFA)
4.2.7.6 In order to address the differentiated problems and prospects of the semi-arid and arid regions, the Authority may set up separate National Committees for Integrated Watershed Development for Semi-arid Regions and for Sustainable Land Development for Arid Regions (Figure 6). These should be constituted and function as a multistakeholder consortia for monitoring the outcomes of the various programmes and collaborations and for making mid-course corrections, if necessary. The various Watershed Development Projects, Mission Mode Projects, such as National Horticultural Mission, Dairy Mission, Oilseeds Mission, Drinking Water Mission, and Drought Relief Programme must function in an integrated manner and internalize the location specificities to synergistically address local problems and to achieve the set objectives (Figure 7). The arid and semi-arid zone States should constitute State level counterpart Committees, which co-jointly with the National Committee, should ensure timely flow of the earmarked funds to Panchayats at the ground level through the District IWD and SLM Consortia (see Figure 6). The Consortia will be the main technical backstopping units comprising experts from relevant technical fields, development agencies, farmers, private sector, financial institutions, NGOs and other concerned stakeholders. These should be headed by full time experts in the field.

Figure 7. Convergence and synergy among various Programmes and Missions
Sustainable Land Management for Livelihood Security

4.2.7.7 Recognising that acute water deficit, frequent droughts and fragility of land and other natural resources are the distinguishing features of the arid zones, and appreciating that typical watersheds are uncommon to arid agro ecosystems, **Sustainable Land Management (SLM)** should be the focus in arid zones around which should rally all interventions towards sustainable livelihood security. The approach should visualise land as a matrix of soil, water, vegetation and weather. There should be convergence and synergies around SLM to ensure optimal sustainable production and conservation of the ecosystem (**Figure 8**).

![Figure 8. Sustainable land management: multiple benefits](image)

4.2.7.8 The policy must emphasise that land, water and vegetation in arid regions are finite and have limited capabilities. Sustainable **demographic policy and awareness** should be developed by the Government of India and carefully implemented by State Governments to rationally contain population and population-driven over-exploitation in such fragile agro ecosystems which lead to irreversible land degradation, desertification.
and migration of people. Unmindful adoption of “quick-fix” technologies, such as growing rice at the cost of rapid groundwater depletion or rearing buffaloes despite scarcity of fodder and drinking water needs a critical appraisal. Environmental costing through adopting available or locally-developed environmental-economic indicators should be compulsorily implement by State Governments to deter the misuse of the scarce resources.

Harnessing Group Dynamics

4.2.7.9 NABARD, other banks, SFAC, concerned ministries and departments should facilitate public-private linkages not only in infrastructural development but also in promotion of rural entrepreneurship and in establishment and effective functioning of SHGs, cooperatives, Small Farmers’ Estates, other rural groups and community based organisations, agriclinics and agribusiness centres to facilitate access to quality inputs and to fair markets. The Government of India and State Governments should suitably strengthen Panchayat Raj Institutions, congrueing authority, financial capacity and accountability to mobilise grassroot level priority setting, programming and implementation in close collaboration with suitable NGOs and CSOs, particularly in establishing public-private sector partnerships to facilitate technology transfer, establishment of rural SMEs and producer-oriented remunerative marketing. The Smallholder Farm Estates will not only provide the power of economies of scale but will also forge synergy and convergence among various actors and stakeholders and among various processes of production, processing and marketing. Using an end-to-end approach, the Estates should establish strong backward linkages with technology, inputs, services and credit and other institutional supports and forward linkages with remunerative markets, income generation and profit sharing.

Agriculture-Risk Fund: Institutional Life Saving Support

4.2.7.10 Institutional credit flow to arid zone farmer is extremely low. These farmers try to minimize their income risks by taking up different economic activities. The banks need to provide credit for a composite set of activities which may include cultivation
of crops, some horticulture, small animal husbandry and may be a micro non-farm enterprise, unlike other areas where financing for one economic activity is the general practice. The need is, therefore, to look at these farmers differently and provide them credit line in a more flexible manner keeping in view their investment requirements and income flows. Another important aspect is the recurrent and frequent droughts which cripple their income flow rendering the borrowers from banks defaulters and credit unworthy. Rescheduling and restructuring of these loans is not enough in the event of successive droughts. The indebtedness would keep increasing and further accentuate the distress. Under these circumstances, the Central Government may step in to create an Agriculture-Risk Fund to provide relief to the farmers in case of successive droughts. This Fund should have contributions from the Central Government, State Governments and the banks in a predetermined fashion.

Insurance: Insulating the Farmer from Risks

4.2.7.11 Given the high risk, coupled with the poor economic condition of the farmers, many of whom are already acutely stressed, an effective insurance mechanism covering the majority poor is a sine qua non for sustained livelihood security of arid zone farmers. The provisions and coverages under the existing Agricultural Insurance Corporation of India (AICI) are inadequate as these generally cover the bank borrowers who represent only a small fraction of the comparatively better-off people particularly in arid zone, where the outreach of the banks is poor. Special insurance products, covering crops, livestock and health of the farming families as a composite micro insurance scheme need to be designed for these areas. Special dispensation to the AICI for developing and marketing such insurance products is required. Intensive efforts are needed in many blocks of the arid zone, which have been generally bypassed, by earlier programmes and initiatives. It may be appropriate for the Central Government to provide premium support, say to the extent of 50%, for this insurance coverage as an essential life-saving support system.
Contingency Funds for Sustaining Agriculture and Livestock in Drought Years in Arid Zones

4.2.7.12 The arid zones are frequented by droughts every other year. **Contingency plans** for meeting the farmers' requirements of seeds and other inputs are prepared by the State Government as well as the Central Government including the ICAR. However, most of the State Governments, because of the financial constraints, are unable to provide the required assistance to the farmers. The Ministry of Agriculture, Government of India, also does not have any fund or schemes which may be utilized by State Governments for the purpose. It is, therefore, felt that a *revolving fund of Rs 500 crore may be created in the Ministry of Agriculture, Government of India, for meeting such expenses*. It is suggested that these funds can be provided by suitable reappropriation by the Ministry out of the unspent approved budget estimate under the various Central Sector and Centrally-Sponsored Schemes.

Enhance Investment in the Distressed Areas

4.2.7.13 The all-time low investment in agriculture notwithstanding, the investment in arid zones is paradoxically still lower. The inhospitable weather conditions and frequent droughts have deterred even the public sector from investing in arid zones. Whatever little, the private sector investment is confined to the environmentally better endowed and congenial areas, such as irrigated areas. This has widened the divide between arid agro-ecosystems and other agro-ecological regimes. The following actions are essential towards providing basic facilities and entitlements and for bridging the divides:

- Both, Central and State Governments, should **substantially increase investment in arid zone areas** for agriculture as well as for infrastructure, education and primary health care development, which will also encourage the private sector to investment in these hitherto 'non hospitable' areas. Provide **tax holidays** and other incentives to private sector to encourage multilateral investments.
Investment in irrigation, especially micro-irrigation and overall soil and water management, should have high socio-economic and ecological pay off.

- **Strengthen research, technology development and extension system** in a strongly affirmative and need based mode, with emphasis on resource conservation and sustainable use and on marketing and socio-economic aspects. At least 15 per cent of the development budget should be earmarked for on-farm strategic research to facilitate refinement and quick adoption of technologies.

- **Augment human resource and skill development** to enhance gainful employability particularly of the rural youth.

- **Engender all agricultural development programmes**, particularly livestock, horticulture, seed and herbal production, processing and marketing programmes.

- Create and strengthen each village as a knowledge centre and establish agribusiness and agriclinic centres, and **promote entrepreneurial systems**.

**Synchronize Trade Policies with Development Policies**

4.2.7.14 Trade, particularly in the liberalized and globalised world, is to be seen as a major development tool. If not handled properly, it will prove detrimental to the welfare of the farmers, especially the smallholders. For instance, development of livestock (which are so very important in arid zone) is closely linked with the trade policies of the Government on dairy products and wool. **The GOI should not liberalize import tariffs on these commodities which will jeopardize domestic production of the vital livelihood resources.** Moreover, for the speciality and monopoly commodities, namely isabgol, guggal, cumin, pashmina and others, special trade and pricing policies and strong enabling mechanisms, such as an effective and responsive SPS system, should be created to meet TBT and non-tariff barriers as well as to maintain our market share.

**B. Catalytic Interventions**

**Income, Food and Nutritional Security**
4.2.7.15. Arid areas have been carrying relatively greater loads of poverty, under nutrition and unsustainability. This unholy alliance among the three maladies could be broken only by a still stronger alliance of increased and sustained productivity, profitability and social justice (Figure 9). Equally strong alliance should be forged (and monitored) by the Task Forces on Arid Agro-Ecosystem at National, Provincial, District (the District SLM Consortium) and Village (Gram Sabhas and PRIs) levels for adoption of proven technologies and development strategies for enhanced productivity, creation of increased marketable surpluses by small farmers, prevention of post-harvest losses, value addition and remunerative marketing. The following actions are recommended for enhancing income, food and nutritional security:

- **Enhance productivity and quality** through the adoption of appropriate ecotechnologies to attain desired competitiveness. Adopt end–to-end approach of development of selected commodities, such as ber, date palm, seed spices in hot arid zone and apricot and *kala Zeera* in cold arid zone. Promote diversification particularly towards horticulture and other high value commodities and intensify production by adopting low-cost green houses, microirrigation and fertigation. A special date palm project involving 40 demonstrations and 40,000 ha under commercial production, including low cost green houses for hardening vitroplants should be completed in the next five years.

- Promote integrated farming system, coupled with marketing, with special focus on livestock-based farming system, especially sheep, goat and camel economy in the hot arid regions and Pashmina goats and new Bharat Marino and hybrid angora rabbits in cold arid regions. Fifty pilot projects in hot arid and 25 in cold arid zones should be launched.

- Strengthen value addition through better post-harvest processing and management and promotion and large scale adoption of new horticultural, herbal and livestock products and efficient marketing system. Due care should be taken of local sensitivities in locating the meat and other such industries.
• Undertake **niche production of hybrid and other vegetable seeds** especially by women SHGs and local cooperatives and establish grain, feed, seed and other fodder banks to be managed by SHGs.

• **Adopt a whole life cycle approach** to the integrated implementation of all nutritional programmes, starting with pregnant women and ending with old and infirm persons.

• **A special programme should be launched for development of the cold desert region** of Ladakh to enhance the productivity, quality, profitability and sustainability of its farm enterprises. Eco- and other tourism should be further assisted through new initiatives such as Rare Birds Park. Human resource development should be accorded high priority for capturing new off-farm job opportunities.

![Diagram](image)

**Figure 9. Breaking the unholy nexus**

4.2.7.16. **The National Rural Employment Guarantee Scheme (NREGS) should be extended to enhance economic as well as physical access to food and also to create assets in integrated watershed and sustainable land development programmes.** The Scheme should be linked with the Food for Work Programme (FFWP) to ensure sustained food security to be regularised under a proposed **National Food Guarantee Act** (See Chapter
2). Techniracy should be promoted by Programme Implementation Agencies and District SLM Consortium to develop **skilled human resources** who could be employed more gainfully.

**Employment Security**

4.2.7.17. Arable cropping is not a dependable proposition in arid zones, especially for small holders. Therefore, alternative and complementary sources of income and livelihood must be developed. For this, **off-farm and non-farm employment** opportunities must be created by the Government as well as by the private sector. Government policies, such as tax incentive to the private sector, development of rural infrastructure, reorientation of research and technology development priorities to generate and transfer technologies for rural people, particularly resource poor farmers, and diversification of the use of the local resources as well as of agro ecological endowments are prerequisites for creation of off- and non- farm employments. It may be added that, almost two decades ago, China took almost 100 million people out from the agriculture sector and employed them in manufacturing and services sectors related with agriculture and primary production systems. For this, China had developed the necessary rural infrastructures, rural agro industries and market connections. Most importantly, the country had made arrangements to train those people and increased their skills in specific areas for their out-of-agriculture redeployment. Similar approach should be adopted by the Central and State Governments in India.

4.2.7.18. Unique features of arid zones should be harnessed for promoting off-farm and non-farm employments. These include ecotourism, spiritual tourism and sports tourism and promotion of agro processing especially based on horticultural and livestock products. For instance, the high dietary value and superior milk products from goat milk could constitute important export products. Further, leather industry based on the huge livestock population of arid zones could be a highly paying proposition, both from the angles of employment as well as income generation. Agroprocessing and value addition industries for horticulture and medicinal and aromatic plants should be promoted in rural areas and small rural godowns should be established to facilitate marketing. Other sources of non-farm employment are the promotion of handicrafts and cottage industries.
Economic activities based on local resources such as marbles, minerals and other deposits should also be promoted to diversify employment opportunities. However, these activities should be consistent with the requirements of environmental sustainability. While the private sector must play a leading role in increasing and diversifying employment opportunities, preference should be given to the local people to avoid migration and social conflicts. However, in order not to compromise with efficiency and competitiveness necessary training and skill development programmes should be established by the State Governments to train the local people seeking the alternative employment.

4.2.7.19. The following micro enterprises and marketing approaches are strongly recommended to be adopted towards the goal of enhanced employment, productivity and livelihood security, especially by landless and non-agricultural people:

- Intensification and spread of household income generating activities like mushroom cultivation, sericulture, backyard poultry, apiculture and vermicomposting.
- Promotion of custom hiring of farm machinery, tools and plant protection equipment etc.
- Establishing and fostering linkages with market committees by e-networking
- Linking SHGs and other farmers organizations/groups with credit, insurance, private & corporate sector to promote Small Holder Estates to benefit from the power of economy of scale.
- Establishing ICT based knowledge centre/internet kiosks for market information and virtual extension service.

Conserving and Utilizing Every Drop of Water

4.2.7.20 Rainwater harvesting: Reviving the “Dying Wisdom”: Water for agriculture or even for drinking is the key issue of arid region and must become the concern of everyone to conserve every drop of water. In Western Rajasthan, the hub of the country’s arid zone, adopting an integrated water management programme, the
“dying wisdom” of traditional system of rainwater harvesting in *tanka, nedis, khadin, talab*, etc., should be revived and restored. New technologies developed by ICAR and other institutes for the purpose should be widely demonstrated and adopted. In this context, nearly 1,000 field demonstrations are proposed to be organized by State Governments. Community surface water storage facilities should be provided to all the needy villages where the piped water supply of the Public Health and Engineering Department (PHED) is inadequate to meet the drinking water needs. With an additional rainwater surface storage of 137 mcm, raising the total capacity to 531 mcm, domestic needs of all arid villages of Rajasthan not covered by PHED could be met. About 70-80% harvesting of rainwater may provide community storage to all. Over time, the capacity of *Khadins* and other water storage structures have decreased due to land degradation and crop intensification. Improvement of these devices and structures through enhancing and sensitizing group awareness and their better management are the needs of the hour (Table 7). Panchayats, Gram Sabhas, community organizations, NGOs and CSOs must play major roles in this effort.

**Table 7. Requirement of traditional rainwater harvesting structures**

<table>
<thead>
<tr>
<th>Rainwater Structure</th>
<th>Existing (no.)</th>
<th>Storage (million cubic meters)</th>
<th>New Structure (no.)</th>
<th>Storage (million cubic meters)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nadi</td>
<td>20,800</td>
<td>322</td>
<td>3,000</td>
<td>90</td>
<td>422.5</td>
</tr>
<tr>
<td>2. Tanka</td>
<td>10,85,000</td>
<td>32.6</td>
<td>2,00,000</td>
<td>17</td>
<td>49.5</td>
</tr>
<tr>
<td>3. Khadin</td>
<td>550</td>
<td>29.7</td>
<td>490</td>
<td>26.5</td>
<td>56.2</td>
</tr>
<tr>
<td>4. Anicut</td>
<td>23</td>
<td>29.7</td>
<td>23</td>
<td>2.8</td>
<td>2.8</td>
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<td></td>
<td></td>
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<td></td>
<td>531.0</td>
</tr>
</tbody>
</table>

4.2.7.21 **Groundwater recharge:** Groundwater recharge must be made compulsory for urban as well as rural settings. Due to negative water balance and higher withdrawals, there is hardly any build-up of groundwater in arid regions. Though starved for water, arid regions also face floods, may be once in 10 years, as recently witnessed in the arid agro ecosystem of Gujarat, which may generate on an average 2100-6200 mcm water. **It is estimated that if 1/3rd of floodwater is made to recharge the groundwater,**
it can sustain five recurring droughts. Ephemeral river water should be used to recharge groundwater through check dams, percolation tanks, sub-surface barriers, sand fill dams, induced recharge, etc..

4.2.7.22 Water resource development and management: **Irrigation water being the most critical input in crop production in the arid eco-system**, restoring water bodies and promoting water harvesting should receive major developmental support. Under Desert Development Programme (DDP), National Watershed Development Programme for Rainfed Areas (NWDPRA), Integrated Watershed Development Programmes (IWDP), Drought Prone Areas Programme (DPAP) and the like, water resource development activities have been promoted by GOI, but often in isolation. These efforts must be converged and synergised at the action site. For instance, several of these programmes have tried agricultural land contour graded bunds and contour vegetative hedge (CVH) as “run-off retention” devices to conserve moisture in situ and for improving infiltration. But, in light soils of arid region, such measures may not be very effective. Efficacies of such efforts must be improved by fine tuning of the technologies through a collaborative, integrated and participatory approach. Emphasis on location specificity and precision is the key to the success in all arid zones. The Task Force on Arid Agro Ecosystem should critically examine the outcomes of these programmes with focus on arid zones where little work has been done as compared to that in semi arid and other zones, and prepare a detailed time- and location-targeted action plan to converge and complement the ongoing activities. About 10 percent of the total investment in watersheds and soil conservation should be allocated for development and fine tuning of technologies for Sustainable Land Management in arid agro-ecosystems.

4.2.7.23 The feasibility of rainwater harvesting through farm ponds in areas with rainfall above 400 mm has been well established. Also, there are many examples of recycling such harvested water for successful raising of horticultural crops. It is estimated that in arid region there is potential of harvesting 70% of rain water for recycling as well as ground water recharge. Under NATP, seven check dams were constructed in
different areas, which led to recharging of ground water, by 80 m in Matyana watershed area of Junagarh in Gujarat. It is claimed that in four years time farmers could reap economic benefits as a result of sale of fruits and crops raised through use of the water for supplementary irrigation. Such “bright spots” should be used for training farmers and extension staff and should be replicated widely by State Governments. Diggi-cum-sprinkler irrigation programme should also work well for vegetables. Similarly, Diggi-cum-drip system developed in CIAH, Bikaner (Rajasthan) may work well for fruit species.

4.2.7.24. In Andhra Pradesh, over 42 lakh ha have been covered by watershed and 9300 micro-watersheds have already been delineated. Similarly, in Karnataka, over 6 lakh ha are under watershed development. Community water management through participatory planning, water audit and district water management agencies are in the water management agenda in A.P. Promotion of micro-irrigation is one of the thrust areas in Karnataka and the State Government has earmarked Rs. 6 crores for drip irrigation for 2005-06.

4.2.7.25. Through Watershed Development Society or Watershed Committee, with farmers participation as per IWDP guidelines, the water resource development for multi-purpose use in arid zones need to be augmented and managed by using participatory approaches. The Panchayats, especially the Pani Panchayats, self-help groups, the SFEs and other grassroot organizations should undertake group operations for water harvesting and management. The Task Force should identify the “nuts and bolts” of the various proven technologies and approaches for water conservation and its efficient use and ensure their time targeted replication in designated areas, as mentioned above.

4.2.7.26. Develop quality micro-irrigation: Pressurised or micro irrigation - drip and sprinkler, should be extensively promoted both by Central and State-Governments for increasing water use efficiency and productivity. So far, generally only larger and well-to-do farmers have benefited from the Central and State Governments’ supports (subsidy) to micro irrigation. Moreover, as usual, the subsidy programmes were not handled
properly and substandard and defective equipment hardwares flooded by spurious firms have choked the water flow and the scheme. The process must be freed from corruption and a transparent people-managed programme with clearly defined responsibility and accountability of stakeholders, supported with a quality control and a close monitoring mechanism, should be established. Coupled with fertigation, micro-irrigation could revolutionise protected agriculture/horticulture through the widespread use of low-cost greenhouse technology. The good beginning made in Kachchh and a few other arid areas should be multiplied by the extension and concerned development agencies of the State Government in other analogous arid agro ecosystems, converting the grey deserts into green and blooming deserts. NABARD, other development banks and private sector (primarily through contract farming) should find the initiative attractive enough and jointly undertake replication and diffusion of the technology.

4.2.7.27. **Traveling workshop:** In order to learn from the successful experiences of other countries on water management in arid agro-ecosystems, a traveling seminar comprising experts from Israel, Egypt, Turkey, Jordan and USA (Arizona) should be organized by the MoA. The Indian team, after a detailed briefing, should start the field visit and on-the-spot discussions starting from the entry point of the Rajasthan Canal in the arid zone and to all other agro-ecologically different regions of the agro-ecosystem. The “hot spots” where recent tensions on water sharing in the Indian arid zone (resulting in a few farmers’ death in Rajasthan) should also be visited to assess the ground problems and solutions. Farmers, NGOs, development agencies, ICAR, SAU and State Govt. representatives should join the seminar. Its findings should critically be analysed by the Task Force of the NADFA and presented at the national level in the presence of all stakeholders and concerned ministries and departments and internalized in the national water policy. If necessary, an Indian team comprising the various stakeholders should visit successful sites and experiences abroad.

**Drought Proofing, Risk Avoidance and Management**

4.2.7.28. The damages caused by droughts, year after year, are huge and destabilizing. Consequently, the Government has to provide equally huge relief funds, with little asset formation and durable impact. In fact, **the drought budgeting during**
the past five years has been higher than the budgeting for irrigation. In order to obviate this recurring loss, several steps, as enumerated in the following paragraphs, should be followed:

4.2.7.29. As mentioned earlier, Special Integrated Agriculture Insurance Programmes, coupled with institutional credit and life-saving assistance programmes should be implemented for arid zone people. Although NABARD and other specialized commercial banks have developed credit plans at district levels and circulated a number of bankable schemes, there is not much credit flow for development of arid agriculture. Bankers generally treat the farmers as borrowers and not as clients. State developmental plans need to be formulated in consultation with the bankers, who must become more farmer-friendly and development-oriented.

4.2.7.30. Complementarily, schemes are needed for adequate drought proofing through popularization of integrated farming and mixed cropping systems by cultivation of agricultural and horticultural crops that are high value and are known for extreme drought tolerance with minimum funding support. Long-term measures such as wind breaks and shelter belt plantation and reinvigoration of local techniques and traditional wisdom for water conservation (reviving the ‘dying wisdom’ and the nadi, tankas and khadins) should be promoted by State Governments, including SAUs, the Consortium, Panchayats and grassroot organizations. Water literacy and peoples participation in management of water should assume high priority.

4.2.7.31. In order to reach the needy and to enhance effectiveness of such schemes, the criteria for classification and delineation of areas as arid, semi-arid and drought prone need to be revisited by the NADFA. Group dynamism and power of partnership should particularly be harnessed in arid agro ecosystems for mutual reinforcement of confidence of the various stakeholders. Development by small-marginal farmers through SHGs may eventually establish effective Small Farmers’ Estates (SFE) which will bring desired convergence among various processes of production, processing and marketing and establish and operate grain, fodder, feed, seed
and water banks each numbering about 700. These moves will help create off and non-farm employment opportunities.

Judicious Land Use Planning and Use

4.2.7.32. Selection of crops and cropping systems: The State Land Use Boards, State Extension Department, SAUs and farmers together should select crops and cropping systems in arable lands considering rainfall, soil type, length of growing season, marketability and household needs. Replacing low yielding cultivars with improved high yielding ones, which are resistant to abiotic and biotic stresses and optimizing their agro-techniques can easily reduce 20-30 percent cropping area without sacrificing grain production. Low rainfall areas (150-200 mm) and light textured soils with 8 weeks’ growing period should be kept for *Lasiurus sindicus* grass, range management and moth bean varieties like RMO-40, CAZRI-Moth 1, 2 and 3. Areas receiving 200-400 mm rainfall and 8-10 weeks’ growing period are suitable for short duration legumes, cluster bean, sesamum and agro-forestry. The areas having more than 400 mm rainfall, heavy soil and 8-12 weeks’ growing period should be kept under pearl millet, guar, cowpea, and sesamum. Dual-purpose pearl millet variety, providing good grain and fodder yield, such as CZP-9802, should be preferred.

4.2.7.33. Rotation and inter-cropping with legumes: There is sufficient data at CAZRI showing that pearl millet after clusterbean produces double the grain yield compared to that obtained under mono cropping. Inter-cropping with legumes boosts the yield of the companion crop. Therefore legumes should be introduced in sequence or in rotation for improving fertility and productivity of arid lands.

4.2.7.34. Revolution with specialized arid zone cash crops: Arid region is endowed with drought-hardy species of medicinal and aromatic plants, spices and condiments. There are areas which are highly suitable for growing crops like isabgol, methi, mehndi, cumin and medicinal and aromatic plants. As trees have got long gestation period, and reduced crop yields, farmers are inclined to shift to cultivation of these specialized cash crops. Through post harvest and value addition and proper liaison
with industries, economy of arid region can be revolutionized by commercializing these cash crops. Based on the edapho-climatic conditions, crop zones for pearl millet, mustard and special crops should be delineated. Farmers should accordingly be trained and educated by District SLM Consortium and extension agents for growing these crops, their post-harvest management and for improving their economy.

4.2.7.35. **Soil test based micro-nutrient amendments for increasing yields:** Nearly 80-100 per cent of the tested farmers’ fields in several pockets of the arid zone were severely deficient in boron, zinc and sulphur in addition to the macro-nutrients like nitrogen and phosphorus. Farmer participatory trials with micro-nutrient amendments increased crop yield by about 50 per cent. The economic gains with the application of micro-nutrients were substantial. This technology should be adopted on large scale throughout arid areas of the country. Additional facilities for soil test analysis for all the 16 macro and micronutrients are needed to implement this programme. To begin with, the Central Government may assist each arid zone district to establish one adequately equipped soil testing laboratory which could reliably test for the various nutrients, especially the micronutrients. The SAUs and their KVKs should be actively involved in this task. Additional investment both in terms of equipment and human resources are required to create credible soil testing laboratories.

4.2.7.36. **Animal-based farming system and good grazing practices:** Animals are the mainstay of the arid agro ecosystem. An integrated livestock based farming system, with focus on pastures, horticulture, medicinal plants, bio-fuel and oil bearing plants should be endeavoured. In the process, culturable wastelands, marginal lands and non-arable lands can be fruitfully utilized for pasture development and silvi-horti-pastures for animal husbandry. Sandy wastelands can also be fruitfully utilized for shrubs and grasses. But, poor grazing practices and high stocking rates, particularly in the sub-alpine pastures have denuded the pastures, sometimes beyond rejuvenation as exotic invasive weeds have replaced the native vegetation. The NDDB cooperative model for production-marketing link for milk and milk products should be adopted throughout the zone.
4.2.7.37. **Fodder production:** In order to overcome the main bottleneck of the paucity of fodder, the scarcity being 35 per cent during normal rainfall years and as high as 75-80% in drought years, to meet the demand of the huge livestock population in the zone, incentive should be given to farmers to grow fodder crops in part of their lands. Livestock–based farming system should attempt reduction in pearl millet area from 60 to 40 per cent while increasing legumes form 20 to 30 per cent, oilseeds from 10 to15 and forage from 10 to 15 per cent. It has been worked out that in a seven-hectare farming system model, agro-horti may be assigned 30 per cent, agro-forestry 25 per cent, agri-pasture 15 per cent and silvi-pasture 10 per cent. Nearly 300 demonstrations of this model are proposed in the arid zones of Rajasthan, Gujarat and Haryana.

4.2.7.38. **Fodder bank:** The fodder is generally imported from neighboring states during drought at exorbitant rates. During good rainfall years there is a high potential of production of fodder from wastelands, marginal lands, community lands and by assigning some parts of arable lands. **High priority should be given to the production of fodder and creation of fodder banks for the locally grown fodder.** About 1,200 fodder banks are proposed. These fodder banks need to be created at Panchayat Samiti level, preferably with the involvement of SHGs and SFEs, and the fodder can be utilized during scarcity period/drought. Further, with the availability of fodder block machines, both stationary and mobile, **compressed fodder bricks and bundles, easy to transport and store, should be produced at large scale and stored in the fodder banks.** Such bricks, also made of straw plus urea plus molasses could be made in the adjoining States of Punjab, Haryana and Westerns UP (where surplus straw is available and is often burnt in the field itself) and transported into Rajasthan or other needy states for immediate consumption or for augmenting the fodder banks.

4.2.7.39. **Management of cattle:** During a drought year, a large number of cattle are let loose or sent to gaushalas, which is a unique way of management of cattle population. There are more then 226 gaushalas in arid region of Rajasthan, Jodhpur district alone hosts about 146 of them. These gaushalas have been created for philanthropic reasons, and act as cushion for cattle management during stress. The by-
product of gawshalas are utilized as medicines, insecticides, manures etc. These noble institutions should be encouraged and promoted by State Governments through providing veterinary assistance and training of the caretakers for adequate upkeep of the animals.

4.2.7.40. **Saline water fish culture:** Production of **Scampi** in saline water accumulated due to over irrigation and inappropriate water management in major canal command areas, such as Indira Gandhi Naher Pariyojna (IGNP) in Rajasthan, is a profitable proposition. The technology is indigenously available and special extension efforts and incentives should be launched by the States using the saline soils/water for production of Scampi. A benefit: cost ratio of about 1.5 has been realized under several trials in these settings.

**Mechanization of Arid Zone Agriculture**

4.2.7.41. **Precision and timeliness of agricultural operations are fundamental to the success of arid zone agriculture.** Further, for maximum output we have to shift to high-tech agriculture in selected areas that require greenhouses and specialized equipment for precision farming. There is also need for developing energy-efficient implements for various operations. Trials at various levels have revealed that **crop productivity, operation cost and time and inputs efficiency can be increased by 25 to 50 per cent through mechanization, thus increasing farmers’ income by about Rs.3000 to Rs. 5000 per ha.**

4.2.7.42. Feed and fodder shortages are major concerns in arid regions, especially during drought years, when large-scale transportation of fodder becomes too voluminous and, hence, cumbersome. Therefore, appropriate mechanization of harvesting, bailing and storage of fodder is a necessity. Further, harvesting of perennials like Henna, Kair, etc. need special tools.

4.2.7.43 With the increased emphasis on horticulture-led diversification in arid zone, and considering that horticultural harvests are generally perishable, rural processing and value addition will be essential to ensure suitable prices and prevention of post-
harvest losses. Suitable low-cost processing machines will need to be popularized in rural areas.

4.2.7.44 Quality production of equipment through local industry, improving availability of costly implements to farmers through custom hiring centres and capacity building of farmers, industry workers and entrepreneurs are key elements of arid zone mechanization policy framework. Supports of Central as well as State Governments are needed in the following aspects of mechanization:

- **Creating strong R&D centres** for arid zone mechanization.
- **Developing training infrastructure** for capacity building of farmers, operators, industry workers and entrepreneurs of custom hiring centres.
- **Linking banking institutions** for financing different activities including purchases by farmers for setting industry and custom hiring centres etc at reasonable rate of interest.
- **Simplified, smooth and transparent flow of subsidy** to resource-poor farmers for procuring implements and small machines.

**Preserving Livestock Heritage and Establishing Gene Banks**

4.2.7.45 The National Bureau of Plant Genetic Resources, The National Bureau of Animal Genetic Resources, The National Bureau of Agricultural Micro-organisms and other concerned Central and State agencies, in collaboration with local communities, should help chronicle and digitise inventories of the bio resources of the hot and cold arid zones covering plants, animals, fish and microorganisms. **Genetic and gene literacy movement should be launched for all stakeholders, especially the farmers.** An **integrated conservation strategy, in situ, ex situ**, including suitably managed field repositories, will be needed for converting the biological wealth into economic wealth. There is scope for introducing and commercialising exotic germplasm such as of cactus, pear, quandong, cardo, African dove plum, organ tree, marula nut, nance, oyster nut and other nuts. But, this must be done only in accordance with the SPS and IPR provisions, and the three Bureaus must play the Leading role in this context.
Traditionally, many of the finest Indian cattle milch breeds like, Tharparker, Gir, Kankrej, Sahiwal, Rathi etc have been evolved from arid regions of Rajasthan and Gujarat. Buffaloes, particularly the breeds like Mehsana, Surti, Jafrabadi are popular in arid regions of Gujarat, Murrah in Southern Haryana and Nagpuri in parts of Maharashtra. **But due to unscientific and uncontrolled cross breeding, the quality of some of the excellent livestock is on continuous decline.** For example, one of the hardiest and best breeds of Tharparker cow has only 10 per cent now. The excellent ‘Nagauri’ breed, which is famous for draft bullocks, is being relegated due to the use of tractors. In Gujarat, Khunni buffalo, which is capable to subsist on zero management, is on the decline due to degradation of Banni grassland in Kachchh district. These trends should not only be arrested but must be reversed. In fact, our **rich national animal heritage and genetic resources are seriously threatened.**

In order to safeguard the precious germplasm, it is recommended that a part of the **Suratgarh Farm (in Rajasthan) of the Government of India should be developed as an ex-situ germplasm repository of arid zone livestock.** The centre should also undertake genetic improvement programmes of the local breeds. Quality semen banks to facilitate artificial insemination programmes should also be established at the farm. Additional model animal farms could be developed at strategic locations considering the geophysical characteristics of the area where local breeds could be preserved, germplasm banks could be established and training facilities could be developed on veterinary first aid, AI and improved management practices. In fact, these farms should work not only as a technology transfer centers but should also be instrumental in triggering associated socio-economic changes. **Protection, utilization and further enrichment of wealth of traditional wisdom of the desert dwellers as to how people survived without depletion or over exploitation of natural resources, as well as of tribals who inhabit arid zones in large numbers, is as important, if not more, as the indigenous biodiversity.** Many of the survival and resource conservation and utilization strategies and knowledge are presently under severe strain. Some are no more practiced because of increased demand, weakening of societal control and lack of collective concern. The time-tested values and
traditional knowledge and devices should be systematically documented and fine-tuned to meet local needs and to improve their efficiencies. Several of them provide lead for new and modern technologies. Willing participation and mobilization of local communities and rural institutions from planning through execution in R&D efforts, therefore, assume a high priority. **The PVPFR Act, enacted in 2001, should be implemented to benefit farmers, including tribals, as conservers and breeders.** The National Authority on Plant Variety Protection should be rendered functional as soon as possible. **Loss of a genetic resource is a loss for ever, and it is happening unabated.**

**Socio- Economically and Agro Ecologically Differentiated Approach and Utilization of Special Features of Arid Agro-Ecosystem**

4.2.7.49. In arid areas, natural resources endowment and development potential vary greatly from location to location. The northwest arid zones and southern arid zones are very different in their agro-ecological endowments and opportunities. In this context, non-arable lands from class V should be assigned to class VIII for permanent vegetation like pasture, silvi-pasture or afforestation. Therefore, **location specificity must be emphasized in micro planning, in allocation of resources and in setting socio-economic targets.** Area-based development duly internatilized in the integrated sustainable land use management approach, should be the hallmark of development and growth of arid areas. Therefore, we propose that the ICAR, Land Use Boards and concerned Central and State level agencies should delineate agro ecological sub-regions of the arid districts and the various programmes should be designed primarily by the Consortium to match their capacities. This will particularly be important for creating assets to ensure sustainability of the land, water and vegetational resources. Some of the important action programmes with high socio-economic and agro-ecological pay offs are described below.

4.2.7.50. **Seed production:** Recognizing that arid zone offers an ideal environment for producing quality seeds because the infection due to various pests and diseases is very low under these conditions, arid ecosystems should be utilized for producing seeds of
selected crops and can become a “Seed Bank” for the country. Farmers can also earn better income from seed production.

4.2.7.51. **Organic farming:** The level of fertilizer use due to risk aversion is rather low in arid zones. Since productivity or yields in arid zone are stabilized at lower level, these should best be achieved through organic manures. Organics will also improve soil physio-chemical properties and water retention in profile. Agricultural products such as vegetables, fruits, grains, pulses etc. produced organically should be suitably certified and marketed remuneratively for giving higher returns to the farmers.

4.2.7.52. **Harnessing solar and wind energy for agriculture:** Since there is ample of solar and wind energy available in arid zones and coastal belt of Gujarat arid regions, the natural renewable energy should be harnessed traditionally for agriculture and other commercial uses. Many post harvest industries should be integrated with solar and wind power. The R&D institutions, involving SAUs and other non-agricultural technology institutions should work together to design and popularize low cost devices to harness solar and wind energies at village as well as household levels. The State Task Force on Arid Agro-Ecosystem should oversee this activity.

4.2.7.53. **Arid horticulture:** Arid fruits such as ber, aonla, gunda, date, bael have excellent potential for integration in arid zone farming system. It was observed that even in extreme drought of 2002, ber crops fetched $1/3^{rd}$ of income through horticulture while there was complete failure of crops in the arid areas. Therefore, arid horticulture should be strongly promoted by State Departments of Agriculture and/or Horticulture for drought proofing and to improve the economy of arid land farmers.

**Special Attention to the Cold Arid Zone**

4.2.7.54. With more and more employment avenues open to the local people today in non-agricultural sector, the land-based economy stands neglected in cold arid zone. However, this situation could prove to be extremely short-lived as the current boom that
Ladakh, Lahul - Spiti and other tourist places are experiencing cannot be considered sustainable. Moreover, much of the opportunity is being mopped up by non.locals. Thus, **there is an urgent need to make land-based occupations more remunerative and economically rewarding.** At the same time, local capacity must be built (particularly in the sphere of entrepreneurship) to help locals tap the commercial possibilities of this sector. The Ladakh Autonomous Hill Development Council (LAHDC) and State authorities in Himachal Pradesh and Uttaranchal should ensure that the conservation of natural resources supporting the land based economy and the move towards increased cooperation between the various stakeholders that are a part of it could be adopted as additional measures.

4.2.7.55. The natural resources that support the land-based economy are themselves deteriorating rapidly. Soil is getting eroded due to the incessant mining of this precious resource. Similarly, water resources (especially glaciers) have been receding for the past many years, purportedly due to the effect of global warming. Pastures have been severely neglected resulting in poor forage availability. This in turn is largely because of the lack of proper irrigation facilities, which has put a severe constraint on the development of the livestock industry in the region.

4.2.7.56. New strategies should be adopted by the LAHDC, particularly the Horticulture and Agriculture Departments to meet the above challenges. Firstly, the region must reduce its dependence on the outside world for critical requirements such as food by strengthening agricultural production and productivity. Traditional technologies should be judiciously blended with modern technologies to build on the time-tested approaches. Diversified integrated farming systems encompassing use of organics and service exchange systems should be pursued. The indigenous and traditional knowledge systems should be protected and gene banks for conservation of the rich biodiversity should be established. Further, additional land should be brought under cultivation and should particularly be allotted to landless farmers for greater equity. Participatory irrigation approaches, adoption of intensive cultivation techniques, greenhouse cultivation, IPM, pasture and forage development, management of zoonotic diseases and optimization of herd sizes and herd insurance should be strengthened. **It would be**
helpful if Pashmina production in Changthang could be raised to 65,000 kg per year and in the rest of Ladakh to 6,000 kg by the year 2025 to maintain the leadership of the region in this highly specialized commodity.

4.2.7.57. Secondly, the interest of the people in land-based economy must be revived. The local people, particularly the youth, must be sensitized and made aware of the important role that agriculture, livestock and horticulture have played and will continue to play in the socio-economic and overall livelihood security of the people in these areas. Training programmes for skill improvement and promotion of land-based entrepreneurship should be undertaken through producers’ groups and Self Help Groups (SHGs) as well as by individuals to streamline the production, value addition and marketing activities. Assistance in the form of credit, marketing infrastructure and support prices will be essential for linking the producers with the consumers.

4.2.7.58. Thirdly, agriculture (in a comprehensive sense) must become remunerative to the farmers and to all those linked with it. The cold arids constitute special niches for vegetable seed production, floriculture (off season cut flowers and bulbs), medicinal and aromatic plants and several highly nutritious rare fruits like seabuckthorn and nuts like walnuts and “exotic” vegetables. In order to receive remunerative returns from these specialty products, strong marketing initiatives, linking the producer with the consumer at mutually beneficial terms should be created. Existing systems such as the HPMC (Horticultural Produce Marketing Corporation), marketing cooperatives, Mandis, and agriclinics should be strengthened through additional infrastructural and database and information sharing facilities. Greater use of small effective machines to enhance productivity of the labour force, integrated soil and water management through the plant, soil and water testing facilities and knowledge-based technological interventions will be essential for increasing overall productivity and profitability. The ICAR should open a regional station of the Central Arid Zone Research Institute (CAZRI) in Ladakh to cater to the technological needs of the cold arid region. Linkages with other initiatives, especially those of DRDO and ISRO
should be ensured. An integrated cold arid area development programme for soil, water and biodiversity conservation should be intensified.

4.2.7.59. Fourthly, the economic growth must be synergized with environmental and ecological security. Priority should be given to pastures improvement, increased efficiency of existing irrigation facilities, and to the creation of additional irrigation resources by harnessing micro irrigation devices and by tapping hydro, solar and thermal powers in a participatory mode. Improved fodder production and sustainable grazing systems and good grazing practices should be evolved and enforced. In this context, traditional migration patterns should be revived and conditions should be created for extended stay at summer pastures, both for herders and livestocks. The socio-economic and cultural interests and roles of the herders and nomads, who are distinct and important component of the cold arids (as also in hot arids) should be duly promoted by the State Governments. Moreover, as climate change is already impacting the glacier regimes and snow lines in the cold arid zones, research and technology development processes should focus on evolving and adopting coping and new climate change management mechanisms, such as creation and maintenance of new artificial water bodies. The proposed National Centre on Glacierology (see Chapter 4.1) should address these issues.

Bridging Technology Gap: Connecting the Disconnect

4.2.7.60. There is almost a total disconnect between research and extension. A good number of Central Research Institutions of ICAR and of SAUs, particularly research through All India Co-ordinated Research Projects (AICRPs), NARP, NATP and others, have developed technologies for arid regions. Pioneering work in natural resource management (NRM) at CAZRI, Jodhpur for arid zone and CRIDA and ICRISAT at Hyderabad for semi-arid zone, on dry land horticulture under AICRP (Horticulture) and at CIAH, Bikaner and on livestock at CS & WRI, Avikanagar, CIRG for Goats at Makhdoom, NRC for Camel at Bikaner and DRDO’s agricultural technology development initiatives at Ladakh alongwith the J&K State Government initiatives are worth mentioning. Production system research (PSR) has generated technologies on land
and water resources, cropping systems, soil microbes, salinisation in IGNP areas, low-cost greenhouse and offseason cropping and production of high value low volume products, including seeds in cold arid areas and characterization and improvement of breeds, brackish water fish culture, feed enrichment and reproductive efficiency improvement in livestock sector. But, only those technologies (as elucidated in Box 1) which had linkage with value addition and marketing have been adopted and majority of the other technologies continue to await adoption.

Box 1.

### Arid Zone Horticulture: Some Success Stories

#### Ber Cultivation
- With the introduction of improved cultivars the area under ber in Rajasthan has increased during 1984 to 1996 from 229 ha to 829 ha. And production from 1387 t to 4145 t.
- Varieties such as Gola, Seb, Mundia, Umran were found to be promising in this region.
- A preliminary survey has shown that 5 million plants are produced every year which generates employment to the tune of 37,500 man days.
- On average Rs. 20,000 per ha is realized as net profit in normal rainfall years. Even in extreme drought condition in 2002 in Rajasthan, ber fetched 1/3rd of the income when there was complete failure in other crops.

#### Henna Cultivation
- Henna (*Lawsania inermis*) is known for natural dye and leaves are used for cosmetic purpose. Its export potential is Rs. 80-100 crores.
- Identification of high yielding MH-1 and MH-2 varieties (3-3.5 q/ha) with high quality of dye and distribution of saplings of improved varieties helped in the spread of henna to about 35000 ha in Rajasthan and Gujarat with a net return of Rs. 10,000 per ha.

#### Senna Cultivation
- Senna (*Cassia angustifolia*), an ideal crop for degraded land with leaves of medicinal value, is a drought hardy shrub.
- High yielding cultivars Tuticorin and Bikana with 8-10 q /ha /year yield helped in spread of senna cultivation to over 11,000 ha in Rajasthan and Gujarat.
- A Senna composite with 3.8% sennoside content, against 2.84% in commonly grown one, has been developed.
- A net return of Rs. 10,000 per year per ha is expected from senna cultivation in arid zone. The estimated export potential of the crop is Rs. 11 crores.
- Marketing associations have been formed for senna and processing units established in Bikaner and Jodhpur.

4.2.7.61. Transferable technologies for sustainable land use and enhancement of productivity of crop and livestock sector are now reasonably well developed. The Angora rabbit production is popular in hilly areas of H.P., U.P., Eastern region and Tamil Nadu.
One Angora rabbit can give net income of Rs. 150 to 200 per year. Such successful experiences should be widely adopted through creating grassroot institutions and public-private linkages. Other transferable technologies include: the Bharat Merino Sheep, enhanced reproductive ability of sheep, hybrid rabbits, fat lamb production, handloom woven blankets, wool camel hair blended products, hand made felts from blended rabbit and sheep wool of inferior quality. **About 2000 large-scale demonstrations of catalytic technological interventions are proposed to be carried out by State Governments in collaboration with private sector, NGOs, SAUs and ICAR to disseminate the technologies.**

4.2.7.62. **Given the pivotal role of livestock and horticulture sub-sectors in arid zones and high perishability of their products, very high priority should be given to post harvest processing, value addition, storage and establishment of cool chains. A post harvest technology wing should be added to each KVK to bridge the gap between production, distribution and pricing. Accordingly, the KVKs should be redesignated as Krishi and Udyog Vigyan Kendra (KUVKs).**

4.2.7.63. **Majority of the technologies developed by the various institutes await transfer and effective adoption. The Poor socio-economic base of small and marginal farmers and inadequate extension services are responsible for slow rate of adoption of new technologies, resulting in huge technology transfer gaps (Table 8). New extension and technology transfer mechanisms are needed to bridge the gaps. Group approach of extension through formation of self-help groups (SHGs) is one such approach. The small farmers SHGs in clusters should be helped to organize establishment of Small Farmers Estates (SFEs) covering an area of 200-500 ha each to capture the economies of scale.** It is proposed to establish 1000 SFEs during the next five years. Landless labourers should be supported with specialized activities like vermi-composting, beekeeping, IPM activities etc. SFEs for horticultural crops will suit well both in arid Rajasthan and Gujarat and semi-arid Andhra Pradesh and Karnataka.
Table 8. Yield gaps (technology transfer gaps), Bijapur

<table>
<thead>
<tr>
<th>Crop</th>
<th>10 years back</th>
<th>5 years back</th>
<th>Present (2003)</th>
<th>Potential</th>
<th>Gap-Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearlmillet</td>
<td>398</td>
<td>524</td>
<td>468</td>
<td>1500</td>
<td>1032</td>
</tr>
<tr>
<td>Groundnut</td>
<td>400</td>
<td>438</td>
<td>476</td>
<td>1180</td>
<td>704</td>
</tr>
<tr>
<td>Sunflower</td>
<td>400</td>
<td>495</td>
<td>545</td>
<td>900</td>
<td>855</td>
</tr>
<tr>
<td>Rabi Sorghum</td>
<td>430</td>
<td>450</td>
<td>485</td>
<td>1200</td>
<td>715</td>
</tr>
<tr>
<td>Chickpea</td>
<td>220</td>
<td>240</td>
<td>265</td>
<td>900</td>
<td>635</td>
</tr>
</tbody>
</table>

Source: CRIDA, 2004

4.2.7.64. Seed spices and medicinal and aromatic plants (MAP) should be promoted as sources of income to people living under harsh climatic conditions of the deserts. This highly specialized group of crops must be raised with technology backstopping and intensive training of poor farmers in the arid zone. Such skill development training will be effective only through SHGs and SFEs under scattered low population density areas. Wherever advantageous to the farmers, contract farming to ensure remunerative marketing of these specialty crops should also be promoted.

4.2.7.65. Training and follow-on extension support including provision of limited non-repayable micro-capital grant (MCG) to the SHGs and SFEs through making suitable provisions in various developmental schemes need immediate attention. The micro-capital grants will be provided to the groups and estates for adopting modern technologies to improve production, value addition and marketing.

4.2.7.66. Group capacity building will be crucial and structured support / participation of technical personnells both in public and private sector will be required. Services of SAUs, R&D units, KVKs, ATMA's and grassroot organizations should be rendered for organizing training of trainers as well as farmers. Farm schools, representing “bright spots”, numbering nearly 500, will be used for farmer to farmer training. Training focusing women empowerment should concentrate more on gender friendly technologies / messages favoured by women. For example, skills in raising
quality planting materials of horticultural crops and post harvest handling of farm produce may suit women farmers better.

Farmer–Centered Marketing

4.2.7.67. Due to small size of holding and low productivity of arid crops, the quantity of marketed surplus of individual farmers is generally low, which constrains smallholders from bargaining effectively. High transportation cost of small-sized marketable surplus raises the transaction cost. Further, higher inter-village distances make provision of marketing infrastructure like road connectivity, telephone links, location of storage godowns and emergence of processing units, relatively less viable compared to those in densely populated areas. As the public sector investment in infrastructure in arid areas remains a low priority, private investors, of course, show less interest in such investments. Keeping in mind these features unique to arid zone, special support should be provided to the marketing centres, whose success will underpin the livelihood security of the arid zone farmers, as the future productions will increasingly be market-led.

4.2.7.68. Out of 25 agricultural commodities for which national agricultural price policy is operative, there are several commodities which are grown in arid areas. These include pearlmillet, blackgram, greengram, moth, and mustard. Even wheat is grown wherever irrigation facilities are adequately available. By very definition of arid agriculture, farmers are able to harvest a satisfactory crop only in one out of three or four years. In such years, prices of these commodities, particularly during the peak marketing season, go below the support levels announced by the Government of India and situation warrants price support purchases by the public agencies. But, unlike rice and wheat in regular surplus producing areas (of Punjab, Haryana, Western UP & A.P), the arrangements for support operations either do not exist or farmers have to agitate for quite some time and then only support operations commence. By that time, several farmers are compelled, by cash needs, to sell to private traders at lower prices. While the need for support operations in these areas is all the more acute (because such occasions arise in a year after a lapse of 3 to 4 years), the farmers of arid areas do not get benefit due to faulty planning.
4.2.7.69. Apart from the commodities covered under national price support policy, there are several commodities which are life-line of arid farmers, for which the provision of Market Intervention Scheme (MIS) of GOI exists but due to lack of prudent planning, full benefits of MIS do not reach the arid farmers. Such commodities are guar, cumin, coriander, fennel and fenugreek and should be included in MIS. The inter-year price fluctuations in these arid zone crops are relatively larger hence provision should be made to insulate farmers from abnormal price dips.

4.2.7.70. There are several other commodities and products of arid zone which have special geographical indications, and considerable demand in distant markets, including overseas markets. These include sojat ki mehandi, kair, sangari, bikaneri bhujia, isabgol etc, which have considerable potential of increasing employment and income through branding and organised marketing and this requires (i) working capital support to farmers, (ii) modern terminal markets, (iii) strong market information system, (iv) branding and publicity and (v) organized, transparent and professional markets. After careful market research, special market plans and facilities should be created for these specialty products. Following the NDDB pattern, SAFAL type (as in Bangalore) venture should be established in Western Rajasthan, to begin with. Considering that forward linkages of production with value addition and marketing is the most crucial step in the end-to-end approach, the venture should be allocated the necessary financial support (nearly Rs.75 crores) for one 100-acre modern terminal market. The pay off from such an investment will be high, estimated at least 15 % IRR, not only in financial terms but also in social terms through increased employment opportunities and greater access to nutritive and high quality products.

4.2.7.71. Notwithstanding the recommendations contained in the Chapter on Marketing of this Report, the following strategies for strengthening production and marketing linkages in arid zone should be followed:

- Increase public investment in marketing infrastructure like rural roads, small rural storage godowns, cold chains and processing units. Relax
viability norms and provide tax and other incentives to private investors to invest in arid areas.

- Modern Transactional Banking in villages or in cluster of villages. The village knowledge centres must play key role in collecting and disseminating market and price information on relevant commodities.

- Adopt the revised APMC Act and amend State Agricultural Produce Marketing Acts to encourage private investment in agricultural marketing and contract farming arrangements.

- **Effectively implement price support policy in arid areas.** Instruments of advance planning and preparation for price support operations should be put in place at the State level.

- **Market Intervention Scheme for arid areas should be prudently formulated and implemented.** Both Central Government and States have a role.

- The role and functions of State Agricultural Marketing Boards and Agricultural Produce Market Committees should be redefined to include promotion of marketing organizations/contract – marketing arrangements of products specific to arid areas.

- **Agricultural marketing system research should be made a part of priority research under NARS for arid areas.**

- **Special commodity parks/zones** recently announced by the Government for arid-zone specific commodities should be put in place and made functional as early as possible.

- Extension agencies and NGOs must give emphasis on training of farmers in post-harvest operations, group marketing, packaging and branding at farm/village level and quality maintenance; enhancing quality and trade literacy.

- Develop **periodic markets** and increasing numbers of farmers’ markets and provide grading, sorting, standardization facilities in villages.
4.2.8.0 Financial Implications

4.2.8.1 A National Agriculture Risk Fund, as an institutional lifesaving support, is required to be set up by the Central Government for providing relief to the farmers in the event of successive droughts commonly experienced in Arid Agro-Ecosystems. Given the Poor economic condition of the farmers, many of whom are acutely stressed, Special Insurance Products, combined with Special Dispensation Mechanism, will be required to insulate the farmers from the high risk situation in arid zones. The Government of India may meet 50 per cent of the cost. The State Governments are called upon to provide Micro Capital Grants to SHGs, SFEs and other such groups to strengthen their capacities for backward and forward linkages in the production–processing-marketing chain, as initiated in Gujarat. The Central Government will be required to establish a Special Market Intervention Scheme for supporting prices of specialty products of arid zones in the year (once in 4 years or so) when the harvest is good. In order to bridge the serious gaps in marketing, a modern market centre will need to be established at a strategic place, preferably jointly by the Central and the concerned State Government.

4.2.8.2 In order to bridge the huge yield gaps and to capture new opportunities in productivity and income growth, increased financial resources will be needed for establishing advanced soil testing laboratories for addressing the micronutrient and other soil fertility imbalances, system-oriented on-farm demonstrations, supply of quality planting materials, promotion of “protected” (low cost greenhouse) production of high value commodities, strengthening of value addition and post harvest management and conservation of bio-diversity. Increased investment will also be required for establishing fodder, feed, grain and seed banks, training and capacity building at various levels, establishment of village knowledge centres and data bases. Additional financial resources will be required also for undertaking new researches and development of new technologies, new methods of extension and technology transfer such as the use of farm schools, traveling seminars, environmental costing and its realization etc. The Department of Agriculture and the ICAR of the
Ministry of Agriculture should provide part of the funds needed through re-ordering of priorities under their ongoing programmes.

An additional sum of Rs. 1,275 crore as detailed below, may be provided in the budget to cater to the above mentioned requirements (of which Rs.1075 crore to be provided by the GOI and the remaining Rs. 200 crore to be provided by State Governments) to implement the various activities during the next seven years, including the remaining two years of the current Five Year Plan and five years of the next Plan.

- A National Risk Fund ---- Rs.500 crore (GOI)
- Special Insurance Products and Dispensation --- Rs. 300 crore (GOI)
- Micro-Capital Grant to support drought proofing and to assist and mentor SHGs and SFEs ---Rs. 300 crore (State Government Rs. 200 crore and Central Government Rs.100 crore)
- Special Market Intervention Scheme ---Rs. 100 crore (GOI)
- Establishment of modern marketing centre --- Rs. 75 crore (GOI)
- Contingency fund--- Rs. 500 crore (GOI)*
- Strengthening horticulture-led diversification--- Rs. 300 crore (NHM)*
- Livestock *ex situ* germplasm conservation at Suratgarh Farm--- Rs. 100 crore (ICAR)*
- Augmenting water availability by promoting rainwater harvesting, groundwater recharge and water bodies restoration, development and management --- Rs. 250 crore *
- 2000 large scale demonstrations, establishment of 700 each of fodder, feed and grain banks, 1000 Farm Schools --- Rs. 300 crore *
- Soil health care based on soil test, including micronutrients analysis and popularization of agricultural machines and implements--- Rs. 200 crore*
- Commercialization of date palm production, support to micro-irrigation supply of quality vitroplants and other planting materials --- Rs. 120 crore*
* To be met through redeployment of resources from existing National Horticulture Mission and other National Missions, Watershed Projects, ATMA, ICAR’s KVK and other projects and by using National Rural Employment Guarantee Scheme and Food for Work Programmes.

Acknowledgement

The National Commission on Farmers is indebted to the ICAR, particularly the nodal point, CAZRI, for organizing the Experts Consultation on Arid Zone Agriculture on the 22\textsuperscript{nd} and 23\textsuperscript{rd} April, 2005 at Jodhpur. The Commission is also grateful to the Governments of Andhra Pradesh, Haryana, Karnataka, Jammu and Kashmir, Gujarat, and in particular to Rajasthan for deputing their experts and farmers to the consultation. The Commission also thanks the banks and financial institutions, other ICAR Institutions, State Agricultural Universities, NGOs, SHGs, Cooperatives, industries, etc., for their active participation. The valuable participation of farmers and their very useful contributions in this event are most gratefully acknowledged.
CHAPTER - 4.3

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

COASTAL ZONE AGRICULTURE

4.3.1 Our country is endowed with a long coastline of about 7,500 km of which the mainland accounts for 5,400 km, Lakshadweep coasts extend to 132 km and Andaman & Nicobar Islands have a coastline of about 1,900 km. Nearly 250 million people live within a distance of 50 km from the coast. The coastal zone is also endowed with a very wide range of coastal ecosystems like mangroves, coral reefs, sea grasses, salt marshes, sand dunes, estuaries, lagoons, etc., as well as with a rich diversity in both living and non-living resources. The coastal areas are assuming greater importance in recent years, owing to increasing human population, urbanization and accelerated developmental activities. These anthropogenic activities have put tremendous pressure on the fragile coastal environment and on marine biodiversity.

4.3.2 The coastal areas are subjected to frequent natural hazards. Some of the serious natural calamities in recent years are the super cyclone, which hit the Orissa coast in 1999 and the tsunami that occurred on 26 December, 2004. Along the coastal zone millions of farm and fisher families live and earn their livelihood. A Committee set up by the Ministry of Environment and Forests to review the coastal Regulations Zone Notification of 1991 under the Chairmanship of Prof M S Swaminathan has recommended that all development along coastal areas should be based on the principles of integrated coastal zone management, giving concurrent attention to the sea and land surface. India has nearly 2 million sq. km of sea surfaces available for economic use under the Exclusive Economic Zone of the UN Law of the Sea Convention. Unfortunately at present, coastal zone resources are being exploited in an unsustainable manner.

4.3.3 In chapter 3 on Fish for All in this report, we have recommended that an expert Committee may be set up to develop proposals for aquarian reforms on the lines of land reforms. The aim is to promote harmony between artesanl and mechanized fisheries on
the one hand, and agriculture and aquaculture on the other. We have also proposed the setting up of Fish for All Resource and Training Centres on the model of Krishi Vigyan Kendras for the purpose of imparting the latest technical skills to fisher women and men in all aspects of sustainable capture and culture fisheries. The training will cover the entire range of activities from capture or culture to consumption. This will help to avoid the growing conflicts between farmers and aquaculturists. We have also recommended Low External Input Sustainable Aquaculture (LEISA) in order to ensure that aquaculture can be practiced without ecological and social harm.

4.3.4 It would be useful to organise Women’s Aquaculture Estates along the coast through Women’s Development Corporations and financial institutions for the purpose of assisting dalit and fisherwomen to take to sustainable and profitable aquaculture. Seawater constitutes more than 97% of the available global water resources. In launching the Dandi March 75 years ago, Mahatma Gandhi wanted to stress that seawater should remain a social resource and should not be privatized either by Government or industry. In view of our long shoreline, it would be useful to initiate a programme on “Sea Water Farming for Coastal Area Prosperity”. Such a programme will involve the planting of mangroves, salicornia, atriplex and other halophytes. In the canals, shrimp/prawn farming can be undertaken. Such agro-aqua farms will generate considerable income and employment for coastal fisher and farm communities. We recommend the establishment of agro-aqua farms under the seawater farming project in about 50,000 ha in the States of Gujarat (Kutch), Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal. Coastal wastelands could be identified for this purpose. This kind of agro-forestry involving salt tolerant tree species and shrimp farming would provide additional livelihood opportunities which are very urgently needed in many coastal areas where considerable environmental damage is taking place due to increasing human population and unemployment.

4.3.5 The Sea Water Farming for Coastal Area Prosperity programme can be taken up in tsunami affected States with funds provided for rehabilitation. The planting of mangroves and other trees will confer both ecological and economic benefits. The
mangroves, casuarina and other tree species will serve as bio-shields, reducing the fury of cyclonic storms and tidal waves. Hence, we recommend that the Sea Water Farming for Coastal Area Prosperity Programme, based on sound scientific principles of agro-forestry may be given priority in the livelihood rehabilitation programmes being sponsored under the Prime Minister’s Relief Fund.

4.3.6 In the field of agriculture, rice cultivation is the predominant land use near coastal areas. The ground water resources are getting depleted and in some cases there is seawater intrusion in the aquifer. The data of the extent of ground water use in different coastal areas are given in table 1 below:

**Table 1: Extent of Ground Water Use in Coastal Areas**

<table>
<thead>
<tr>
<th>State / Union Territory</th>
<th>Resources (Million ha. Mtr/yr)</th>
<th>Development (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>3.52909</td>
<td>26.10</td>
</tr>
<tr>
<td>Goa</td>
<td>0.02182</td>
<td>8.30</td>
</tr>
<tr>
<td>Gujarat</td>
<td>2.03767</td>
<td>49.29</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1.61750</td>
<td>33.06</td>
</tr>
<tr>
<td>Kerala</td>
<td>0.79003</td>
<td>18.99</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3.78677</td>
<td>34.70</td>
</tr>
<tr>
<td>Orissa</td>
<td>2.01287</td>
<td>15.22</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>2.64069</td>
<td>62.55</td>
</tr>
<tr>
<td>West Bengal</td>
<td>2.30914</td>
<td>32.19</td>
</tr>
<tr>
<td>UT of Dadra &amp; NH</td>
<td>0.00422</td>
<td>12.81</td>
</tr>
<tr>
<td>UT of Daman</td>
<td>0.00071</td>
<td>80.00</td>
</tr>
<tr>
<td>UT of Diu</td>
<td>0.00037</td>
<td>94.84</td>
</tr>
<tr>
<td>UT of Lakshadweep</td>
<td>0.003042</td>
<td>39.12</td>
</tr>
<tr>
<td>UT of Pondicherry</td>
<td>0.01746</td>
<td>77.63</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.79875</strong></td>
<td><strong>Average 35.38</strong></td>
</tr>
</tbody>
</table>

States, which still have a good untapped reservoir of groundwater near the sea, should use this invaluable resource very carefully.

4.3.7 Programmes should be developed for the conjunctive use of sea and fresh water. There is considerable potential for agro-forestry systems involving casuarina and several palms grown along with annual crops like arhar (pigeon pea). Already in many places casuarina, cashewnut and coconut are planted in a sequence from the shoreline. Unfortunately, research on coastal agriculture is very inadequate. There is need for
a Coastal Systems Research Programme (CSR) on the lines of Farming Systems Research Programme carried out in inland areas. Such a CSR programme should give concurrent attention to coastal agro-forestry, crop and animal husbandry and capture and culture fishings. **We recommend that ICAR may initiate an All India Coordinated Research Programme on coastal agriculture with the help of CSIR** (National Institute of Oceanography, Goa and the Central Salt and Marine Chemicals Research Institute, Bhavnagar) and State Agricultural / Animal Husbandry / Fisheries Universities. Currently fisheries research is fairly extensive, but coastal agriculture research is yet to receive the attention it needs.

4.3.8.0 The Coastal Zone Regulation Committee has recommended the following ground rules for management and sustainable use of coastal land and aquatic resources. We enclose these principles:

4.3.8.1 Ecological and cultural security, livelihood security and national security should be the cornerstones of an integrated coastal zone management policy.

4.3.8.2 The coastal zone would include an area from territorial limits (12 nautical miles), including its sea-bed to the administrative boundaries or the biological boundaries demarcated on the landward side of the sea coast. The coastal zone management should also include the inland tidal water bodies influenced by tidal action and the land area along such water bodies. This area should be taken up for an integrated, cohesive, multi-disciplinary and multi-sectoral coastal area management and regulatory system.

4.3.8.3 Regulation, education and social mobilization should be the three major components of a participatory and sustainable Coastal Zone Management strategy. Panchayati Raj institutions in coastal areas should be fully involved in the educational and social mobilization programmes.

4.3.8.4 Coastal regulation needs to be based on sound scientific and ecological principles and should safeguard both natural and cultural heritage. Heritage sites need particular
care and should be conserved in their pristine purity. These include areas of environmental significance, rich in biodiversity and scenic beauty. Bird sanctuaries, parks and breeding grounds of migratory birds should be protected.

4.3.8.5 **The precautionary approach** should be used where there are potential threats of serious or irreversible damage to ecologically fragile critical coastal systems and to living aquatic resources. Scientific uncertainty should not be used as an excuse for the unsustainable exploitation of coastal resources – both living and non-living.

4.3.8.6 Ecological economics should underpin economic activities, so that present day interests and future prospects are not antagonistic. Significant biological, cultural and natural assets should be considered incomparable, invaluable and irreplaceable and should receive overriding priority in the allocation of resources for coastal area protection and conservation

4.3.8.7 Coastal policy and regulations should be guided by the principles of gender and social equity as well as intra-generational and inter-generational equity, (i.e. the interests of future generations). They should be based on Mahatma Gandhi’s dictum, “Nature provides for everyone’s needs, but not for anyone’s greed”. All stakeholders should be involved in decision-making. Precious biological wealth, coming under Marine Biosphere Reserves, should be managed in a Trusteeship mode, with all the stakeholders protecting the unique natural wealth of biosphere reserves as Trustees and not as owners. A case study should be made on how the Gulf of Mannar Biosphere Trust is functioning, so that the Trusteeship pattern of sustainable management by the principal stakeholders can be replicated.

4.3.8.8 The regeneration of mangrove wetlands, coral reefs and sea grass beds as well as the promotion of coastal forestry and agro-forestry will confer both short and long term ecological and livelihood benefits. Carbon sequestration through coastal bio-shields will make an important contribution to promoting a balance between carbon emission and absorption, in addition to offering protection during coastal storms and calamities like
tsunami. An important lesson taught by the tsunami disaster is that the rehabilitation of degraded mangrove forests and the raising of coastal plantations of salicornia, casuarinas, Vetiver and appropriate species of halophytes will represent a “win-win” situation both for nature and coastal human habitations. No further time should be lost in initiating a national coastal bio-shield movement along the coasts of the mainland of India as well as islands. This can be a priority task under the National Rural Employment Guarantee and Food for Work Programmes.

4.3.8.9 The severe loss of life and livelihoods as well as property caused by tsunami in Andaman & Nicobar Islands and in the coastal regions of Tamil Nadu, Kerala, Andhra Pradesh and Pondicherry teaches us that short term commercial interests should not be allowed to undermine the ecological security of our coastal areas. Human memory tends to be short and neglecting the lessons of tsunami will be equivalent to writing off the future of coastal communities.

4.3.9 The prospects for sea level rise as a result of global warming and climate change are real. Therefore there is need for anticipatory research to meet the consequences of a rise in sea level to both agriculture and aquaculture. Integrated Coastal Zone Management will be possible only if there is convergence and synergy among numerous activities along the coast. Since several Ministries / Departments / Institutions are involved in the use of coastal land and water resources, it would be useful to set up a National Board for Coastal Agriculture under the Chairmanship of the Union Minister for Agriculture and Food in order to provide the coordination needed in policy formulation and task implementation in the area of coastal agriculture including capture and culture fisheries. Sustainable livelihoods have to be found for large numbers of landless labour families living along the coast if further damage to fragile coastal ecosystems is to be avoided. Also, we should harness seawater for sustainable tree farming and for fisheries.

4.3.10 Our coastal land and water resources can provide income and job security to millions of families living in coastal land areas provided we use them scientifically. Both
to benefit from this opportunity and to safeguard millions of children, women and men living along the coast from the fury of natural disasters like cyclones, storms and tsunamis, it is high time that we start initiating integrated and coordinated efforts to improve the productivity and profitability of fisheries, forestry and crop and animal husbandry along our 7,500 km coast line.

4.3.11 Integrated farming systems and the conjunctive use of sea and fresh water will open up new windows of livelihood opportunities for the 250 million people living in the coastal zone. We suggest that the proposed National Board for Coastal Agriculture (agriculture will cover crop and animal husbandry, fisheries and forestry) be set up soon. The Board should also have the Ministers in charge of Environment and Forests, Science and Technology, Ocean Development, Water Resources and Commerce and senior representatives from all the Coastal States and A & N and Lakshadweep Islands as Members, so that a holistic view on all aspects of sea water use and coastal agriculture management can be taken.
CHAPTER 4.4

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

MISSION FOR THE PROSPERITY OF SUGARCANE FARMERS

4.4.1.0 Sugarcane and Sugar Industries

4.4.1.1 Sugar industry is the second largest agro-based industry, next to textiles in India. However, it is by far the largest agro-based industry in rural areas. Nearly all other agro-based [large] industries are set up in urban areas. The sugar industry consists of two stages of production process- first, farm level sugarcane production and second processing of sugarcane into sugar. Sugarcane processing also generates valuable by-products, which are used in many downstream industries. There are 553 sugar mills in the country, out of which 453 were in operation during 2002-03. About 60% of the mills are in the cooperative sector, 35% in the private and 5% in the public sector. The sugar production during 2002-03 was 20.1 million ton as against 8.75 million ton in 1988-89.

4.4.1.2 Sugarcane cultivation, which is the first stage in the process of producing sugar, occupied around 4.30 million hectare in 2002-03 and produced 282 million ton of cane. Sugarcane occupies less than 2.5% of the total cultivated area and contributes nearly 7.5% gross value to the agricultural production in the country. About 4.5 million farmers grow sugarcane and a large number of agricultural labourers are involved in sugarcane cultivation, harvesting and other ancillary activities.

4.4.2.0 SWOT Analysis – Sugar Industry and Sugarcane Cultivation

4.4.2.1 Strengths

4.4.2.1.1 India is the second largest producer of sugar in the world after Brazil. During 2000-01 to 2002-03, India’s share in cane sugar production was around 15%. The industry has enabled the country to be self-reliant in this highly sensitive essential commodity of mass consumption. During the last three years, India exported about 4 million tons of sugar. The sugar industry pays well over Rs 10,000 crore to the sugarcane growers every year for cane, about Rs 1600 crore by way to excise duty and about Rs 600 crore as purchase tax and cess on cane. The total value of sugar produced is around Rs 24,000 crore. The sugar industry provides direct employment to nearly 0.5 million
workers, and a host of others gain employment in industries, which use its by-products as their raw material. Molasses, a by-product of the sugar industry is the main raw material for alcohol and alcohol-based industries. In India, a total of 290 distilleries with an installed capacity of about 3200 million litres are functioning; out of these, 107 distilleries are attached to the sugar factories themselves. Sugarcane bagasse is an important source of power in the sugar mills. Bagasse is also being used as raw material for paper industry. Another by-product, the press mud, contains plant nutrient and could be an important source of organic manure for the crops. The sugar factories, particularly the cooperative sugar factories have been the focal point for socio-economic development in the rural areas by mobilising rural resources, generating employment and higher incomes, transport and communication facilities. Further, many sugar factories have established schools, colleges, medical centres etc for the benefit of the rural populations in the area which have long-term productivity consequences.

4.4.2.1.2 Sugarcane is the only raw material for all the major sweeteners produced in India. Besides the sugar factories and other industries based on the by-products of these factories, sugarcane also supports rural and cottage industries, viz. gur [jaggery] and khandseri industries which together produce about 10 million tons of sweeteners.

4.4.2.1.3 Sugarcane is more profitable relative to other crops in the area where it is planted.

4.4.2.3.0 Weaknesses

4.4.2.3.1 The health of the sugar industry is not good and it is facing problem in attracting fresh capital. The sugar mills often find it difficult to pay for the sugarcane supplied by the farmers on time. The large and surplus production in recent years and the limitation of storage space and the costs involved had aggravated the problems. Obsolescence of technology and machinery is another factor along with unsustainable low installed capacity of many factories. Over 40% of the factories are reported to be more than 40 years old. In many of these factories mechanical breakdowns are more than normal, fuel consumption is much higher and extraction rate is low. Poor management [lack of professionalism particularly in the cooperative and public sector units] and diversion of funds are the other weaknesses of the sugar industry. Short crushing season and lack of development of alternative feed stock are other issues, which need attention.
4.4.2.3.2 The major problem of the sugarcane cultivation is the stagnation/decline in the average yield over the years. An average all India yield of above 66MT/ha was achieved in 1991-92 where as in 2002-03 it was 64.6MT/ha. The highest average yield during the last 12 years was obtained in 1994-95 at 71.3MT/ha and more or less similar average yields were obtained in 1998-99 [71.2MT/ha] and 1997-98 [71.1MT/ha]. However, since 1998-99, the average yield has continuously declined. The reasons for the stagnancy/decline are discussed subsequently.

4.4.2.3.3 The mismatch between cane production and demand from the sugar factories is another issue. Over time, the growth rates in cane crushing capacity, quantity of cane crushed and sugar production has outstripped the same in terms of area under cane, its yield rate and total production. Thus, a situation of general cane shortage has been created, leading to competitive bidding up of the price of cane, which is the major item of cost in the production of sugar. The problem was compounded by the decline in sugar prices during 2001-02 to 2003-04 causing serious financial problems to the sugar industries and the sugarcane growers due to mordinate delay in payment of cane prices.

**Table 1: Compound Annual Growth Rate: 1950-1999 (In percentage)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area under cane</td>
<td>3.83</td>
<td>0.63</td>
<td>1.88</td>
<td>1.45</td>
<td>1.66</td>
</tr>
<tr>
<td>Cane Yield</td>
<td>1.28</td>
<td>1.13</td>
<td>0.66</td>
<td>1.21</td>
<td>1.09</td>
</tr>
<tr>
<td>Cane production</td>
<td>5.11</td>
<td>1.76</td>
<td>2.45</td>
<td>2.66</td>
<td>2.75</td>
</tr>
<tr>
<td>Actual crushing Capacity</td>
<td>2.89</td>
<td>1.87</td>
<td>1.57</td>
<td>1.70</td>
<td>4.70</td>
</tr>
<tr>
<td>Cane Crushed</td>
<td>8.04</td>
<td>2.27</td>
<td>4.63</td>
<td>5.24</td>
<td>4.05</td>
</tr>
<tr>
<td>Sugar Production</td>
<td>8.00</td>
<td>2.86</td>
<td>4.69</td>
<td>5.34</td>
<td>4.02</td>
</tr>
</tbody>
</table>

*Source: Indian Sugar: Nov. 2001*

4.4.2.4.0 Opportunities

4.4.2.4.1 The silver lining for the sugar industry in India is the rapid growth in the per capita consumption of sugar, the rate of growth in population and the fact that the consumption of sugar as a proportion of total consumption of sweeteners viz. sugar, gur and khandseri is also increasing. Based on the growth trends, the average per capita consumption of sugar in India is estimated to increase from the level of 18.3 kg per year in 2001-02 to 23-24 kg by 2010. Even on the basis of an average consumption of 21 kg
per year and the projected population 1.16 billion by 2010, the total demand of sugar is estimated to increase to 24.3 million tons. Further, the domestic prices of sugar during the last about a year or so have also firmed up. Another important opportunity for the sugar industry is the potential of its by-products particularly molasses for manufacture of ‘ethanol’. Based on the research findings, up to about 20% ethanol could be blended with petrol even without any change in engine design and carburetor. Ethanol is not only eco-friendly, but could also be foreign exchange saver for India. This is becoming more relevant by the day with increasing international prices of crude. It is also possible to have car engines totally run on alcohol, as in Brazil, which could further save the consumption of petrol. There is also considerable potential for production of many value added products from cane juice and also developing full potential of production of green fuel from bagasse.

4.4.2.4.2 On sugarcane production, the major opportunities are the large potential to increase the productivity of cane and also the sugar recovery levels. As per the agro biological calculation and considering 50% use of solar radiation and 30% transpiration loss in sugarcane, it is considered possible to have a yield of 600Mt/ha [based on a paper submitted by the Vasantdada Sugar Institute, Pune]. Some of the progressive farmers in Maharashtra have achieved 350MT/ha yield. The following table shows

Table 2: Yield position and potential of sugarcane

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Details</th>
<th>Sub-Tropical Zone</th>
<th>Tropical Zone</th>
<th>Average India</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Average yield of sugarcane 2001-02 (MT/ha)</td>
<td>52.07</td>
<td>82.73</td>
<td>67.40</td>
</tr>
<tr>
<td>2</td>
<td>Yield obtained in crop demonstrations (MT/ha) [average]</td>
<td>78.05</td>
<td>102.30</td>
<td>90.40</td>
</tr>
<tr>
<td>3</td>
<td>Yield in crop yield competition (MT/ha) [average]</td>
<td>175.00</td>
<td>256.50</td>
<td>215.75</td>
</tr>
</tbody>
</table>

[Based on information provided by the Vasantdada Sugar Institute, Pune]

4.4.2.4.3 This is further strengthened from the fact that the average yield in Tamil Nadu was 101.6MT/ha in 2001-02 and 106.8MT/ha in 2002-03, even Karnataka had achieved average yield of above 81MT/ha in the above years. The potential to improve average recovery level is also there, with Maharashtra consistently achieving well over 11%
recovery for last about 8 years and Karnataka well over 10.5% during the last 4 years against the all India recovery of around 10.3% during 2001-02 & 2002-03. The above shows that technology and do-how does exist in India to achieve a much higher level of productivity and quality of sugarcane production, the need however is to make well planned concerted efforts in this direction.

4.4.2.5.0 Threats

4.4.2.5.1. Sugar is probably the most distorted among agricultural products in the global market mainly due to policy distortions in some major developed countries like the U.S, Japan, EU etc. which has kept the global demand much lower. It not merely affects the export demand of Indian sugar, but also creates problems due to possibility of cheaper imports. Other important issues for the sugar industry are the aspects relating to the pricing of the sugarcane. If the cost of sugar is to be brought down in a regime of free global trade, pragmatic policies need to be evolved through mutual consultations with the stakeholders involved in the supply of the three major inputs i.e., the sugarcane, interest on bank credit and the labour costs which contribute about 90% of the cost of production of sugar.

4.4.2.5.2 The threats to sugarcane cultivation mainly arise from the weaknesses and threats to the sugar industry as the fortunes of the sugarcane farmers are closely linked with the sugar factory/ processing unit in the area. The prospects of expansion in sugarcane area are now extremely limited due to the high water requirements and the claims of the other crops. Further, sugarcane being a soil nutrient exhausting crop, the farmers have to plan crop rotations and also take care of the soil health for sustainable production

4.4.2.6.0 Sugarcane Cultivation - The Developments

4.4.2.6.1 There has been in the past a steady growth in area under sugarcane cultivation. The area under sugarcane was only 17.07 lakh hectares in 1950-51 which increased to 44.3 lakh hectare in 2001-02. It declined to 43.6 lakh hectare in 2002-03. Since there are year-to-year fluctuations in the area under sugarcane.
Table 3: Area under sugarcane (averages for five years –1966 to 2002)

<table>
<thead>
<tr>
<th>Period</th>
<th>Area under sugarcane [000 hectare]</th>
<th>Increase over the previous 5-year average (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966-67 to 1970-71</td>
<td>2449</td>
<td>-</td>
</tr>
<tr>
<td>1971-72 to 1975-76</td>
<td>2650</td>
<td>8.20</td>
</tr>
<tr>
<td>1976-77 to 1980-81</td>
<td>2876</td>
<td>8.52</td>
</tr>
<tr>
<td>1981-82 to 1985-86</td>
<td>3092</td>
<td>7.51</td>
</tr>
<tr>
<td>1986-87 to 1990-91</td>
<td>3362</td>
<td>8.73</td>
</tr>
<tr>
<td>1991-92 to 1995-96</td>
<td>3769</td>
<td>12.10</td>
</tr>
<tr>
<td>1996-97 to 2001-02</td>
<td>4139</td>
<td>9.81</td>
</tr>
</tbody>
</table>

4.4.2.6.2 The area has increased by nearly 69% in 30 years. The average increase in every five years has been around 9%. However, the area under sugarcane to the total cropped area has remained more or less constant at about less than 2.5%. Sugarcane is also considered to be most profitable among the major crops in India. The possibilities of similar increases in the sugarcane area in future are however is extremely low due to competition from other crops and the soil and water requirements.

4.4.2.6.3 Nearly 92% of the sugarcane is cultivated in irrigated conditions. While in the sub-tropics 6-8 irrigations may be sufficient, in the tropical regions the sugarcane crop requires 16-18 irrigations.

4.4.2.6.4 Sugarcane is generally grown in all States in India excepting the hill States. However, ten States had more than 1 Lakh hectare under sugarcane during 2002-03 accounting for nearly 96% of the total sugarcane cultivating area in the country.
Table 4: Sugarcane area, yield, total production and sugar recovery

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>State</th>
<th>Cane area (Lakh, ha.)</th>
<th>Cane Yield (M.T./ha)</th>
<th>Cane Production (Lakh, M.T.)</th>
<th>Sugar recovery (% Cane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Uttar Pradesh</td>
<td>20.35</td>
<td>58.0</td>
<td>1179.82</td>
<td>9.53</td>
</tr>
<tr>
<td>2</td>
<td>Maharashtra</td>
<td>5.78</td>
<td>78.1</td>
<td>451.40</td>
<td>11.60</td>
</tr>
<tr>
<td>3</td>
<td>Karnataka</td>
<td>4.07</td>
<td>81.1</td>
<td>330.17</td>
<td>10.72</td>
</tr>
<tr>
<td>4</td>
<td>Tamilnadu</td>
<td>3.21</td>
<td>101.6</td>
<td>326.20</td>
<td>9.61</td>
</tr>
<tr>
<td>5</td>
<td>Andhra Pradesh</td>
<td>2.18</td>
<td>82.9</td>
<td>180.82</td>
<td>10.01</td>
</tr>
<tr>
<td>6</td>
<td>Gujarat</td>
<td>1.76</td>
<td>70.9</td>
<td>124.65</td>
<td>10.79</td>
</tr>
<tr>
<td>7</td>
<td>Bihar</td>
<td>1.13</td>
<td>46.0</td>
<td>52.11</td>
<td>8.78</td>
</tr>
<tr>
<td>8</td>
<td>Haryana</td>
<td>1.61</td>
<td>57.6</td>
<td>92.70</td>
<td>9.95</td>
</tr>
<tr>
<td>9</td>
<td>Punjab</td>
<td>1.42</td>
<td>65.1</td>
<td>92.50</td>
<td>9.45</td>
</tr>
<tr>
<td>10</td>
<td>Uttaranchal</td>
<td>1.26</td>
<td>60.0</td>
<td>75.55</td>
<td>9.41</td>
</tr>
<tr>
<td>All India</td>
<td></td>
<td>44.30</td>
<td>67.4</td>
<td>2984.22</td>
<td>10.27</td>
</tr>
</tbody>
</table>

The above data shows that the yield in tropical area States is higher than the sub-tropical States. The highest yield per hectare in 2002-03, was observed in Tamil Nadu [106.8 M.T./ha] followed by Karnataka [84.4 M.T./ha], Gujarat [69.4 M.T./ha], Andhra Pradesh [65.8 M.T./ha], Maharashtra [61.8 M.T./ha]. It is worth noting that the yields in Andhra Pradesh and Maharashtra during 2001-02 were 82.9 M.T./ha and 78.1 M.T./ha respectively and the decline during 2002-03 was mainly because of drought conditions and the pest attack in Maharashtra. As against the above, the yield among the sub-tropical States during 2002-03 was highest in UP [62.8 M.T./ha] followed by Punjab [60.3 M.T./ha], Uttranchal [59.3 M.T./ha], Haryana [44.4 M.T./ha] and Bihar [24.6 M.T./ha].

4.4.2.6.5 The recovery rates were highest in Maharashtra [11.64] followed by Karnataka [10.79] and Gujarat [10.58]. The recovery rates were also good in Haryana [10.13], Andhra Pradesh [10.10] and Tamil Nadu [9.88]. The lowest recovery rates were in Bihar at about 9%.

4.4.2.6.6 A worrisome aspect is the stagnation in all India average over the years and continuous decline of average yield over the last five years.
Table 5: Yield stagnation of sugarcane over the years

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield M.T./ha</th>
<th>Year</th>
<th>Yield M.T./ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>66.1</td>
<td>1997-98</td>
<td>71.1</td>
</tr>
<tr>
<td>1992-92</td>
<td>63.8</td>
<td>1998-99</td>
<td>71.2</td>
</tr>
<tr>
<td>1993-94</td>
<td>67.1</td>
<td>1999-00</td>
<td>70.9</td>
</tr>
<tr>
<td>1994-95</td>
<td>71.3</td>
<td>2000-01</td>
<td>69.6</td>
</tr>
<tr>
<td>1995-96</td>
<td>67.8</td>
<td>2001-02</td>
<td>68.2</td>
</tr>
<tr>
<td>1996-97</td>
<td>66.5</td>
<td>2002-03</td>
<td>64.6</td>
</tr>
</tbody>
</table>

4.4.2.6.7 As stated earlier, with anticipated increase in population to 1.16 billion and the per capita consumption of 21 kg, by 2010, the requirement of sugar in India would be about 24.36 million tons. Keeping in view that increase in area under sugarcane may be extremely difficult to achieve [in the context of other crops], it would be necessary to increase the yield to atleast 80 M.T./ha and recovery from the present level of 10.36% to 11% by the end of 2010-11 to have sugar production of around 25 million ton to take care of the projected increase in demand.

4.4.2.6.8 Two aspects of sugarcane production which impact the average yields but are often ignored are the ‘ratoon’ and ‘adsali’ crops. Ratooning of crop is a common practice [around 40% of the total cane produced is through ratoon crop], it is more prevalent in UP where over 50% of the sugarcane production is from ratoon crop. Ratooning brings down the cost of production and leads to early maturing which helps the factories to start early. However, the yield under the ‘ratoon’ crop is lower than the plantation crop. This partly explains the low average yield in UP. In fact, the farmers generally neglect the ratoon crop, which brings the yield down. With integrated ratoon management, maintaining required plant population through gap filling by settlings, use of adequate fertilizers and need based micro-nutrients, better irrigation management, plant protection care etc. training of the farmers and more intensive extension work by the extension staff and the sugar factories is called for higher yields from ratoon crops could be taken. Maharashtra has large areas under the ‘Adsali’ crop, which is grown over a period of 15-18 months. The yield under this crop is higher than the other crops by about 30-35%. In Maharashtra around 20% area is covered by Adsali, which improves the overall average yield figures of Maharashtra.

4.4.2.6.9 The main reasons for recent decline in sugarcane yield are the weather conditions, attack of ‘white woolly’ aphid in Karnataka, Maharashtra etc. and delayed
cane payments in certain areas which led to constraints in use of desired quantity and quality of inputs. The other constraints leading to lack of improvement in productivity are as under:

(a) Inadequate care of the ratoon crop and constraints in adequate availability of quality planting material.

(b) Depletion of micro - nutrients from soil due to monoculture and unbalanced application of major nutrients.

(c) Depletion of organic carbon in the soil due to gradual shift towards application of mainly inorganic fertilizers.

(d) Low adoption of available technologies for increased production and productivity.

(e) Inadequate research/extension efforts in developing/adopting location specific varieties and development of superior varieties with high cane yield and high sugar content with resistance to biotic and abiotic stress for different regions.

(f) Inadequate efforts for identification of varieties with high input use efficiency in terms of water requirement, micro-nutrients, sunlight and varieties suited to low input conditions.

(g) Inadequate attention to use of crop residue from sugarcane and sugarcane industry by-products such as press mud, sugarcane trash and distillery effluents.

(h) Inadequate attention to tissue culture.

(i) Problems in timely and adequate availability of quality inputs including credit.

(j) Inadequate attention to development and dissemination of information regarding better farm appliances/equipments for harvesting, ploughing, planting etc.

(k) Poor drainage in some areas.

(l) Lack of adequate participation of the sugar factories in the development of sugarcane.

A cane development department with adequate and competent staff is essential for each sugar factory.

4.4.2.7.0 Issues Concerning Sugarcane Growers

4.4.2.7.1 Sugarcane is a perishable crop. It has large bulk with an average all India yield of nearly 65 tons per hectare in 2002-03. Further, the sucrose content in sugarcane declines if it is not crushed quickly after the harvest. The above factors make it prohibitive for farmers to carry their crop to any distance. Around 90% of the sugarcane
is crushed for making sugar/khandseri/gur/jaggery etc. By and large, therefore the growers are tied up with the sugar factories/other processing units. The sugar factories also require firm arrangements for supply of sugarcane. The practices regarding sugarcane area reservation, the pricing and marketing tie up etc. peculiar to sugarcane cultivation which impact the growers are discussed in the following paragraphs.

**Cane Area Reservation**

4.4.2.7.2 Sugarcane is an essential commodity under the Essential Commodity Act, 1955; as such the Government is empowered to control its production, distribution and supply. The Government regulates its supply to sugar factories under the Sugarcane [Control] Order, 1966. The power of regulation of cane supplies has been delegated to the State Governments. Under the above order, the Government is empowered to reserve area for a factory having regard to the crushing capacity of the factory, the availability of sugarcane in the reserved area and the need for production of sugar with a view to enabling the factory to purchase the quantity of sugarcane required by it. The cane growers in the reserved area are required to enter into bond with the sugar factory for supply of a specified quantity or percentage of sugarcane grown by him/her. The grower is not allowed to supply cane to any factory outside the reserved area unless he/she obtains a permit for this purpose. The factory is also under an obligation to crush the entire cane, which is bonded by the growers.

The benefits of reservation are:

- It controls the cost of transportation and loses of sucrose due to the time taken in taking it to factories located at a distance.
- It helps the factories to regulate the cane supply according to the crushing capacity available each day. In absence of such an arrangement, the factory may have inadequate supplies of sugarcane on certain occasions, while on other days, the supply may far exceed the capacity. The mills in this situation may have to install higher capacities to crush all the sugarcane which may be supplied during the peak season which would lead to higher cost of production or alternatively the growers may have to wait with the cane which in turn would lead to reduction in sucrose contents.
- Helps in building linkages between the mills and the growers.
- Encourages the mills to take up cane development work.
- Helps the banks to link credit with marketing.

4.4.2.7.3 However, if the factory refuses registration or bonding or is unable to crush sugarcane within the normal season or within 15 days after the normal season, the grower is permitted to supply the cane to another factory. On the other hand, during the period of cane shortage poaching of sugarcane becomes a serious problem. Though the State Governments impose penalty for poaching, unless it is adequate it does not serve as a deterrent to the factories. In Punjab, for example, the penalty on conviction in a court was only Rs. 2000, which was grossly inadequate. This needs a review by the State Governments.

4.4.2.7.4 Further, the reservation of area needs to be on a long-term basis say, 5 to 10 years with provision for review by the State Government to ensure better linkages between the grower and the factory. The second appeal in the case of dispute could be to the Government of India. There could be a system of social audit which could also facilitate decision making in case of disputes. In UP, the area reservation is for one season at a time which is not conducive to orderly cane development work. Long-term reservation provides the necessary incentive to the factory to undertake the development work in its reserved area. This also encourages building of long-term credit arrangements with the banks. Issue of reservation order of long-term periodicity was also favoured by the Standing Committee of the Lok Sabha on Food, Civil Supplies and Public Distribution (1995-96), as well as by the high Powered Committee on Sugar Industry under the Chairmanship of Shri Mahajan [1998]. Further, it is also important that the reservation of area is done systematically and is conducive to efficient functioning of the mills. There are instances where the villages allotted to different sugar mills are interspersed. This needs to be corrected in consultation with the factories/growers.

**Cane Pricing**

4.4.2.7.5 Sugarcane accounts for more than 60% of the cost of production of sugar. The Central Government fixes a Statutory Minimum Price [SMP] in terms of Clause 3 of Sugarcane (Control) Order 1966 with regard to the:
- Cost of production of sugarcane.
Return to the grower from the alternate crop and the general trend of agriculture commodities prices.

Availability of sugar at reasonable prices to the consumer.

The price at which sugar produced from sugarcane is sold by the producer of sugar;

Recovery of sugar from the cane.

The Commission for Agricultural Costs and Prices [CACP] while recommending the SMP also takes into account other factors such as current realization from sugar sale, the demand and supply situation, level of sugar stocks, cost of transportation, international price situation and the need for stability in sugarcane production. Further, according to the law, the farmer is also entitled to an additional payment out of price realization by the factories (Clause 5 A of the Sugarcane Control Order, 1966). The sharing formula which is commonly known as ‘Bhargava Formula’ \([(R-L)/2]\) has been discussed subsequently.

**Table 6: Increase in SMP**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sugar Season</th>
<th>SMP per qtl. at 8.5% recovery [Rs.]</th>
<th>Increase per qtl. over the previous year in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2000-01</td>
<td>59.50</td>
<td>3.40*</td>
</tr>
<tr>
<td>2.</td>
<td>2001-02</td>
<td>62.05</td>
<td>2.55</td>
</tr>
<tr>
<td>3.</td>
<td>2002-03</td>
<td>69.50</td>
<td>7.45</td>
</tr>
<tr>
<td>4.</td>
<td>2003-04</td>
<td>73.00</td>
<td>3.50</td>
</tr>
</tbody>
</table>

* [The SMP for 1999-2000 was Rs. 56.10 per qtl.]

For the year 2004-05, the CACP had recommended that the SMP for sugarcane payable by the sugar factories be fixed at Rs. 74.50 per quintal linked to be basic recovery of 8.5% subject to a premium of Rs. 0.88 for every 0.1% point increase in the recovery above that level. At All India average recovery rate of 10.29%, the SMP recommended worked out to Rs. 90.25 per quintal. The CACP also recommended that the SMP needs to be announced by the Government at least one year in advance to give the price signals, the delayed announcement of SMP did not serve any purpose in providing price signals to the growers to help in matters relating
to allocation of land and other resources. If the SMP could be announced for a longer period say about 3 years, it would help in better planning and stabilizing cane production. The feasibility of such announcement could be examined by the CACP. While the SMP has been steadily increasing, the sugar prices during the last 4-5 years upto 2002-03 had been rather low. **Table 7: Sugar prices –1999 to 2003**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Year</th>
<th>Index Number of whole sale prices on monthly average [Base 1993-94 =100]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1999-2000</td>
<td>141.2</td>
</tr>
<tr>
<td>2.</td>
<td>2000-2001</td>
<td>138.9</td>
</tr>
<tr>
<td>3.</td>
<td>2001-2002</td>
<td>131.7</td>
</tr>
<tr>
<td>4.</td>
<td>2002-2003</td>
<td>117.1</td>
</tr>
</tbody>
</table>

The situation started improving rather slowly during 2003-04 and the prices firmed up in 2004-05. The SMP needs to carefully balance the interests of the growers and the factories. While the sugar prices were declining, the SMP for sugarcane continued to increase which also contributed towards increasing the sugarcane price payment arrears [discussed later.] leading to an unsustainable situation. Some of the other important issues connected with SMP are discussed in the following paragraphs:

**Fixation of SMP on Regional Basis**

4.4.2.7.7 The sugar industry has been suggesting that the SMP needed to be fixed on a regional basis- one for the tropical region i.e., Maharashtra, AP, Tamil Nadu, Karnataka, Orissa & Gujarat and the other for the sub-tropical region covering states of UP, Punjab, Haryana, Bihar, Uttarakhand, Rajasthan and MP. The suggestion for regional SMP is mainly because [a] the yield of sugarcane is higher in the tropical region as compared to sub-tropical region and hence the cost of cultivation is lower [b] the sales realization from free sale sugar in sub-tropical region by factories is higher than the tropical region and the variation is large ranging from Rs. 44 to Rs. 110 per quintal.

While it is true that the cost of cultivation as well as the realization from free sugar sales is lower in tropical region, fixation of SMP on a regional basis would be against the fixation of support price of all other agricultural commodities which is on a
national basis. Further, the cost of cultivation differs within the tropical and sub-tropical regions as also within the State, under the circumstances it may lead to many other similar demands. In any case, the region which is more suitable than the other [has a lower cost of production] should get the price benefit for expanding and growing. Further, such regional SMP would not be in line with the developments in the markets which are getting integrated at national and the international level.

**Raising the Base Recovery Rate from the Present 8.5%**

4.4.2.7.8 Upto 1971-72 [sugar season], the base recovery level was taken at 9.4%. On the recommendation of the Agriculture Price Commission to reduce the base recovery level to 9%, the Government decided to reduce it to 8.5% which continues since then. The All India recovery level has been improving and was 10.32% in 2001-02. Keeping in view the above, as also the interest of the farmers, there is a need to increase the base level recovery. It is understood that the CACP has also suggested for 2005-06 that the base recovery level may be fixed at 9%. The factories having a lower average recovery [for the season] may have to improve their cane development efforts including the cane collection arrangement and the operational efficiency. Improving the recovery rate benefits the farmers as they get higher price for their produce and it also leave a surplus to the factory as it has higher production and hence higher income by sale of sugar etc.

4.4.2.7.9 There is also a suggestion to link the sugarcane price to the sucrose contents of the cane as is done in some other countries. While this may be a better strategy to encourage the farmers to grow better varieties, this could be done only after satisfactory arrangements for assessing sucrose contents of the cane could be tested and become generally acceptable. This however needs to be expedited and done in a time bound manner. Under the circumstances, for the time being existing arrangements may have to continue. However, it may be possible even now to fix incentive prices for varieties, which have higher sucrose contents with a view to encourage the farmers to take up cultivation of these varieties.

**The State Advised Price**

4.4.2.7.10 Some of the State Governments have been fixing the sugarcane prices commonly known as the State Advised Prices [SAPs]. Unfortunately, there is a
normal tendency on the part of the State Governments to raise the prices, which could even become uneconomic for the sugar factories. According to the Mahajan Committee Report [1998], “This tendency may get accentuated in the era of unstable and coalition Governments where short-term consideration of political expediency may outweigh consideration of the long-term impact on the sugar industry in the State and consequently in the long-term, interest of the cane growers themselves. There is also some sort of competition among the States for announcing higher cane prices than the other and this tendency is likely to be accentuated.”

4.4.2.7.11 A connected issue is the general apprehension of the growers that the clause 3 of the Sugarcane [Control] Order, 1966 which indicates the aspects to be considered for fixation of the SMP includes among other two clauses which tend to influence in favour of fixing of lower prices of sugarcane. These clauses are [a] availability of sugar to the consumers at a fair price and [b] sugar producers sell price at which sugar produced from sugarcane. Deletion of these two clauses would mean that the common unmerited perception about the cane prices deliberately being fixed lower to keep the levy price lower for PDS purposes would be generally laid to rest. Incidentally, the clause 5A of the Sugarcane Order 1966, which states that the farmer is entitled to an additional payment out of the price realization by the factories, has implementation problems. Under this formula [Bhargava Formula], the farmers and the mills share the excess realization broadly in the ratio of 1:1. The sharing formula is: \[
\frac{R-L}{2}.
\]
Under this, R is the realization from the sale of sugar [levy and free] and L is the unit cost of production. However, there have been considerable delays in the notification of the Zone-wise ‘L’ factor by the Govt. of India and factory-wise additional sugarcane price to be determined by the State Government. The ‘L’ factor for four season was announced in February 2003 and for 2001-02, the ‘L’ factor was announced on 6 April, 2005. Information regarding announcement of cane price by the State Government on the basis of above details is also not available raising doubts about the effectiveness of the implementation of the above clause. Prima facie the formula appears to be in order save for the implementation delays. If it could be announced quickly at the end of the season, the impact would be much better. A connected question however is as to why the farmer should not have a share in the
value of the byproducts of the factory, which are sugarcane based. The problems of sugarcane pricing are serious. A continuous upward movement of the sugarcane prices without any relationship with the price of sugar is not sustainable. It is welcome that the Government of India have constituted an Expert Group on New Sugarcane Pricing Policy. It is hoped that the new pricing policy would serve the interests of the growers and the factories in a more equitable manner and to the satisfaction of all concerned.

**Delayed Payment and Cane Arrears**

4.4.2.7.12 It is not only necessary to ensure remunerative price for the produce, but it is also important that the farmers are paid the price promptly. The farmers cite long delays in payment of sugarcane prices by the sugar factories as a major reason for less than the optimum level of input usages leading to low productivity. The Govt. of India have amended the Sugarcane [Control] Order, 1966 evaluating the Central Govt./State Government/Officers authorized by the Central Govt./State Governments to recover the arrears of cane prices remaining unpaid after 14 days supply of sugarcane by the growers, together with interest @ 15% per annum thereon, as arrears of land revenue. However, in practice there is considerable delay in making the payment to growers. There have been agitations/demonstrations regarding arrears in cane price payment and it has often become an issue taken up by political parties. The cane arrears on 30.04.04 were reportedly Rs. 2568 crore mainly due to poor sugar prices during the last 2-3 years and accumulation of sugar stocks with the factories. Due to the stringent provisions against delay in cane payments, the factories do want to avoid the delays but financial constraints often make it extremely difficult for them. In view of the high build up of cane arrears, the Govt. of India decided to create a buffer stock of 2 million tons of sugar for one year in December 2003 (subsequently extended by one more year). Further, the Government also announced two packages of special assistance to the State Governments. A sum of Rs. 678.06 crore was allocated as a one time assistance to the Governments of UP, Uttranchal, Bihar, Punjab and Haryana to help clearance of sugarcane price arrears for 2002-03 by private sugar factories subject to the following conditions: -
(a) It would cover difference between the SAP and SMP with regard to the sugar factories in the private sector only.
(b) The assistance would be in the nature of a soft loan at a concessional rate of interest of 4% p.a. with an initial moratorium of 3 years and repayable in 3 years thereafter.
(c) The assistance would be contingent upon the State Government undertaking not to declare SAP in future either formally or informally.
(d) The money would be released to the farmers directly by the District Officials.

In addition, the Government of India also provided a one-time assistance to the State Government by permitting them to raise additional market borrowings to the used for liquidating the cane price arrears of the mills in the cooperative and public sector in the States where SAPs were announced and all mills in States where the practice of SAP announcement did not exist. The conditionality of assistance were broadly similar to the first scheme with moratorium of 5 years and repayment in next 5 years of loans extended by the State Governments to the factories. As a result of the above schemes, the arrears as on 30.09.2004 came down from Rs. 2568 crore [30.04.04] to Rs. 560 crore. During 1992 to 1997 the peak level arrears formed nearly 20% of the total cane payment. The arrears in 2004 had formed nearly 30% of the total cane payment. The cane payment arrears have generally been lower in the case of cooperative sugar factories and rather high in the case of public sector units. Strict enforcement of law regarding timely payment of sugarcane price to the growers is called for.

**Cane Supply Arrangements**

4.4.2.7.13 Cane supply arrangements are extremely important both for the growers and the sugar factory. Sugarcane is perishable and the sucrose contents get reduced if it is not milled within a short period after harvesting. For the factory it is important that it gets adequate supplies of cane for as long a period as possible to increase the crushing season and also within the least possible time after the harvest. The growers are also interested to supply their sugarcane soon after maturity to get the income as well as time to prepare the land for the next crop. Different varieties of cane reach their optimum sucrose content at varying period. There is therefore need for considerable planning regarding the timing/varieties etc. planted in the factory area and also in managing the flow of cane
supplies. The factory wants a planned inflow of cane as per its installed capacity. Since a large number of farmers [normally about 10,000 to 15,000 farmers] supply the sugarcane to each factory in about 150 to 180 days a very careful planning and fine-tuning is necessary to complete the operations efficiently for the maximum benefit of the farmers and the factory.

4.4.2.7.14 As already stated, the State Governments reserve the area for various sugar mills in the State. However, the practices regarding cane supply vary considerably in the States. The major cane producing States could be divided into three groups regarding the sugarcane/supply arrangements. Maharashtra & Gujarat have a similar system, the tropical States of Tamil Nadu, Andhra Pradesh & Karnataka follow another system and the sub-tropical States i.e., UP, Bihar, Punjab & Haryana have a different system.

4.4.2.7.15 In Maharashtra, Gujarat and some parts of north Karnataka, the growers supply cane ex-field to the factory and the sugar factories [which are mostly organized as co-operatives] arrange for the harvest and transportation of the sugarcane. The harvesting in this arrangement is obviously planned by the sugar factory as per its requirements and the crop in the area based on variety/maturity etc. The factories engage harvesting/transporting groups/contractors who handle the entire operations. Many of the factories own carts/trolleys etc., which are used for transportation of the cane. The operations are smooth and save the growers from organizing harvesting and transportation frequently to dispose off the entire produce. However, the State Governments/CACP may examine it whether certain norms could be developed for harvests and transportation costs and cap be fixed.

4.4.2.7.16 In Tamil Nadu and Andhra Pradesh, the factories have been assigned area on long-term basis. This has encouraged the factories to take up cane development work more seriously, leading to better yields and recovery rates. The growers handle the harvesting and transportation. The direct relationship between the grower and the factory has an overall good impact on cane cultivation and development. There are no outstation procurement centers unlike in sub-tropical regions, which lead to delays and consequently poor recovery percentage. The factories bear transport cost upto a certain radius and the balance is borne by the grower.
4.4.2.7.17 In UP, which has nearly 45% of the sugarcane growing area of the country, the area reservation is done for one season at a time and the factories are also asked to open and operate cane purchase centers. In some cases, the factories operate as many as 100 purchase centers. The sugarcane is purchased through the Cane Cooperative Societies and the sugar factory does not have direct relationship with the grower. The payments for the cane are also made through these societies. These societies enter into agreement with the factory regarding the supply of cane. Under this arrangement, the sugarcane is harvested by the grower and supplied at the purchase center/factory gate. The factory meets the cost of transportation from the purchase center to the factory. The Cane Cooperative Societies prepare supply calendar and issue supply slips [Parchies] to the growers. These supply
slips are issued on the basis of the last 2-3 years supplies of sugarcane. The quota of a farmer is divided in the expected days of running of the sugar factory and he/she is issued supply slips in equitable proportion. As the supply entitlements are fixed on the basis of last 2-3 years supply, the farmers are reluctant to introduce better varieties, which could increase the yield due to anticipated difficulties in selling the excess production. The factories indicate their daily requirement of cane separately for supplies at the Gate [Factory] and at the purchasing centers. Weightment both at the Factory Gate as well as the Purchase Centre is expected to be done in the presence of the representative of the Cane Grower Cooperative Society. However, of late, due to staff constraint, the cane Grower’s Cooperative Societies are often unable to send their representatives for the weighing. The farmers do apprehend that the weightment may not be correct and would like electronic weighing scales to be installed at all places. Further, the sugarcane growers also complain about the long waiting period at purchase centers. The arrangement is complicated. It also leads to delay in reaching the cane to the factory and consequent decline in recovery percentage. The farmers engage harvesting teams and have to harvest their field repeatedly. The system is not farmer friendly. The system is also not effective linkages between the sugarcane growers and the factories.

4.4.2.7.18 The arrangement in Punjab and Haryana is similar to UP excepting that the cane is supplied by the farmers directly to the factory. In Bihar Cane Cooperatives are working in certain areas where the cane is routed through these societies but elsewhere it is direct to the factory.

4.4.2.7.19 The system of purchase of sugarcane by factories through the Cane Cooperative Union has been considered to be less efficient as compared to the direct linkage of farmers with the factories. Since the sugar factories have mostly computerized preparation of cane supply calendars, issuing supply-slips to the farmers and maintenance of farmer wise records etc. the role of the cane cooperatives has dwindled. Further, the farmers also complain about red-tapism in the cane cooperatives. The Lok Sabha Standing committee on Civil Supplies & Distribution [1995-96] recommended direct link between the farmers and the factories. The Tuteja committee on Revitalization of Sugar Factories [2004] also favoured direct tie up of farmers with the factories and a tri-partite agreement between the banks, farmers and factories. The compulsory routing of the
sugarcane supplies through the Cane Union needs a review. To began with UP could consider trying the direct linkage of the sugar factories and growers at least on a pilot basis and evaluate the same.

4.4.2.7.20 The factories need to have a well planned programme of crushing with respect to different varieties of cane grown in their reserved area. The farmers growing early varieties and ratoon should be able to harvest their cane early so that they get the benefit of switching over to these varieties. The issue of supply slips should be strictly on the basis of maturity of crop and planning dates.

4.4.2.8.0 OTHER ISSUES

Khandseri & Gur
4.4.2.8.1 Khandseri and gur provide traditional sweeteners at lower prices than the white sugar and also an outlet for disposal of cane to the growers in areas where sugar mills are not operating or do not have enough capacity to crush the entire cane production. The use of sugarcane for gur and khandseri has come down from about 55% in 1980-81 to 28.9% in 1999-2000. Among the major sugarcane growing states, the percentage of cane used for gur & khandseri during 2001-02 was highest in UP (39.4%) followed by AP (34.5%) Tamil Nadu (31%) and Karnataka (24.4%). With growth of incomes and urbanization, the per capita consumption of gur and khandseri is likely to come down.

4.4.2.8.2 Uttar Pradesh has a very large number of khandseri units. During 1994-95, the khandseri units in UP crushed over 90% of the sugarcane crushed by the khandseri units in four major khandseri producing States i.e., UP, Haryana, Andhra Pradesh and Karnataka. Khandseri has an important share in the sugarcane economy of UP as around 13% to 15% sugarcane is crushed by these units. In UP only around 50% of the sugarcane is crushed by sugar mills. In certain parts of UP, only about 20% cane goes to the sugar mills against an average of nearly 80% in Maharashtra.

4.4.2.8.3 However, most of the khandseri units are small sized with crushing capacity of less than 100 TCD [about 74%]. Nearly 31% of the units operate at less than 50 TCD capacities. About 80% of the units operate with less than 6 rollers, which would mean that these units are likely to extract only about 70% of the juice. Over 1 lakh people are employed in the khandseri units. The overall recovery rate of khandseri units is around
7% to 7.5%. The gur/jaggery is mostly manufactured in the unorganized cottage industry sector. Again, UP has the largest number of gur manufacturing units. Average employment in the gur making units is 10 persons.

4.4.2.8.4 Excepting in times of scarcity, the price paid by khandseri/gur units for sugarcane is lower than the SMP. However, these units invariably make prompt payment for the sugarcane supplied to them, which attracts some of the sugarcane farmers. The growers needing immediate/quick cash for their produce do tend to divert part of their crop to these units though the price paid to them is lower than the SMP. Incidentally, a substantial number of these units [more than 50%] are located within 20 km of sugar factories in UP, Karnataka and Tamil Nadu, which would mean that these units interfere with the cane supplies in the registered areas of the factories. This is particularly so in UP where there is no long-term reservation of area and the linkage of growers with factories is also not direct.

4.4.2.8.5 A connected issue is that in the years of high price for gur, the manufactures are willing to pay a higher price for cane which leads to diversion of cane from the sugar factories, thus adversely affecting their working. As nearly the gur/khandseri units use 26- 27% of the sugarcane, there is also a need to relook at the tax incidence on these units. It may be appropriate to treat khandseri units with above 500 TCD capacity and those with less than 500 TCD capacities differently for excise purposes. The larger khandseri units [above 500 TCD] may also he required to pay SMP for the cane supplied to them atleast during the normal crushing season.

4.4.2.8.6 There is need for improvement in operational efficiency of both khandseri and gur units. One way could be to create a Khandseri Development Fund at the State level through levy of a cess, which could be used for providing need-based support (margin money, low rate of interest) for modernization/expansion to units located outside the reserve area of the factories.

4.4.2.8.7 There is a need for extension work regarding improved methods of gur production and storage not only among the gur producing units but also among the farmers who produce and store gur for their domestic consumption.
Distance between Sugar Mills
4.4.2.8.8 While the sugar industry was delicensed in September 1998, the distance criterion of 15 km has been retained. The minimum distance criterion is necessary to avoid shortage of cane for the factories on a regular basis. The distance of 15 km appears to be adequate for a factory with 2500 TCD plant. However if the plant is bigger say, 5000 TCD or more, the above distance may be grossly inadequate and harm the interests of both the factories and the growers.

4.4.2.8.9 The Committee on Revitalization of Sugar Industry [Shri Tuteja Committee-2004] also looked at this issue and concluded that to ensure availability of sufficient cane for a sugar factory of 5000 TCD, a minimum radial distance of 25 km will have to be maintained. As 5000 TCD is sustainable, the minimum distance between two factories may be increased from the present 15 km to 25 km. The Committee also felt that additional capacity beyond 5000 TCD should accrue through increase productivity and not by expansion of area under sugarcane.

Box – 2
Phased Decontrol of Sugar

|Government has been following a policy of partial control and dual pricing of sugar under the Essential Commodities Act, 1955 which covers sugar and sugarcane. Under this policy the Government as levy sugar collects a certain percentage of sugar produced by the factories. The levy sugar is distributed under Public Distribution System [PDS] at lower prices. The non-levy sugar is allowed to be sold according to the quantity released by the Government as per the free sale sugar release mechanism. The percentage of levy sugar has been reduced over time and w.e.f. 1st March 2002, the levy obligation is now only 10%. The monthly release mechanism was introduced before the independence and has been useful. Sugar is produced only during 4-5 months and released in a controlled manner over the year. The objective is to ensure a reasonable price to the consumers as also to the sugar factories.

The announcement of complete decontrol of sugar from April 2003 resulted in panic sales, which reduced the prices, and many sugar factories suffered financial set back. On request from the industry the Government decided to defer the proposal of decontrol of sugar by two years i.e., upto September 2005.

The Government have also permitted forward trading in sugar.

Margins in Sugarcane Cultivation
4.4.2.8.10 Among the major crops in India, sugarcane is the most profitable crop. Dr. Abhihit Sen, in the ‘State of the Indian Farmer: A millennium study’ on Cost of cultivation and Farm Income worked out the $A_2$ Cost per hectare [all paid out expenses plus rent paid on leased land] and output, at current value for major crops for 5 years time slice of 1981-86, 1988-93 and 1995-2000. He stated, “Sugarcane is the most profitable crop in the country with weighted average profit over paid out costs per hectare at Rs.
30,825 during 1995-2000. Profit per hectare from this crop was highest at Rs. 52,704 in Tamil Nadu followed by Karnataka and Haryana at Rs. 44,283 and Rs. 37,955 respectively. It was somewhat above average but lower in the range of Rs. 23,000–26,000 in major cane producing states of Maharashtra and UP. However, even at this level and taking into account the larger crop period, sugarcane was more profitable than other crop rotations in these states.”

4.4.2.8.11 Even when the margin of the gross value of output over the C2 costs \( [A2+\text{interest on value of owned capital assets including owned land minus land revenue} + \text{imputed value of family labour}] \) are taken for 1995-2000, the sugarcane crop gave larger surplus \( [\text{Rs. 16,705 per hectare}] \) on all India basis than the other crops like wheat \( [\text{Rs. 5242 per hectare}] \), Tur daal \( [\text{Rs. 5458 per hectare}] \), Jute \( [\text{Rs. 3049 per hectare}] \), Cotton \( [\text{Rs. 4221 per hectare}] \) and Rapeseed \( [\text{Rs. 4129 per hectare}] \). The surplus in case of Paddy was only Rs. 2793 per hectare.

4.4.2.8.12 However, with increasing costs of inputs and declining yields during the last 5 years, the margins in sugarcane cultivation have been squeezed in spite of the increase in SMP. In this connection the Commission for Agricultural Costs and Prices in their report for crops sown during 2004-05 season observed as under:

“The primary concern before the Commission is that the cost of production of sugarcane is rising consistently over the years. There is limited possibility to arrest the rising cost of cultivation. At the same time, increasing price for sugarcane affects the financial viability of the sugar mills. A balance has to be struck between the rising cost of production and declining sugar prices nationally and internationally. **The rising cost can be partially compensated through increasing the productivity.** There is, therefore, an urgent need to increase the productivity of sugarcane so that the sugarcane cultivation becomes more remunerative. Presently, there is a wide gap in productivity of sugarcane between tropical and sub-tropical regions of the country, the productivity of sub-tropical region being much less than the national average. The southern states, over a period of time, have increased the productivity through appropriate adoption of new varieties replacing the traditional ones. Such initiative is critically lacking in sub-tropical regions. The Commission emphasizes that the Government
must do all that is needed to enhance the productivity of sugarcane in sub-tropical States. For adoption of new varieties and new technology in sugarcane production, agriculture extension plays a key role which is lacking in many States. The sugarcane mills in southern India, where productivity has gone up substantially over the years, have taken a lead role in extension programme. Going by the success story, the Commission recommends that the “Government should initiate appropriate measures to encourage the public private partnership in research and extension programme with particular emphasis on ratoon management, propagation of disease and pest resistance varieties, integrated plant nutrient management and judicious water management assigning the lead role and responsibility to the sugar mills, for raising the productivity levels of sugarcane. The Government must also pay particular attention to raising yields in the sub-tropical regions”.

The Committee on Revitalization of the Sugar Industry [Shri Tuteja committee-2004] also recommended that suitable steps by various stakeholders [including State Governments] are necessary to ensure that sufficient sugarcane is developed and grown in the mill areas for economic viability of sugar factories.

### 4.4.2.9.0 Strategies to Improve Productivity and Quality of Sugarcane Production

4.4.2.9.1 The strategies to improve the productivity and quality of sugarcane production are discussed in the following paragraphs.

**Seasonal and Varietal Planning**

4.4.2.9.2 Implementation of season wise and variety wise planting programme in the area of each sugar factory is one of the most important aspects of ensuring supply of quality cane throughout the crushing season. The harvesting planning has to be done on the basis of the planting programme in the entire area. There are few factories, which take up scientific season and harvest planning [maturity wise]. The factories, which adopt such planning, get good results. An equally important aspect is increasing the area under better varieties. In Maharashtra the area under COC 671 and CO 86032 varieties is around 80%, which has helped in improving the recovery percentage. Much work in this regard may have to be done in UP, Bihar and MP through extension efforts Shri Tuteja Committee
[2004] referred to earlier, also felt that there was an urgent need for replacement of low sugared variety of cane through extension services in UP.

Production of Quality Seeds

4.4.2.9.3 Good seeds provide the basis for production of good crop in general but it is more so in the case of a crop like sugarcane, which is propagated vegetatively. The sugar factories have an important role in this regard as they could raise nurseries with foundation seeds obtained from the research stations. The factories could also have contract with some progressive farmers for maintenance of nurseries. There is also a need to reduce the seed quantity at the farm level to cut down the costs of seeds. The costs could be reduced substantially by transplanting polybag-raised seedlings or planting one eye-bud setts. Use of tissue culture for breeder seeds to raise foundation seeds is becoming popular in Maharashtra, Tamil Nadu etc. The advantages of tissue culture seedlings raised setts are:

(a) Assured genetic purity and uniformity
(b) High planting ratio
(c) High germination [about 95%]
(d) Early germination
(e) Disease & pest freeness
(f) Quicker coverage of area by improved varieties
(g) Increase in yield of crop

Efforts should be raise say, about 50% of the foundation seed plots annually with tissue culture seedlings in next 4-5 years. The sugar factories may have to be supported for having tissue culture laboratories.

Water Management

4.4.2.9.4 Sugarcane being a long duration crop, water management is important particularly in the tropical region where 15-16 irrigations are required. Drip and sprinkler irrigation have enhanced water use efficiency as compared to furrow irrigation without adversely affecting the soil fertility. However, the high capital cost and irregular electricity supplies are the major constraints in adoption of this system. The after sale service of the equipment also needs improvement. According to studies, drip system
saves irrigation water by about 35 to 55%, fertilizers by about 30% and increases the yield by about 25-30%.

**Soil Fertility and Plant Nutrient Management**

4.4.2.9.5 Sugarcane is an exhausting crop and it is important to take special care to maintain soil health. Integrated nutrient management ensures sustainable production. Use farm yard manures [F.Y.M.], vermi-compost, bio-compost or green manures alongwith needed dosages of NPK and other micronutrients is necessary to maintain sustained high yields. Greater attention needs to be paid for encouraging use of pressmud, sugarcane trash and distillery effluents for improving the sugarcane productivity. Use of bio-fertilizers could helps in reducing the use of nitrogenous fertilizers.

**Crop Rotation and Intercropping**

4.4.2.9.6 It is essential to follow proper crop rotation according to the agro-climatic conditions to improve the biophysical properties of the soil and reduction in pest incidence. Monoculture of cane has resulted in substantial reduction in productivity. Proper sequence of cropping such as sugarcane leguminous crops is suitable for sustainable productivity. Some suggested crop rotations are:

- Rice – Sugarcane – Ratoon – Groundnut
- Groundnut - Sugarcane- Ratoon - Groundnut
- Cotton – Sugarcane – Ratoon – Vegetables
- Vegetables – Sugarcane – Ratoon - Green gram
- Green Manure Crop – Sugarcane – Ratoon – Groundnut

High value inter crops like vegetables, oil seeds, pulses are remunerative and are appropriate for growing as inter crops to provide additional income and reduce risks in the long duration crop of sugarcane.

**Use of Farm Implements and Machinery**

4.4.2.9.7 Tractor drawn sugarcane planter, trash shredder, interculture implements, stubble shaver, rotavator, sub soiler plough etc. are useful and cost effective in sugarcane cultivation. There is need to make these implements available at cheaper rates/hiring at farmer’s level. Use of sugarcane planter and interculture equipment could reduce the labour cost substantially. Cane planting done by planter improves bud germination. On a
rough basis, the cost of planting cane could be reduced by about Rs. 1500/- per hectare with the use of planter. Efforts are needed to design indigenous sugarcane harvesters, which could reduce harvesting cost and also avoid losses due to labour shortages during the peak cane harvesting periods in sugarcane producing States.

Plant Protection - Integrated Pest and Disease Management
4.4.2.9.8 Plant protection is often a neglected part of sugarcane cultivation. To control seed borne diseases like smut, grassy shoot etc. and the pests like scale, mealy bugs etc. the planting material should be treated with fungicides and insecticides. There are parasites for control of bores and predators for controlling sugarcane woolly aphid. The sugar factories/extension agencies could play an important role in adoption of integrated pest control practices collectively by the farmers in an area.

Sugarbeet as a Supplementary Crop
4.4.2.9.9 With the availability of tropicalised sugar beet varieties, there are possibilities of lengthening the crushing season of the factories. It is possible to cultivate sugar beet in the winter season, which is ready for harvest in about 5.5 to 6 months. The preliminary trials have indicated a crop of about 50 M.T./ha with sugar contents in the beet at above 16% is quite feasible. However, it would require additional machinery/other investments in the sugar factories for beetroot washing, slicing, diffusion and clarification of the juice etc. It is rather early to assess the prospects of sugar beet cultivation in sugarcane producing areas. It would be necessary to have after pilot projects to assess the potential of sugar beet and evaluate it as a supplementary feed stock for sugar factories.

Transfer of Technology
4.4.2.9.10 The available technologies are needed to be transferred to the farm quickly and efficiently. Conduct of result demonstrations, operational research projects, problem based training programmes, visits of farmers to the research stations/Agriculture Universities/pilot farms/leading farmer’s fields, publications of literature in local language, exhibitions, use of audio visual aid etc. are essential for transfer of technology. It is also useful to encourage the leading farmers by awards and felicitations etc.
Identification of Appropriate Technologies
4.4.2.9.11 It is customary to say that the small/marginal farmers do not adopt better technologies due to ignorance and unwillingness to change. This may be partly true but often the technology is not adopted due to its inappropriateness to the farmer’s needs, resources and risks taking ability. Efforts are necessary to fit research to the farmer’s needs and requirements. Gaps in support system i.e., extension machinery, credit and input supplies could be the major reason for gap in technology adoption.

Role of the Sugar Factories
4.4.2.9.12 The sugar factories have an important role in sugarcane development in their area. A public private partnership i.e., a close relationship between the research institutions/extension machinery and the sugar factory is essential for cane development in the reserved area. Unfortunately, barring a few, the sugar factories in sub-tropical region have not paid adequate attention to cane development. The factories need to have adequate qualified, trained and motivated Cane Development Staff for the development work. It may be a good idea for each factory to have a cane Development Council representing the farmers, the factory and the Government [including research organizations] to advise in the matters of cane development.
Sugar Development Fund [SDF]

Sugar Development Fund was formed in 1982 under the Sugar Development Fund Act, 1982 passed by the Parliament, for financing various programmes in mission mode for development of sugar industry. A sugar cess @ Rs. 14 per qtl on levy and non-levy sugar in collected and is credited to SDF after deducting the cost of collection of the cess. Eligible purposes of loans from the SDF include modernization of the sugar factories, development of sugarcane in the area of the sugar factory, establishment of Bagasse-based cogeneration power projects, production of Ethanol and defraying expenditure for the purpose of building Buffer Stock with a view to stabilizing prices of sugar etc. The position of the Fund as on 31.03.04 was as under:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cess collection transferred to the Fund</td>
<td>Rs. 3006.00 crore</td>
</tr>
<tr>
<td>Amount disbursed</td>
<td>Rs. 2528.93 crore</td>
</tr>
</tbody>
</table>

The disbursements under modernization/rehabilitations were highest at Rs.1252.39 crore followed by expenditure on buffer stock maintenance [Rs. 473.84 crore]. The repayments by 31.03.2004 had aggregated Rs. 839.19 crores.

The interest rate on SDF loan, which was 9% p.a., has been recently reduced to 2% below the Bank Rate.

There have been two main problems in availment of loans by the factories from the SDF. The first is the matter of security. The borrowing unit is required to provide either the State Government Guarantee or Bank Guarantee for the loans. This is difficult due to reluctance of the State Government/the cost of Bank Guarantee. The Government may consider alternative security like the charge on sugar factories assets for granting loans under SDF. The second problem is that the unit costs for various investments are not being updated regularly. It is understood no revision has taken place for over 10 years making assistance under SDF grossly inadequate. These cost norms need to be revised periodically. The operations of SDF need to be more flexible and user friendly.

4.4.2.10.0 Import and Export of Sugar

4.4.2.10.1 India has exported about 4 million tons of sugar during the last three years. The value of exports during 2001-02 and 2002-03 was Rs. 1728 crore and Rs. 1693 crore respectively. During 2003-04 [upto July 2004] the exports had already aggregated Rs. 707 crore.

4.4.2.10.2 Sugar was brought under the decanalized system in January 1997 but the quantitative ceilings were fixed. These quantitative ceilings were also removed w.e.f. April 2001. In order to boost exports, the Government have taken following measures:

(a) Sugar meant for exports exempted from levy obligations.
(b) Sugar released for exports treated as advance free sale sugar to be adjusted within 18 months.
(c) Sugar factories allowed reimbursement of expenditure incurred an internal transportation and freight charge upto Rs. 1000 per ton.
(d) Allowed neutralization of ocean freight disadvantage on exports shipments @ Rs. 350 per ton.
(e) Handling and marketing charges upto Rs. 500 per ton on export shipment.

**Box - 4**

**Competitiveness of Indian Sugar**

The Global market in sugar is not truly competitive. The market is highly distorted in the major developed countries like USA, Japan, EU with quotas, tariffs and use export subsidies. This not only affects the export demand for India sugar but also poses a challenge of cheaper imports to the domestic production.

Indian sugar is reasonably import-competitive. Even if Indian sugar is not import-competitive for some units during specific years, there is no reason to be guided by narrow commercial interests of cheaper imports. The spectrum of by-products from sugarcane is competitive and makes it possible to cross-subsidise the farmer without sacrificing the interests of the consumers. It is also necessary to remember that even if the import prices are low, it is quite likely that India’s entry for imports would push up the prices. Further, the competitiveness of other countries in exports may be also in some cases due to their subsidising the exports in different ways.

It is important that the competitiveness of sugar industry is assessed on the use of the entire bio-mass of sugarcane and all the by-products and not only the sugar. However, it is necessary to make all efforts to reduce the costs of sugarcane, labour, transport, packaging etc., to improve the competitiveness of the sugar industry. A strategy could be to develop pragmatic pricing policies of inputs through mutual consultations with the stakeholders of these inputs. This could be quite important in respect of the prices of sugarcane, which constitute about 60% of the cost of sugar.

4.4.2.10.3 Since, sugar shows considerable variations in production, it is appropriate that India builds up its export market. We should also continue our efforts aggressively at international level to get rid of global distortions in the world sugar market. It would also be necessary to increase investment in improving sugar quality to meet international standards. An important connected issue would be to have a pragmatic sugar packaging policy. Compulsory packaging in Jute bags of 100 kg causes two fold problems: it adds to the costs and repacking in 50 kg [internationally demanded pack size] costs additional money.

4.4.2.10.4 Import or sugar was allowed under open General License in March 1994. Customs duty on import of sugar gradually increased to 60% in February 2000 along with countervailing duty of Rs. 850 per ton. During 2002-03 and 2003-04 [upto July only negligible quantity of sugar was imported]. However, in the year of shortfall in production, more imports would be needed. It would be appropriate that when necessary, we may import only raw sugar, which could be processed into white sugar by the industry in India.
4.4.2.11.0 The By-Products

4.4.2.11.1 Sugarcane is a versatile crop. Nearly every part of this bio-mass has industrial potential and uses. The process of making sugar also releases certain by-products having considerable value. So much so that production of some of these products could be profitable enough that sugar could in a way be considered as one of the by-products. In specific situations, the sugarcane could be crushed for making those products and sugar production could be controlled.

4.4.2.11.2 Bagasse, molasses and filter cakes could be considered as the major by-products of the sugar industry and the green tops, cane trash, spent wash, furnace ash and flue gas could be considered as the minor by-products.

4.4.2.11.3 Bagasse is being used as fuel to meet the steam requirements of the sugar factories. A small percentage of bagasse is also used for making paper/particle boards etc. Co-generation of power could be an important by-product of the sugar factories. Technological changes [change from low pressure boilers] could considerably enhance the capability of the industry to generate substantially more power, which could be sold to the National Grid. One problem with this power is its seasonality. However, it is possible to preserve bagasse and use the same for power generation over a larger period. According to the report of the Committee on Revitalization of Sugar Industry [Tuteja Committee Report-2004] the sugar industry has a potential of producing 5000 MW of power.

4.4.2.11.4 Molasses is an important by-product of the sugar industry, which is used extensively for manufacture of potable alcohol, and a number of alcohol based chemicals. An extremely important aspect is that molasses generated ‘Ethanol’ [dehydrated alcohol] is a good oxygenate and could be used as a blend with petrol for motor fuel. Brazil is the world’s largest producer of ‘Ethanol’. There are well over 20 million vehicles in Brazil, which are either pure alcohol powered or run with ethanol mixed petrol [about 22% ethanol blended with petrol]. With increasing prices of crude oil, the promotion of alternate motor fuel has become extremely important.

4.4.2.11.5 The Tuteja Committee [2004] has recommended the following policy interventions:
(a) Oxygenation of gasoline may be made compulsory.
(b) Central Government may formulate long-term policy for blending of ethanol with petrol.
(c) Fiscal and other incentives may be in place for a minimum period of five years.
(d) Purchase price for ethanol may be fixed for a period of 3 years [with suitable price escalation clauses].
(e) The Central Government may take steps to prevent frequent changes in the Power Purchase Agreements by the State Electricity Boards for cogeneration projects.
(f) National Energy Policy may have provisions for (a) mandating the proportion of ‘green’ power to be purchased in the overall power purchase in the State (b) preferential tariff for cogenerated power. The Central Electricity Act may also be suitably amended to provide teeth to the policy to support ‘green’ power.

4.4.2.11.6 A carefully worked out policy in regard to the by-products of the sugar industry could make substantial difference to the sugar industry. The increased profitability, better production planning for sugar and other products [change in product mix] could benefit the growers, help in stabilizing sugar prices, save in foreign exchange [use of ethanol] by reducing oil import bill and help the sugar industry.

4.4.2.11.7 (vi) Another aspect worth considering is the need to develop value added products from sugarcane to boost the demand for cane and improve the profitability of sugarcane cultivators. Some of these products could be tetra-packed cane juice, flavoured jaggery, and syrup from cane juice, liquid sugar and commercial production of vinegar. Perhaps, it may also be possible to produce cane juice wine on commercial scale.

4.4.2.12.0 Sugar Industry - Problems
4.4.2.12.1 It is a well-known fact that the welfare of the sugarcane farmers is closely linked to the working of the sugar factory, which processes the cane grown by him/her. Many sugar mills have also been the focal point for economic and social development in rural areas by generating employment, increasing incomes and creating facilities like schools, colleges, hospitals etc. About 60% of sugar mills in India are in the cooperative sector, 35% in the private sector and the remaining in the public sector. The cooperative form of organization is definitely beneficial in an agro-based industry like sugar. The
cooperative being a member’s organization is concerned with the integrated development of the area, which in the long-term also has beneficial productivity consequences.

4.4.2.12.2 The sugar industry is going through a serious financial crises period. The adverse weather conditions in certain parts of the sugarcane growing-area, attack of pests [white woolly aphid], depressed sugar prices nationally and internationally led to low cash realizations, huge cane payment arrears and serious financial crunch for the industry. In many cases, the value of stock was not enough to cover the working capital loans outstanding to the banks, affecting normal business operations and difficulties in servicing the debts. In some cases, the routine off-season maintenance was affected. The sugar production during 2003-04 was projected at a level of 13.8 million MT against 20.1 million MT in 2002-03. The 2004-05 [Oct-Sept] started with high stocks, low sugar prices and huge cane payment arrears. While, late in the year prices started improving, due to low cane production, it was not possible for well over 100 factories to start crushing during the 2004-05 season creating further difficulties in meeting fixed costs and wage bills etc.

4.4.2.12.3 The Government of India set up a Committee under the Chairmanship of Shri S.K. Tuteja, Secretary, Ministry of Food, Consumer Affairs & Public Distribution, Government of India in March 2004 [referred to earlier in this chapter]. The Committee was to identify the problems faced by the sugar industry and suggest a package for its revitalization to make it viable, self sustaining and globally competitive. The Committee gave its report in December 2004. Some of the important recommendations of the committee are given at appendix-II. The Government may take an early view regarding various recommendations concerning revitalization of Sugar Industry. A weak Sugar Industry would adversely affect the welfare of millions of sugarcane farmers and India would eventually loose its position of premier producer of sugarcane and sugar

4.4.2.12.4 In view of the detailed coverage of the problems of the sugar industry and recommendation for its improvement/revitalization given by the Tuteja Committee, this aspect is not being discussed in this chapter. However, the causes leading to sickness in sugar industry are discussed very briefly in the next paragraph.
4.4.2.12.5 One of the main reasons for sickness of sugar industry is the inadequate availability of the sugarcane which could be due to various reasons including faulty location, inadequate attention to development work, competition from Gur, and Khandseri units, non-availability of adequate and timely inputs to the growers, poor crop and harvest planning and lack of long-term relationship with the growers and the mismatch due to the faster growth in sugarcane crushing capacity as compared to the increase in sugarcane production. Another reason could be the payment to the growers at rates which are not sustainable for the factory. This could be due to fixation of high SAP or payment of excess price due to apprehension of poaching etc. Another reason is the low equity and high indebtedness particularly in the case of the cooperative sugar mills. High interest rates charged by banks, particularly the cooperative banks could be another reason for high debt service obligations. There are also cases where the sugar factories have expanded or diversified without bringing adequate owner’s equity [cooperative sugar factories]. In the years of higher production, the factories have to carry larger stocks increasing the debt burden and interest liabilities. As a matter of fact, sugar industry has to carry stocks for larger periods and any slackening of demand adds to the problems. Obsolescence of technology and machinery is another factor along with unsustainable low installed capacity of the mills or other problems. It may also be stated that in some cases the rigorous Government Controls, which were exercised on the sugar factories in the past, might have also contributed to sickness of some unit.

4.4.2.13.0 Technology Mission on Sugarcane [TMS]

4.4.2.13.1 The importance of the sugarcane cultivation and sugar production in the country cannot be over emphasized. There is a need for improving the productivity, profitability and sustainability of sugarcane farming and also modernization of the sugar industry. The strategies to improve the productivity and quality of sugarcane production have been discussed at an earlier paragraph [15]. The need is to introduce packages of technology, services and public policy for the purpose. At present, there is some multiplicity of the Government departments/organizations, both at the Centre and State, dealing with this subject. Although sugarcane is an important commercial crop providing employment on a large-scale in rural areas, there is no special programme or Centrally sponsored scheme of the Agriculture Ministry exclusively for improving the production
and productivity of sugarcane in the country. The Department of Sugar is implementing the SDF Scheme, which has components for improving the productivity of sugarcane, but perhaps the main focus is with regard to the health of the sugar industry. In the field of research also, though the ICAR is doing its own research efforts through its various schemes and Institutes, the full potential of their research is yet to be achieved.

4.4.2.13.2 Therefore, in order to have a coordinated and focused attention for implementing the strategies discussed earlier to improve the productivity and quality of sugarcane production it is proposed that a Technology Mission on Sugarcane [TMS] be formed jointly with the sugarcane growers’ organisations, cooperatives, sugar factories, banks and research organisations, on the basis of a seed to sugar approach. The objective of the Mission would be to increase the all India average productivity to at least 80 MT/ha. [present average of (2002-03) 64.6 MT/ha against the average yield in many countries already well above 100 MT/ha] and improve the sugar recovery to 11% [from the present 10.3 against the Australia average at 14.25%] with a view to minimizing the cost of production to improve the competitiveness of sugar production with focus on use of better quality seeds, efficient soil, water and nutrient management and taking care of soil and plant health. The above improvements in yield and recovery would help in increasing the production to 25 million tons of sugar in 5 years which would take care of the projected consumption in India at 24.3 million tons.

4.4.2.13.3 The Technical Mission on Sugarcane [TMS] could have three major components:

(a) Intensification of sugarcane research

(b) Technology Transfer

(c) Improving the productivity and quality of sugarcane.

The Intensification of sugarcane research in the following main areas is called for:

(a) Breeding sugarcane varieties/hybrids resistant to biotic stresses including development of transgenic varieties etc. suitable for different agroclimatic and soil conditions.

(b) Improving seed production technology including tissue culture techniques and its standardisation.
(c) Optimisation of resource use efficiency through development of integrated soil, water, nutrition, pest and weed management. Strategies for sustainable productivity and production. Improvement in ratooning for better yields.
(d) Further development work in eco-friendly technologies in IPM, biofertilizers etc.
(e) Development of appropriate and cost effective equipments, tools and machinery for sugarcane cultivation particularly in planting, harvesting etc.
(f) Exploring/evaluating/developing sugarbeet as a supplementary feed stock.

4.4.2.13.4 The above intensification of research would require investment in infrastructure mainly for establishment of a hybridization center for development of sugar hybrids. At present, the major work in this regard is being done at Coimbatore on parents whose flowering synchronizes during a short span at Coimbatore. To supplement the above, another hybridization center could be established. The unused/excess physical facilities already available at existing research stations CENTRES and their suitability may be looked at carefully before a new place is identified for the proposed centre. This facility would be useful to the sugarcane breeders to get additional crossed seeds. Further, the existing facilities for molecular biology and genetic engineering at the research set up at the Sugarcane Breeding Institute, Coimbatore, Indian Institute of Sugar Research [IISR], Lucknow and Vasantdada Sugar Institute [VSI], Pune need to be strengthened for developing varieties including transgenic which are resistant to biotic and abiotic stresses and would give higher yields and recovery. The estimated costs for building these facilities would be around Rs. 20 crores. These developments would help in long-term improvement of sugarcane varieties etc to ensure that the productivity and quality level are sustained and improved.

4.4.2.13.5 Research studies for optimization of resource use efficiency, crop protection, use of bio-pesticides, bio-fertilizers, development of appropriate and cost effective instruments/machinery for sugarcane will have to be supported. A research programme for about five years with clear monitorable output indicators, yearly milestones with final output target will have to be worked out, funded, closely monitored and achieved. A preliminary identification of suggested research studies by the Vasantdada Sugar Institute, Pune are listed at Appendix-I. These could be considered along with similar other suggestions for firming up the research agenda on the subject.
While exact research items, their allocation to different research bodies including Universities, monitoring systems and costs will have to be worked out, on a rough basis an amount of about Rs. 100 crore to Rs. 125 crore may be required for this purpose. The ICAR/Sugarcane Breeding Institute, Coimbatore/IISR Lucknow and VSI, Pune may have to play a major role under this programme. It will also be important that the end users i.e., the farmers and the sugar factories are actively associated in firming up the research programmes etc.

**Technology Transfer**

There is a wide gap between the potential and realized productivity. [Please see the details at para 4 (ii)]. The productivity gap between, the tropical and sub-tropical zone is large. Further, in Tamil Nadu average productivity of 106.8 MT/ha was achieved in 2002-03. Karnataka has also been achieving average productivity of over 80 MT/ha. There are also wide gap in sugar recovery between different States, ranging from over 11.6% in Maharashtra to only 9% in Bihar. The low recoveries could be attributed to poor quality of cane and inefficient making of sugar. As regards the quality of cane, there is much room are improvement particularly in the sub-tropical areas [The average sugar recovery in 2001-02 in sub-tropical zone was about 9.67% as compared to about 10.75% in the tropical zone. Nearly 55% of the factories in Maharashtra, 26% in Karnataka and 11% in each in Andhra Pradesh and Gujarat are having more than 11% recovery of sugar]. However, this would require considerable step-up in extension efforts. The need is to develop and introduce a more effective technology transfer system, which demands proper strategies for effective planning, implementation and evaluation of activities in the technology transfer process. It is said that perhaps the farmers adopt about one third of the available technologies, which needs to be improved.

The objective of the programme under the TMS could be as under:

(a) Develop seed production chain by organizing breeder, foundation and certified seed production programme and available better seeds to the farmers.

(b) Promote use of quality planting material produced by tissue culture.
(c) Transfer production technologies developed by ICAR/Agriculture Universities etc. to farmers through field demonstrations, farmer/extension workers training programmes, farmer to farmer learning and exchange visits to different areas/States.

(d) Bringing more area under efficient irrigation systems like drip, sprinklers etc.

(e) Minimize crop loss by adopting IPM technique, promoting bio-agent production in farmer’s fields.

(f) HRD for updating knowledge/skills of the farmers and field staff.

(g) Reduce cost of cultivation and restore soil health through green manuring, trash manuring and use of press mud, vermi-compost etc. Deteriorating soil health is one of the main reasons for productivity decline/stagnation and it needs more attention.

4.4.2.13.9 The technology transfer programme would have to be done jointly by the staff of the Agriculture Department [AD] and the staff of the sugar factories. The staff of the AD and the factory could prepare farmer wise production programme for each factory in consultation with the farmers and undertake the same after due approval etc. This would become the basis for improving productivity and quality of sugarcane. The farmer training programmes may be given special focus. Assuming about 10,000 to 15,000 farmers in the area of each sugar factory, it may take about 4-5 years to cover all [50 to 60 programmes of about 50 farmers each in a year]. Farmer to farmer learning and visits to other areas/States may be given adequate importance in the training programmes.

4.4.2.13.10 Devising appropriate training programmes keeping in view the farmer’s needs, beliefs, attitudes and problems would be the crucial part of the entire programme of technology transfer. All technologies are not appropriate for all resource conditions. Small and marginal farmers who are resource poor and require technologies, which are appropriate for them, cultivate nearly 45% of the sugarcane area. There has to be integration of the technology support systems, technology generation and technology transfer.

4.4.2.13.11 Much of the anticipated increase in productivity and quality of production may come about through use of quality seeds. Development of seed production chain will be accorded a high priority. This may have to be primarily implemented through ICAR/Agriculture Universities/VSI, Pune etc. Assistance may have to be provided to the
above organizations to maintain genetically pure nucleus seed, production of breeder seeds and foundation seeds. The Sugar factories could also associate in production of breeder seeds depending upon their capabilities and set up. **The programme of production of certified seeds will have to be done by the sugar factories/farmers.** The programme of seed production may be planned in the ratio of 1:10:100 for breeder, foundation and certified units and with a view to replace \( \frac{1}{4} \)th of the area with fresh seed material every year [replacement of seed alone can increase the productivity by about 10 to 12\%].

4.4.2.13.12 Subsidy may be provided for production of foundation/breeder seeds for 5 years. The programme details may have to be worked out by the ICAR in consultation with the State Governments, Agriculture Universities, VSI etc. On a rough basis of subsidy of Rs. 40,000 per hectare for breeder seeds and Rs. 10,000 per hectare for foundation seed, the subsidy component would come to about Rs 16 crore in the first year. The total requirement of subsidy breeder/foundation seed programme for five years would work out to about Rs.100 crore including the subsidy for maintenance of nucleus seeds. Another about Rs. 500 crore may be needed [details will require to be worked out] for training, demonstration and other extension related expenses as additionality to the extension efforts being presently done. This may be worked out on sharing basis between the Center, State Government and Sugar Factories. Out of this additional investment of Rs. 500 crore in extension efforts over five years the Centre’s share may be Rs. 250 crore. Focus of these programmes may be mainly on small and marginal farmers, which constitute about 43\% of the total sugarcane farmers.
Box –5

Sugarcane – DSCL way of bringing prosperity to the farmers

The DCM Shriram Consolidated Ltd (DSCL) started its first crushing season in 1997-98 in U.P. having 16,748 hectare under sugarcane in its area with intensity of sugarcane cropping at only 26%. The challenge to the company was low productivity due to poor technologies, low yielding and susceptible varieties, poor soil conditions and low water availability. The DSCL realized that to ensure regular and adequate supply of sugarcane either the area had to be increased or the yield had to go up and maximum possible share of the sugarcane produced in the area had to come for crushing at the factory. The Company moved in the matter by extending credits for farm inputs, ensuring availability of quality inputs at reasonable rates, providing extension services for popularizing modern agri-techniques, soil testing, providing better varieties of seeds, recommending proper crop rotation, inter-cropping and developing close relationship with the farmers.

The result is that the average productivity has increased in the last four years from 42 ton/ha to 55 ton/ha and the yield in paired row spacing upto 75 ton/ha to 120 ton/ha. The farmers are also getting additional income of Rs.5000 to 10,000 per hectare from inter-cropping. Further the intensity of sugarcane cultivation has improved to 52% and the area under sugarcane to 50,000 hectare.

The Company established the first Haryali Kisaan Bazar (HKB) in July 2002 and now there is a chain of 16 HKBs in four States viz. Uttar Pradesh, Haryana, Punjab and Rajasthan. These units provide fertilizers, insecticides, pesticides and seeds of different crops, agricultural implements, diesel, petrol and lubricants through BPCL petrol pumps to ensure better quality and quantity cooking gas to farmers through Bharat gas agency, different FMCG products of daily use, veterinary medicines, green card facility by using ATM through rural branch of ICICI Bank and giving crop extension services.

Improving the Productivity and Quality of Sugarcane Production

4.4.2.13.13 It is felt that the sugarcane cultivation could be revolutionized by a strong proactive role of the sugar factories, banks, financial institutions and the Government both the Centre and the State Governments. The broad objectives of the programme could be stated as under:

(a) To increase the productivity and quality of sugarcane in all sugarcane growing States, of the country while keeping the area under sugarcane constant.

(b) To maintain sustainability of the sugarcane farms.

(c) To increase the profitability of the sugarcane farmers.
(d) To encourage the sugar factories to establish additional facilities for sugarbeet processing.

4.4.2.13.14 This is the most important part of the project. The benefits of focused research support, extension work, improved availability of better quality seeds/varieties and inputs has to be converted into higher productivity and better quality of output. The farmers wise production programme worked out for each factory would be the basis. There could be two main components of this programme. The first relating to establishment of certain infrastructural facilities like Soil Testing Laboratories and Tissue Culture Laboratories at the factory level to support the programme for scientific cultivation and improve the availability of superior planting material in their reserved area. To provide incentive to the sugar factories to invest in creating the above facilities, the Government may provide 25% capital subsidy for development of about 250 Soil Testing Labs [unit cost of about Rs. 40 lakh] and 125 Tissue Culture Laboratories [unit cost of nearly Rs. 105 lakh]. The amount may work out to about Rs. 50 to 60 crore. The factories may raise the balance of 75% from their internal resources/banks etc. The soil testing labs should work to prepare a soil health card for each farm and specially assess the micro nutrient deficiencies so that the same could be applied on the soils to improve their productivity. It is felt that this development alone could improve the productivity of farms by at least 15-20%. Further, it may also be necessary to encourage establishment of bio-fertilizer units. The use of nitrogen fixing and phosphate solubilizing biofertilizers in sugarcane significantly increases the cane yield besides as much as 25% saving in inorganic nitrogen. The potential demand for all types of biofertilizers for sugarcane is estimated at 0.90 lakh MT against the production of 0.13 lakh MT. It is, therefore, suggested that the Government may encourage establishment of such units [about 300 units] by providing 25% subsidy. On a rough basis the subsidy may work out to nearly Rs. 45 - 50 crore.

The second component of the programme i.e., taking up scientific cultivation, using proper nutrients based on soil test reports, introduction of drip irrigation, need based farm mechanization, improving ratoon management, green manuring, improving irrigational facilities, using better quality certified seeds, providing adequate credit for purchase of inputs etc. could be supported by banks under their normal development programmes.
However, it would mean intensification of efforts, development of new model schemes, training of the field staff of the banks, close monitoring and eventual evaluation. The National Bank for Agriculture and Rural Development [NABARD] which has an important promotional and developmental role may be nominated as the nodal agency to prepare factory wise credit intensification programme based on farm plans [referred to earlier] prepared by the extension staff and the factories, to be incorporated in the District Potential Linked Credit Plans prepared on an annual basis by NABARD for all the districts in the country. These programmes may have to be dovetailed with the District Credit Plans of the banks. These plans may be aggregated at the State/National level. It is felt that sugarcane cultivation presents excellent opportunities for the banks to intensity their credit operations. Sugarcane is a highly profitable crop and has assured marketing tie up with the sugar factories. The need is to have a focus and an agency for coordinating, problem sorting and giving a lead to the entire investment programme. A kind of role, which is tailor, made for NABARD.

4.4.2.13.15 NABARD may also lead the training of the bank staff in this credit intensification programme. The Banker Institute of Rural Development [an autonomous national level training establishment established by NABARD] may take the lead role in preparation of course contents, reading material and training of the trainers of the banks and other training institutions involved in training of the bank staff.

4.4.2.13.16 The Government may provide a small service charge to NABARD for the credit intensification programme at say 0.5% on the basis of incremental credit disbursed under the programme. Assuming incremental lending of Rs. 10,000-12,000 crore, a provision of Rs. 60 crore would be adequate.

4.4.2.13.17 A High Level Committee of about 15 members consisting of the representative of Government of India, Four State government [on rotation], NABARD, RBI, Commercial Banks [on rotation], the Federations of the Cooperative Banks, ICAR and Industry may be constituted under the Chairmanship of the Union Agriculture Minister or his nominee Government of India with Chairman/ MD, NABARD as Member Secretary. The Committee may broadly oversee the entire programme.
4.4.2.13.18 Similar Committees may also be created at the State level under the Chairmanship of Agriculture Production Commission of the State and the Incharge of the Regional Office of NABARD as the Member Secretary to oversee the programme in the State. For undivided and focused attention the TMS may be placed under the exclusive change of a senior level officer in the Govt. of India to the designated as ‘Mission Director’. Similarly, in the major sugarcane growing States, the Governments may also designate a State level ‘Mission Director’ to act as the ‘nodal officer’ for the programme.

4.4.2.13.19 To sum up the total cost of the programme may be around Rs. 900 crore in a five year time slice as detailed below:

A. Intensification of research efforts : Rs. 125 crore to Rs. 150 crore
B. Technology Transfer : About Rs. 600 crore of which the Centre’s share may be Rs. 300 crore
C. Improving the productivity and quality of sugarcane : Rs. 160 crore

Needless to say, the above are rough estimates and the details would require to be worked out.

4.4.2.13.20 The Project would aim to reach in 5 years, all India average productivity of above 80 MT/ha and recovery level of 11% which would produce nearly 250 lakh tons of sugar [on the assumption that about 62.5% cane would be available to the sugar factories for crushing]. This would mean additional sugar production of about 50 lakh tons in the fifth year of the project, from the level of production of 2002-03, which would value [on the basis of Rs. 14000 per ton] about Rs. 7000 crore. For achieving an average productivity of 80 MT/ha it is expected that the average productivity in the tropical region would increase to 95 MT/ha against the level of 82.73 MT/ha in 2001-02 and the average productivity in sub-tropical region would increase to 70 MT/ha against the average of 52 MT/ha in 2001-02. It is also assumed that the area under sugarcane in tropical and sub-tropical region would continue to be in the ratio of 60:40 as at present.

* During the last 4 years the total use of sugarcane for khandsari gur, chewing seed and other purposes has never exceeded 135 million MT. In view of the possibilities that the demand for these purposes may not grow [may decline] the cane available for sugar would be 225 million ton i.e. about 62.5% of the production. This is based on an estimated total sugarcane production of 360 million MT [450 lakh hectare with average production of 80 MT/ha] and average sugar recovery of 11%.
4.4.2.14.0 SUMMARY OF RECOMMENDATIONS

4.4.2.14.1.0 SUGARCANE PRODUCTION

4.4.2.14.1.1 Good seeds provide the basis for good crop in general but it is more so in the case of sugarcane crop, which is propagated vegetatively. The programme for production of breeder seeds/foundation seeds needs to be supported. The sugar factories could play an important role in raising nurseries with foundation seeds from research stations. Replacement of seed is important. The replacement of seeds by the farmers in fourth year could improve the yield by 10% to 12%.

4.4.2.14.1.2 There is an urgent need for replacement of low sugared variety of cane in UP, Bihar, MP etc. through extension efforts.

4.4.2.14.1.3 There is a need to reduce the seed quantity at the farm level. The cost of seeds could be reduced substantially by transplanting polybag-raised seedlings or planting one eye-bud setts.

4.4.2.14.1.4 Tissue culture needs to be encouraged for assured genetic purity, better and early germination, quicker coverage by better varieties and higher sugarcane yield. The sugar factories need to be supported for having tissue culture laboratories.

4.4.2.14.1.5 Proper care of ‘ratoon’ crop could increase the sugarcane yield. Maintaining required plant population through gap filling by settlings, use of adequate fertilizers, need based micro - nutrients and plant protection care could help in increasing the yield of ratoon crop. Training of the farmers and more intensive extension work by the extension staff and sugar factories is called for.

4.4.2.14.1.6 There is a need for the sugar factories to have soil testing laboratories so that soil health card for each plot of land in the reserved area could be prepared and need based micronutrients and fertilizers could be applied. This alone could improve the yields by 15% to 20%.

4.4.2.14.1.7 The cane area reservation needs to be on a long-term basis (5 to 10) years with provision for review by the State Government, to ensure better sugarcane development efforts by the factories and effective linkages with the growers. Social audit
of the arrangement may be taken up which could also facilitate the decision-making in case of dispute.  

4.4.2.14.1.8 Monoculture of sugarcane has resulted in substantial reduction in productivity. Proper sequence of cropping such as sugarcane-leguminous crops is suitable for sustainable productivity.

4.4.2.14.1.9 The high capital cost and irregular electricity supplies are the major constraints in adoption of drip/sprinkler irrigation systems. The after sale service of the equipment also needs improvement. According to studies, drip system saves irrigation water by about 35 to 55%, fertilizers by about 30% and increases the yield by about 25-30%.

4.4.2.14.1.10 Crop specific equipments need to be popularized. The sugarcane planting done by planter improves bud germination. On a rough basis, the cost of planting could be reduced by about Rs. 1500/- per hectare with the use of planter. Efforts are also needed to design indigenous sugarcane harvesters, which could reduce harvesting cost and also avoid losses due to labour shortages during the peak cane harvesting periods in sugarcane producing States.

4.4.2.14.1.11 The sugar factories/extension agencies could play an important role in adoption of integrated pest control practices collectively by the farmers in an area.

4.4.2.14.1.12 Greater attention needs to be paid in use of crop residue from sugarcane and products much as press mud, sugarcane trash and distillery effluents for improving sugarcane production.

4.4.2.14.1.13 There is scope for increasing the use of bio-fertilizers in sugarcane cultivation. The use of nitrogen fixing and phosphate solubilizing bio-fertilizers in sugarcane significantly increases the cane yield besides as much as 25% saving in inorganic nitrogen. The Government may support establishment of bio-fertilizers units by providing capital subsidy.
4.4.2.14.2.0 CANE PRICE
4.4.2.14.2.1 SMP needs to be announced by the Government at least one year in advance to give price signals and also to help in the allocation of land/other resources. If the SMP could be announced for a longer period say about 3 years, it would help in better planning and stabilizing cane production. There should be very strict enforcement of the law regarding timely payment of sugarcane price to the growers.

[Para 4.4.2.7.7 & 4.4.2.7.12]

4.4.2.14.2.2 The SMP needs to carefully balance the interests of the growers and the factories. While the sugar prices were declining/stagnating, the SMP for sugarcane continued to increase which also contributed towards increasing the sugarcane price payment arrears.

[Para 4.4.2.7.7]

4.4.2.14.2.3 Though suggestions have been made, it may not be appropriate to have SMP on regional basis.

[Para 4.4.2.7.7]

4.4.2.14.2.4 Linking the sugarcane price to the sucrose contents of the cane as is done in some other countries could encourage the farmers to grow better varieties. However, it could be done only after the equipments for assessing sucrose contents of the cane are tested and become generally acceptable by the growers. This needs to be done on a priority basis. However, for the present it may be possible to fix incentive prices for varieties, which have higher sucrose contents with a view to encourage the farmers to take up cultivation of these varieties.

[Para 4.4.2.7.9]

4.4.2.14.2.5 Prima facie the Bhargava formula for sharing the surplus of income from the sale of sugar over the cost of production 50:50 by the growers and the factories appears to be in order save for the implementation delays. If it could be decided quickly at the end of the season, the impact would be much better.

[Para 4.4.2.7.11]

4.4.2.14.3.0 CANE PROCUREMENT [SUPPLY] ARRANGEMENTS
4.4.2.14.3.1 In U.P. and Bihar the system of sugarcane procurement for crushing on the basis of ‘Parchies’ issued to the farmers through the Cooperative Cane Societies/Union needs to be reviewed. This system leads to delay in reaching the sugarcane to the factories [collection is usually at the purchase centers] and is also not farmer friendly.
This system is also not effective in developing linkages between the farmers and the factories. [Para 4.4.2.7.17]

4.4.2.14.3.2 Though the State Governments impose penalty for poaching of sugarcane, unless it is adequate it does not serve as a deterrent to the factories. In Punjab, for example, the penalty on conviction in a court was only Rs. 2000/-, which was grossly inadequate. This needs review by the State Governments. [Para 4.4.2.7.3]

4.4.2.14.3.3 It may be appropriate to treat Khandseri units with above 500 TCD capacity at par with sugar factories for payment of SMP during normal cane season and also for excise duty etc. [Para 4.4.2.8.5]

4.4.2.14.3.4 The electronic weighing scales needs to be installed at all purchase centers/factory gates, so that the sugarcane growers are satisfied about the accuracy of weight and it would reduce their waiting time. [Para 4.4.2.7.18]

4.4.2.14.3.5 As 5000 TCD is sustainable; the minimum distance between two factories may be increased from the present 15 km to 25 km. [Para 4.4.2.8.9]

4.4.2.14.4.0. KHANDSERI/GUR PRODUCTION

4.4.2.14.4.1 There is need for improvement in operational efficiency of both khandseri and gur units. One way could be to create a Khandseri Development Fund at the State level through levy of a cess, which could be used for providing need based support [margin money, low rate of interest] for modernization/expansion to units located outside the reserve area of the factories. [Para 4.4.2.8.6]

4.4.2.14.4.2 There is a need for extension work regarding improved methods of gur production and storage not only among the gur producing units but also among the farmers who produce and store gur for their domestic consumption. [Para 4.4.2.8.7]

4.4.2.14.5.0 SUGAR DEVELOPMENT FUND

4.4.2.14.5.1 The Government may consider alternative security like the charge on sugar factories assets for granting loans under SDF. The unit costs for various investments under SDF assistance are not being updated regularly. It is understood no revision in unit cost has taken place for over 10 years, with the result assistance under the SDF is grossly
inadequate. These cost norms need to be revised periodically. The operations of SDF need to be more flexible and user friendly. [Box – 3]

4.4.2.14.6.0 SUGAR BEET
4.4.2.14.6.1 The potential of the sugar beet crop [which could be cultivated in winter] needs to be analyzed and considered carefully as supplementary feed stock particularly with a view to increasing the crushing period and saving on water use. It would be necessary to take up pilot projects in different areas to evaluate sugar beet as a supplementary crop. [Para 4.4.2.9.9]

4.4.2.14.7.0 SUGAR- EXPORT/IMPORT
4.4.2.14.7.1 Since, sugar shows considerable variations in production, it is appropriate that India builds up its export market. We should also continue our efforts aggressively at international level to get rid of global distortions in the world sugar market. It would also be necessary to increase investment in improving sugar quality to meet international standards. An important connected issue would be to have a pragmatic sugar packaging policy. Compulsory packaging in Jute bags of 100 kg adds to the costs and repacking in 50 kg bags [internationally demanded pack size] costs additional money. [Para 4.4.2.10.3]

4.4.2.14.7.2 In the year of shortfall in production, imports would be needed. It would be appropriate that when necessary, we may import only raw sugar, which could be processed into white sugar by the industry in India. [Para 4.4.2.10.4]

4.4.2.14.7.3 The competitiveness of sugar needs to be assessed on the use of the entire biomass of sugarcane and all the by-products and not only sugar. [Box - 3]

4.4.2.14.8.0 VALUE ADDED PRODUCTS
4.4.2.14.8.1 There is a need to develop value added products from sugarcane to boost the demand for cane and improve the profitability of sugarcane cultivators. Some of these products could be tetra-packed cane juice, flavoured jaggery, and syrup from cane juice, liquid sugar and commercial production of vinegar. Perhaps, it may also be possible to produce cane juice wine on commercial scale. [Para 4.4.2.11.7]
4.4.2.14.9.0 RESEARCH
4.4.2.14.9.1 Efforts are necessary to fit research to the farmer’s needs and requirements. Gaps in support system i.e., extension machinery, credit and input supplies are some of the contributory factors in large gap in technology adoption. [Para 4.4.2.9.11]

4.4.2.14.9.2 Public private partnership between the research institutions/extension machinery and the sugar factories is essential for cane development in the reserved area. This could facilitate extension work and needs to be encouraged. [Para 4.4.2.9.12]

4.4.2.14.10.0 ETHANOL/COGENERATION
4.4.2.14.10.1 Tuteja Committee [2004] recommendations regarding policy interventions in the matter of ‘bio-fuel’ and co-generation of power by sugar factories need favourable consideration.

- Central Government may formulate long-term policy for blending of ethanol with petrol.
- Fiscal and other incentives for ethanol production may be in place for a minimum period of five years.
- Purchase price for ethanol may be fixed for a period of 3 years [with suitable price escalation clauses].
- The Central Government may take steps to prevent frequent changes in the Power Purchase Agreements by the State Electricity Boards cogeneration projects being implemented by sugar factories.

National Energy Policy may have provisions for (a) mandating the proportion of ‘green’ power to be purchased in the overall power purchase in the State (b) preferential tariff for co-generated power. The Central Electricity Act may also be suitably amended to provide teeth to the policy to support ‘green’ power. [Para 4.4.2.11.4]

4.4.2.14.11.0 SUGAR INDUSTRY
4.4.2.14.11.1 The recommendations of the Tuteja Committee [2004] regarding revitalization of the sugar industry needs an early decision. [Para 4.4.2.12.3]
4.4.2.14.12.0 TECHNOLOGY MISSION ON SUGARCANE [TMS]

4.4.2.14.12.1 The average all India yield of sugarcane has been declining during the last five years. Even earlier it had shown tendency of stagnation. During the last 12 years ending 2002-03, the highest average yield of 71.3 MT/ha was achieved as far back as in 1994-95. On the basis of projections, the demand of sugar is likely to reach 24.3 million tons against the production of 20.1 million tons in 2002-03. In view of the limitations in increasing area under sugarcane, the Central Government may establish a Technology Mission on sugarcane with the objective of improving the productivity and quality of sugarcane production. The Technology Mission should help in achieving the All India average sugarcane yield of at least 80 MT/ha [against 64.6 MT/ha in 2002-03] and an average recovery of not less than 11% [against 10.36% achieved in 2002-03] in five year

[Paras 4.4.2.3.2 & 4.4.2.13.2]

4.4.2.14.12.2 The TMS may have three components i.e., intensification of sugarcane research, technology transfer and improving the productivity and quality of sugarcane production. The research establishments may work on breeding sugarcane varieties for different agro-climatic/soil conditions and higher sucrose contents, making available foundation seeds to factories/select farmers for improving availability of quality seeds, suggest improved practices, develop appropriate tools and provide the research support for sustaining increase in productivity and quality of sugarcane. The Agriculture Department & the Sugar Factories would have to work together and provide extension support. The sugar factories need to prepare soil health cards for each plot of land in the reserved area growing sugarcane and also the farm wise production programme.

[Paras 4.4.2.13.3 & 4.4.2.13.6]

4.4.2.14.12.3 Each sugar factory may constitute Cane Development Council representing the farmers, the factory and the Government [including research organization] to advise the factory on the matter of sugarcane development.

[Para 4.4.2.9.3]

4.4.2.14.12.4 NABARD may be declared the nodal agency to coordinate the availability of credit and prepare a factory wise credit plan based on the farm wise production plans prepared by the Sugar Factories/representative of the extension Department of the State Government.

[Para 4.4.2.13.14]
4.4.2.14.12.5 A Committee at the National level chaired by the Hon’ble Union Agriculture Minister and having representation of the concerned Ministries of the Central Government, State Government [on rotational basis] Banks, [on rotational basis] ICAR, Industry, RBI and NABARD may oversee the programme. Appropriate Committees at State level may also be constituted to averse the implementation of the programme in the respective State. [Paras 4.4.2.13.17 & 4.4.2.13.19]

4.4.2.14.12.6 For undivided and focused attention, the TMS may be placed under the exclusive charge of a senior level officer in the Government of India to the designated at Mission Director. Similarly the major sugarcane growing states may also designate a State Level Mission Director to act as the modal officer for the programme. [Para 4.4.2.13.18]

ACKNOWLEDGEMENT

The National Commission on Farmers acknowledges the cooperation extended by the Vasantdada Sugar Institute, Pune and the Indian Institute of Sugar Research, Luknow which helped in holding consultations with the officers of the Government of India, State Governments, Industry, Banks, Research Organisations, Experts and Farmers on the subject at Pune and Luknow respectively. The sharing of knowledge and experiences by the participants in the above meetings and also during the consultations held at New Delhi is acknowledged.
## Appendix –I

### Intensification of Sugarcane Research

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<tr>
<th>S. No.</th>
<th>Name of project</th>
<th>Number of centres to be involved</th>
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<tbody>
<tr>
<td><strong>A. CROP PRODUCTION</strong></td>
<td></td>
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<tr>
<td>1.</td>
<td>Studies on different integrated package of practices to revolutionize sugarcane productivity &amp; recovery.</td>
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Appendix II
Major Recommendation for Sugar Industry by Shri Tuteja Committee

1. To ensure that the sugar factories in drought / flood affected States get adequate working capital to start their crushing operation in 2004-2005, a package of assistance for rescheduling their debts may be provided. Under this package sugar factories, which were operational in 2002-03 sugar season, may be covered.

2. All loans as on 31-03-2004 may be deferred / rescheduled to long term loans repayable in 10 to 12 years, beside a moratorium of both interest and principal for 3 years stating from 2004-05. Loans to be covered under this package are the deficit in stock value as on 31-03-03 (Rs. 1,500 crores), which was rescheduled into working capital term loan, deficit in stock value as on 30-09-04 (Rs. 1,000 crores) and other term loans (Rs. 4,000 crores). The exact terms of the package may be worked out by NABARD and RBI (in consultation with the state governments) on a case-to-case basis taking into consideration the debt service obligations and the capacity to repay of these sugar factories.

3. NABARD may provide (allow) pre-seasonal loans as per their existing norms to sugar factories in Maharashtra and Karnataka.

4. Government of drought/ flood affected states may be allowed additional open market borrowings to help sugar factories to meet the fixed costs and 75 % entitled wages (of 2004-05 and 2005-06 season and arrears of 2003-04 season) of mills which were operational in 2002-03 sugar season but may have to remain closed in 2004-05 and 2005-06 sugar seasons due to no-availability of sugarcane; The State government may offer this as loan to sugar factories at a rate of interest of 4 % per annum, the Central Govt. may provide interest subsidy to meet the difference between the coupon rate on the bonds raised through additional market borrowings and 4% as was done last year when State Governments were allowed the same facility for clearing cane price arrears.

5. A scheme similar to the one available for integrated textile units should be sanctioned for the sugar sector for reducing their debt service burden.

6. In the case of units set up keeping the incentives of 1993 and 1997 in view, the excise duty payable on levy sugar namely Rs. 38/quintal may be charged on 50 % of sugar sold
by these units under their free sale quota as against excise duty of Rs.71/quintal payable on free sale sugar.

7. All eligible cases for restructuring in the sugar industry may be taken under the Central Debt Relief [CDR] scheme. The present minimum principal exposure of Rs. 20 crores may be brought down to Rs. 10Crores.

8. Working capital to cooperative sugar factories may be made available through National Cooperative Development Corporation (NCDC) at a subsidized rate of interest. For this purpose, NCDC may arrange cheaper funds through External Commercial Borrowings (ECBs) and the Government of India may accord permission as well as provide guarantee in this regard.

9. A body like BIFR may be set up for rehabilitation of cooperative sugar mills and NCDC may be appointed as the Nodal agency for preparing rehabilitation packages for sick cooperative sugar mills.

10. The financial restructuring of cooperative sugar factories under rehabilitation package may generally comprise the following components:

- Conversion of full/part of outstanding State Government loans into equity.
- Infusion of additional equity by the State Government/members of the society.
- Reschedulement of outstanding loans of banks & financial institutions and waivers concessions in interest on outstanding loans of cooperative sugar mills.

11. NCDC while acting as a nodal agency may work out a suitable rehabilitation package involving the above steps and also, working out required amount of interest subsidy for revival of a sugar factory, in consultation with term lenders, banks and National Federation of Cooperative Sugar Factories.

12. In order to improve profitability of sugar industry through value addition to by product like bagasse and molasses, cooperatives sugar mills having potential for setting up of diversification projects may be encouraged. In this context, NCDC may also explore the possibility of arranging external commercial borrowings and Government of India may accord permission as well as guarantee in this regard.
13. VRS in the sugar sector may funded by commercial banks.

14. Necessary assistance may be provided from SDF for the following purposes:
   - Installation of appropriate effluent treatment systems (to achieve zero discharge) including installation of heat exchangers for cooling and condensing, tertiary treatment of effluents and labs for monitoring effluent quality.
   - Installation of bag filters/high efficiency wet scrubbers/electronic precipitator to meet standards of air emission

15. As sugar industry do not discharge any toxic or highly polluting wastes, it may be placed in ORANGE category.
CHAPTER - 4.5

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

CONSERVATION, CULTIVATION AND MARKETING OF MEDICINAL PLANTS

4.5.0 Introduction: The Challenge and the Potential

4.5.1 Medicinal and aromatic plants provide a window of opportunity to concurrently strengthen health, food, nutrition, and livelihood security of farm families and agro-ecological security of the environment. Their potential is especially immense in the Indian context where traditional systems of medicine have been used over the years to address human, animal and plant health. Globally also, the potential is being recognized and it is becoming increasingly apparent that Health for All can be assured only by strengthening traditional systems of medicine.

4.5.2 Business opportunities in recent years are expanding due to diversified usages of herbals in pharma, nutraceutical, cosmetic and agro-chemical industries. Whereas India’s current turnover from the herbal industry is estimated to be around 50,000 million rupees (40,000 million rupees in the domestic market, 10,000 million rupees in exports) given the burgeoning global demand trends, this size can increase exponentially in the next 10-15 years. According to a World Bank study, the world market is poised to grow to US $ 5 trillion by 2050. That being the scenario, India as one of the biodiversity rich countries with a rich heritage of traditional medicine has the potential to be a leading player in the sector. This calls for major sprucing up first on the domestic front in the areas of cultivation, research, standardization and regulation to ensure safety, quality and efficacy, and pricing and marketing. A focused strategy has to be undertaken simultaneously to place our products in the international market.

4.5.3 The key challenges in this endeavor are doing research to establish the safety, quality and efficacy of the traditional health products and gearing up supplies via large-scale cultivation and appropriate post-harvest technologies. This again calls for immediate research into development of sources for quality planting materials and
standardization of agro-technologies and agro-economics. But if done in a proper manner, the medicinal plants sector can be a major area for generation of employment and income.

4.5.4.0 Background

4.5.4.1 India has one of the world’s richest medicinal plant heritages. It has 10 biogeographic zones and 25 biotic provinces. About 8000 species of plants are used in local health practices for human, veterinary and agriculture related applications. Around 1800 species are systemically documented in the codified Indian Systems of Medicine - Ayurveda, Unani, Siddha, and Gso-rig-pa which source their drugs from medicinal plants. Over 10,000 herbal drug formulations have been recorded in codified medical texts of Ayurveda. Thus, we are uniquely positioned to capture the new opportunities both locally and globally in providing increasingly sought-after holistic healthcare solutions for human, veterinary and agricultural purposes.

4.5.4.2 Of the indigenous systems of medicine, Ayurveda, the traditional system is based on Vedic scriptures and is practiced all over India. Siddha is extensively practiced in Tamil Nadu and adjacent States. Unani, also known as Greek / Arabic systems, is popular among the Muslims, particularly in the Deccan plateau. Gso-rig-pa or the Tibetan system of medicine is practiced in the trans-Himalayas and NE. More than 15 lakhs practitioners of both the codified and folk streams of the Indian Systems of Medicine and Homeopathy (ISM&H) use medicinal plants in preventive/promotive and curative applications. Already there are 4.6 lakh, registered practitioners of ISM&H and around 7843 registered pharmacies of Indian Systems of Medicine (ISM) and 857 of homeopathy. The World Health Organization (WHO) has estimated that about 80% of the population of developing countries relies on traditional medicines, mostly plant drugs for their primary healthcare needs. Moreover, about 25% drugs in modern medicine are also derived from plants. On account of the fact that crude derivatives of medicinal and aromatic plants are non-narcotic having little or no side effects, the demand for these plants is on the increase in both developing and developed countries. Examples of plants with effective derivatives are Aswagandha (*Withania somnifera*) widely used as an immuno-modulator; Sarpagandha (*Rauvolfia serpentina*) for reducing blood pressure; Sallai Guggal
(Boswellia serrata) for rheumatoid arthritis; Chitrak (Plumbago zehlancia) for improving digestion and Turmeric (Cucuma longa) for diabetics. There are estimated to be over 25,000 effective plant-based formulations available from indigenous medicine for a wide variety of health conditions, including for animal and plant health.

4.5.4.3 Several hundred genera are used in herbal remedies and in traditional or folklore medicines throughout the world. They are used in the form of crude drugs which are dried parts of the medicinal plants, roots, stem, wood, bark, leaves, flowers, fruit seeds and in some cases whole plants and their extracts. There is a much smaller number of plants used by allopathy from which individual active constituents are isolated and used as medicines, either alone or in combination. The structure of isolated molecules can also be used as precursors for synthesis the drugs.

4.5.5.0 Current Scenario

4.5.5.1 The growing needs of the pharmaceutical industry in the country have created problems of supply. One of the major difficulties being experienced by the industry is that of obtaining sufficient quantities of medicinal plants for the manufacture of genuine medicine.

4.5.5.2 In India, 90 percent of the collection is still from the wild. Only few medicinal plants are cultivated on a large scale. The information regarding the area under cultivation and States where cultivation is in progress is given in the table below:
### Table: Area under cultivation of major medicinal plants in India

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Common name</th>
<th>Botanical name</th>
<th>Producing States</th>
<th>Estimated area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Psyllium</td>
<td><em>Plantago ovata</em></td>
<td>Rajasthan and Gujarat</td>
<td>55,000</td>
</tr>
<tr>
<td>2.</td>
<td>Opium poppy</td>
<td><em>Papaver somniferum</em></td>
<td>Madhya Pradesh, Uttar Pradesh and Rajasthan</td>
<td>20,000</td>
</tr>
<tr>
<td>3.</td>
<td>Senna</td>
<td><em>Cassia senna</em></td>
<td>Tamil Nadu, Rajasthan and Uttar Pradesh</td>
<td>20,000</td>
</tr>
<tr>
<td>4.</td>
<td>Coleus</td>
<td><em>Coleus forskohlii</em></td>
<td>Tamil Nadu, Karnataka and Andhra Pradesh</td>
<td>450</td>
</tr>
<tr>
<td>5.</td>
<td>Cinchona</td>
<td><em>Cinchona spp.</em></td>
<td>Darjeeling (West Bengal) and Tamil Nadu</td>
<td>8,000</td>
</tr>
<tr>
<td>6.</td>
<td>Ashwagandha</td>
<td><em>Withania somnifera</em></td>
<td>Madhya Pradesh, Rajasthan and Uttar Pradesh</td>
<td>5,000</td>
</tr>
<tr>
<td>7.</td>
<td>Safed muesli</td>
<td><em>Chlorophytum sp.</em></td>
<td>Madhya Pradesh, Gujarat and Uttar Pradesh</td>
<td>5,000</td>
</tr>
<tr>
<td>8.</td>
<td>Periwinkle</td>
<td><em>Catharanthus roseus</em></td>
<td>Andhra Pradesh, Karnataka, Tamil Nadu and Maharastra</td>
<td>4,000</td>
</tr>
<tr>
<td>9.</td>
<td>Khai katari</td>
<td><em>Solanum spp.</em></td>
<td>Maharashtra</td>
<td>4,000</td>
</tr>
<tr>
<td>10.</td>
<td>Sarpagandha</td>
<td><em>Rauwolfia serpentina</em></td>
<td>Madhya Pradesh</td>
<td>2,500</td>
</tr>
<tr>
<td>11.</td>
<td>Ipecac</td>
<td><em>Cephaelis ipecacuanha</em></td>
<td>Darjeeling (West Bengal)</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source:** EXIM Bank Occasional Paper No.98 “Export Potential of Indian Medicinal Plants and Products” published by Quest Publications in 2003

4.5.5.3 It was only during the Eighth five year plan period, that a programme for the development of medicinal plants was launched by the Department of Agriculture and Co-operation (DAC) with a focus to conserve the medicinal plants by the establishment of herbal gardens, production of planting material by the establishment of nursery at different locations, demonstration of the cultivation practices through the establishment of demonstration plots, provide the support for expansion of area and infusion of technologies through effective transfer. But farmers often face disappointment in absence of effective marketing system. The Department of Indian System of Medicines and Homeopathy (now AYUSH), also initiated the programme during the Eighth five-year plan to develop agro-technology of some selected medicinal plants. Some laboratories of CSIR have also contributed in identification of molecules of medicinal
plants. While there is an expansion in area under medicinal plants certain transit and other regulations of the forest departments discourage the cultivation of medicinal plants by the farmers. Even plants growing in the farmers’ field require clearance certificate from the District Forest Officer for marketing.

4.5.5.4 The Planning Commission, Government of India had set up a Task Force on Conservation and Sustainable Use of Medicinal Plants in 1999. The Task Force studied the issues involved and submitted an exhaustive report in 2000 (hereinafter referred to as TF Report on MP). Setting up of the National Medicinal Plants Board was an outcome of the recommendations of this group. Most of the recommendations of the group however remain on paper. Their implementation in itself would give proper thrust to the development of the sector.

4.5.5.5 As per a study undertaken by the Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore at present, about 926 medicinal plant species are involved in All India trade; of these 760 species are largely collected from the wild. About 48 species are exported and 42 are imported. As per an EXIM Bank estimate, the international market of medicinal plants related trade is to the tune of US $ 60 billion per year having a growth rate of 7% per annum. The annual exports of Indian plants are valued at Rs.10,000 million. In terms of market share in production value, India holds only the sixth place with a mere 7 per cent share whereas China accounts for about 33 percent. 70 percent of the medicinal plant exports from the country is in the form of crude drugs and extracts and only 30 % is finished products.

4.5.5.6 The Basic Chemicals, Pharmaceuticals & Cosmetics Exports Promotion Council (CHMEXCIL) is responsible for the promotion of medicinal plant based products and APEDA is entrusted with the task of export promotion of medicinal plants. So far, setting up of agri-export zones for Aromatic and Medicinal Plants in Kerala and Uttaranchal, have been approved by the Government.

4.5.5.7 According to the TF report on MP, we also import some 15 medicinal plants, which can be made domestically available as well (e.g. Akkalkada - *Anacuclus pyrethrum*, Jestimadh - *Glycrrhiza glabra* (Pakistan, Iran, Afganistan), Dalchini - *Cinnamomum zeylanica* (China), Gajpimpli - *Scindapus officinalis*, and Kankol - *Piper cubeba* (Indonesia), Chopchini - *Smilax china*, Maiphal - *Quercus infectoria* and
Revchini - *Garania pictoria* are mostly met through imports). There are also imports of medicinal plants of foreign origin and medicines like ginseng.

4.5.5.8 No authentic recorded information is available about the volumes of trade of medicinal and aromatic plants within the country. The collectors (both permit holders and others) exploit the plants, through tribals, local people and forest dwellers. The collected material is passed on to the traders in towns and cities. Each of the major traders has one or more indigenous drug manufacturers and private pharmacies as their customers for purchasing the raw plant material from their contractors and other growers of medicinal and aromatic plants in different parts of the country. In the absence of any regulatory mechanism, the trade of these plants, particularly medicinal plants is very secretive. Prices for individual medicinal plants vary with demand, availability and quality. The quality characteristics are ill-defined; for some species they depend on the percentage of active ingredients, appearance, absence of foreign matter and other particular conditions that may be laid down in the relevant pharmacopoeia, formulary or in the purchaser’s specific requirement. Moreover, the ingredients for the final product are contained mostly in certain part(s) of the plant e.g. leaves, root stem, flower, and fruit, and not the whole plant. But due to the ignorance of the collector coupled with the need to earn more, the whole plant is destroyed.

4.5.5.9 The traded materials include leaves, barks, fruits, seeds, roots rhizomes, gums, husks etc., the value of which range between Rs.10/- to Rs.145/- per kg. The major industrial buyers of dried raw herbal materials in the domestic market are around 50 companies which include leading companies like Zandu, Baidynath, Sami Labs, Himalaya, Natural Remedies, Dabur, Sandu, Charak, long-standing traditional manufacturers like Arya Vaidyashala, Kottakal, Kerala, Ayurvedic Pharmacy, Gururaja and a large number of small level manufacturers of Ayurvedic medicine and some leading herbal extracts exporters.

4.5.5.10 The WHO has introduced a series guidelines for collection, cultivation, production, certification, registration and marketing of medicinal plants, through five important practices viz., Good Agriculture Practice (GAP), Good Manufacturing Practices (GMP), Good Laboratory Practice (GLP), Good Clinical Practice (GCP), Good Selling Practice (GSP). The Indian medicinal plants-based industry is yet to take to this in
a concerted fashion. Under the ISM&H, most pharmacies are family owned companies and trade is largely unregulated.

4.5.6.0 SWOT Analysis

4.5.6.1 A SWOT analysis can help bring out clearly the areas needing attention. The TF report on Medicinal Plants, 2000, highlighted the following constraints facing the sector, which are still relevant:

i) Depletion of the resource-base, which is the foundation of the entire sector.

ii) Decline of folk traditional medicines, a source of primary health care for an estimated 800 million people in the country.

iii) Impoverishment of rural people, who are stewards of the resource base and the holders of traditional ecological and medical knowledge, through inequitable marketing channels.

iv) Medicinal plant trade is inefficient, imperfect, informal and opportunistic.

v) Crude drugs supply situation is shaky, unsustainable and exploitative; adulteration takes place.

vi) Deficient toxicology studies and standard preparations to improve the quality, efficacy and effectiveness of the traditional drugs.

vii) Unsustainable wild harvesting

viii) Lack of coordination amongst various stakeholders such as Govt. of India (Ministry of Agriculture, Environment & Forests, ISM&H, S&T etc), State Governments, private traditional medicine sector, research institutes, NGOs, international networks etc.

4.5.6.2 Going by the SWOT matrix, a sectoral analysis of the Medicinal Plants sector is attempted below.

4.5.6.3.0 Strengths

4.5.6.3.1 India has vast agro-climatic zones, is biodiversity rich, and has a long history of traditional medicine practice. Given the agro-climatic suitability and variability, biodiversity richness and treasure of traditional knowledge and historical use pattern of Medicinal and Aromatic Plants (MAPs) in India, the prospects for intensifying and diversifying the country’s herbal industry are unmatched.
Traditionally, medicinal plants constitute the principal healthcare resource for the majority of our population. Herbal-based and traditional medicines have also been major components of the animal healthcare system in the country also. India being home to every fourth farmer as well as to every fourth livestock in the world, the importance of the country’s industry in veterinary and livestock disease management can hardly be overemphasized.

**4.5.6.4.0 Weaknesses**

The weaknesses are in the areas of quality standardization, cultivation, market and research.

**4.5.6.4.1 Quality**

i) The greater part of the collection is from the wild. The collected material are sold to traders of medicinal and aromatic plants, who using their limited knowledge sort out the saleable ingredients in a crude manner thus resulting in contamination with other material leading to poor quality standards.

ii) As bulk of the harvest (wild and cultivated) is marketed as raw product several of the active principles and ingredients are lost rather fast; poor post-harvest management, processing and marketing and lack of marketing chains severely affect quality, safety and efficacy of the products.

iii) Many of the plants are sensitive to climatic conditions and require specific temperature, humidity etc., while being stored and / or transported. Hitherto, this aspect remained neglected both by the growers and collectors. Since the international market is highly conscious about the quality aspects of the production, our success in the export market has been insignificant.

**4.5.6.4.2 Cultivation**

i) The major constraints being experienced by the cultivators of medicinal plants are non-availability of quality planting material of improved varieties, lack of development and extension support in the cultivation and processing, and unorganized marketing.

ii) The cost of production is usually high for the cultivated crops as compared to those collected from the wild as a result of which the cultivation of the crops has not been an attractive proposition for the farmers.
4.5.6.4.3 **Marketing**

i) Some of the other key factors hindering cultivation of medicinal plants are lack of, information on market prices and dependable market support, Good Agricultural Practices, proper support from banks and financial institutions, price parity with wild produce, access to good storage facilities and appropriate post harvest technology. No systematic distribution and marketing network exists, and the growers have to depend on the middlemen who generally deprive them of their legitimate share of revenue.

ii) India is today even importing some plants needed by the industry to meet internal demand. 70% of the exports are in the form of crude drugs.

4.5.6.4.4 **Research**

i) Despite the long and historical tradition and high dependence on herbs for health security, the research and technology development efforts in the sector have remained meager.

ii) One of the major difficulties of medicinal plants cultivation on a large scale is the lack of scientific and appropriate agro-technology and agro-economics for different climatic zones of the country. Although several organizations viz., Indian Council of Agricultural Research (ICAR); CSIR Laboratories, various Indian Universities, etc., and Research Councils of indigenous systems of medicine, Department of Indian System of Medicine (ISM – Ayush), Government of India, have taken up the work of development of appropriate agro-techniques, and development of high yielding varieties of medicinal plants, more effort and multi-centric on-farm trials are needed keeping in view the demands of trade and industry.

4.5.6.4.5 **Opportunities**

i) The revival and renewal of global interest in traditional medicine offers a great opportunity for growth of the sector. World demand for herbal products has been growing steadily at 10-15% per annum.

ii) There are great opportunities for strengthening and synergizing the herbal-based human and livestock healthcare systems in the country. Therefore, the need for the amalgamation of currently scattered ethno pharmacological information through a
systematic validation of efficacy, doses, administration and safety component coupled
with availability issue of the traditional herbs can no longer be ignored or delayed.

iii) It is extremely relevant to not only conserve the rich herbal biodiversity but also to
cultivate it for utilization by the industries to meet the domestic and export demands in a
sustainable manner and also to maintain desired quality standards. Sustainable production
and continuous value addition will ensure effective conservation of the target populations
and species. Shift from collection and conservation mode to conservation and cultivation
for utilization will ensure purity, authenticity and availability of MAPs for pharma and
aroma industries including poly-herbals for nutraceuticals.

iv) We can set a national target to turn into a major exporter of finished products instead
of raw drugs, to emerge as a global competitor in this sector.

v) Cultivation has to be initiated for import substitution of the produce being imported
currently.

vi) The national system, encompassing the public, private, industry, practitioners of
traditional healthcare systems, NGOs, CSOs, tribals and other communities and farmers,
can be organized and strengthened to judiciously harness the resources towards
interactively enhanced and sustained health, nutritional, income and employment
security. The National and State Medicinal Plant Boards can play a pivotal role in
bringing together the various stakeholders.

4.5.6.4.6 Threats

i) Infrastructure in the Indian systems of medicine is below optimal in all areas -
education, R&D, standardization and quality control. There is growing pressure for
communicable benchmarking of products and processes.

ii) At present about 90 per cent collection of medicinal plants is from the wild and since
about 70 per cent of the plant collections involve destructive harvesting, many species are
endangered/ threatened. Some are in the Red Data Book and threatened with extinction.
No measures are taken to replenish the natural resource base through fresh planting. Such
collections constitute poor quality raw materials as these contain veritable adulterants.
This trend must be halted especially in case of those species where the extraction from
the wild has been highly destructive as in the case of Swertia, Picrorrhiza, Podophyllum,
Aconitum, Commiphora, Terminalia, Coscinium, Santalum, Valeriana, Rauvolfia, Jatamansi.

iii) As the price paid to the gatherers tends to be very low they often mine the plants with a view to earn more income. As a result several plant species have become endangered.

iv) China’s business approach to development of the sector has seen it corner a large share of the export market. They have a good regulatory system in place in line with international requirements with regard to GAP, GMP, GLP, GCP and GSP. The work they have done to place ginseng for instance in the world market is commendable. Besides meeting its domestic requirements, China is earning US $ 5 billion from world trade.

v) WTO, patents, biopiracy, IPR issues related to traditional knowledge in the face of lack of organized database of traditional knowledge, threatening resource base and changing regulatory environment of the importing country are major threat factors.

vi) In recent times, there have been reports in the news of reservations abroad about the efficacy of herbal medicines and their being a potential health hazard due to high concentration of heavy metals. The bio-efficacy of ISM has to be urgently established and proper labeling and certification done.

vii) India has to spruce up fast, if it does not wish to be left behind. If critical investments are not made into research India will miss the bus. Critical investments for establishing standards of safety, quality and efficacy are essential, as they will dramatically increase the consumer acceptance of traditional herbals both in India and globally.
4.5.7.0 Recommendations

4.5.7.1 Given the current scenario, the recommendations of the TF report on MP can be reiterated to begin with as strategies for kick starting the sector. Extracts from the recommendations are reproduced below:

The policy for sustainable development of medicinal plants resources should aim at -

a. *In-situ* conservation of medicinal plants in protected areas, herbal gardens, sacred groves, preservation plots and forest areas rich in medicinal plants.

b. *Ex-situ* conservation through cultivation, Joint Forest Management, gene banks etc.

c. **Developing medicinal plant conservation areas (MPCAs) inside as well as outside protected areas.**

d. Research and development efforts for developing agro-techniques, extension & dissemination of information on cultivation of super genotypes.

e. Establishing linkages between farmers and pharmaceutical industries for promotion of organic and contract farming.

f. Formalising and organising marketing by providing information and possible interventions at various levels.

g. As prices paid to the gatherers tend to be very low, they often ‘mine’ the natural resources, as their main objective is to generate an income. Formalisation of market may resolve the problems of exploitation and impoverishment of gatherers.

h. Policies regulating safety and efficacy need to be evolved based on recognition of the uniqueness of tribal and folk medicines, and this should be linked to intellectual property rights to ensure that community benefit from the use made of their technology.

i. A regulatory system is urgently needed to restrain indiscriminate and illegal wild harvests:
   - Setting up of *in-situ* forest gene banks;
   - Critically endangered species should not be harvested.
   - A list of species and habitats from which collection is permissible should be scientifically prepared by every State Forest Department and over harvesting
should not done; there should be switchover to plants which are not in the red list.

- Harvesting should be done at the right stage in scientific and non-destructive manner.
- Good Trade Practices should be followed in the collection – fair price paid to primary collectors and fair cess paid to the State Forest Department.
- Recommended post-harvest procedures should be followed.

4.5.7.2 From the farmers’ perspective, technical advice on package of practices for cultivation, availability of quality seeds, certification and labeling, promotion of contract cultivation, harmonization of collection and cultivation to ensure competitive price are immediate needs for promotion of medicinal plant cultivation as a viable livelihood option. All initiatives should focus on the goal of establishing safety, quality and efficacy standards for medicinal plants products.

4.5.7.3 Some of the steps needed in this direction are: designating competent certification agencies; encouraging cooperative farming of medicinal plants; R&D on the top 10 export priority species with respect to quality, efficacy and safety; addressing emerging issues on patenting and IPR for traditional knowledge.

4.5.7.4 Immediate measures are needed in the areas of Policy, R&D Input supply, Market and Pricing Support as discussed below. A Mission mode approach is warranted. A National Mission on Medicinal and Aromatic Plants maybe organised, to ensure that the sector receives the integrated attention it deserves. The recently approved National Horticulture Mission (NHM) includes MAPs, but given the already large number of fruit, vegetable and flower species to be addressed under the NHM, the MAPs may not receive the special support, attention and leadership it urgently needs. The Mission should converge and synergise policies on agriculture, forestry, environment, health and pharmaceuticals and commerce covering the components impacting the growth and development of MAP industry. Pending the preparation of a full-fledged Mission, a distinct Mini-Mission may be organized for MAPs under the ongoing NHM. A dynamic leader in the area of medicinal plants and herbal medicine may be appointed as the coordinator of the Mini Mission for MAPs.
4.5.8.0 **Policy Action**

4.5.8.1 There is need for Policy support for science-based judicious conservation, utilization and commercialization of medicinal plants to promote health, food, nutrition, employment and income security of the people. In this context, the following policy elements are essential:

i) The National Mini Mission should on priority basis address the issues of R&D (quality, safety and efficacy), *in-situ* conservation, sustainable wild harvest, cultivation, pricing and price parity, marketing, trade, income of the growers, partnerships, institutional supports, networking, availability of quality materials, training, information system and awareness.

ii) **The Mission should have a Policy Guidance Committee (PGC), an apex level body comprising the Ministers of Agriculture, Health, Environment & Forests, Commerce, and Science & Technology, to give direction.** The PGC could guide the restructuring of the National Medicinal Plants Board (NMPB) on the lines of NDDB, to enable it to perform effectively and work for the objectives and targets of the Mission. The functioning of the Board in a competitive and professional manner will in itself help resolve many of the issues facing the sector.

iii) The NMPB’s website should include details of medicinal plants programmes of all Government Departments and Ministries, e.g. DBT, DST, CSIR, ICAR, MoRD, MoEF and AYUSH, in order to avoid duplication of efforts. It should be one-stop window for all information on the sector, sourcing from all the various departments and ministries.

iv) The Mission via NMPB should support

- creation of network of certification agencies using internationally accepted standards for both cultivated and wild produce;
- support forestry sector to set up State level Seed Centres for collection and certification of planting material from forests
- wholesale supply of quality seeds of high priority species;
- initiate mega projects under PPP for high priority tree species.
- emulate DBT models for PPP on R&D projects for herbal products.
v) Promotion of Public-Private Partnerships (PPP): There should be clear cut policies on agro-forestry and reforestation involving tree medicinal plants, tree and non-timber product harvest from forests, land reforms to enable replanting of degraded and wasted lands under PPP mode. The National Mission should through PPP with an ethical private sector company, strive to launch one global herbal product of the outreach like the Chinese *ginseng* every five years, with backward linkages for generation of rural employment.

vi) Promotion of Contract farming: Appropriate codes of conduct should be in place and confidence building among stakeholders

vii) Mandate different Commodity Boards to promote intercropping with plantation crops like coffee, rubber, spices and coconut

viii) The Mission should address the issues of quality and standardization, regulatory controls, code of conduct for collectors/gatherers from the wild in accordance with the CBD and Gene Treaty provisions.

ix) The Mission via NMPB should advocate institutional support through credit not only for production but also seed grants for value addition, market development, promotion of grassroots organizations, SHGs, cooperatives, insurance coverage and price support system for medicinal plants and establishment of community herbal gardens. It should support promotion of ecosystem specific home and *community herbal gardens* to enhance household human and livestock health security.

x) The Mission should encourage NABARD to examine providing Seed Fund to NGOs & CBOs to support viable community-owned enterprise for collection, cultivation, processing of MPs for income-employment benefits to rural poor. NABARD and EXIM Bank should therefore have a package of grant and credit programmes for MPs, and not just crop support programmes

xi) The Mission should support enhanced investment in MAP research, technology development and industry growth to effectively integrate the phyto-industry with national health, nutrition and rural employment.

xii) The TF report on MP had recommended that the Forest Department establish 200 “*Vanaspati Van*” in open forest areas (each having an area of about 5000 hectare) for commercial supply of crude drugs to pharmacies and for exports. The “*Vanaspati Van*”
should be managed by a registered society headed by Divisional Forest Officer under JFM system.

xiii) IPR and TK: Policies regulating safety and efficacy need to be evolved based on recognition of the uniqueness of tribal and folk medicines, and this should be linked to IPR to ensure that community benefit from the use made of their technology. A library database can be prepared and maintained under the National Innovations Foundation (NIF). The library can be used as proof of prior art by the examiners of Patent offices, nationally and internationally.

xiv) Crude drugs of standard quality need to be identified and preserved as the reference standard. The TF Report on MP had therefore recommended establishment of a National Repository of Crude Drugs of ISM&H with an excellent herbarium having authentic reference samples. This center should have the crude drug samples (processed medicinal plants), herbarium specimen, chemical finger print profiles, anatomical slides, supporting literature and a collection of living plants. It should provide easy access to wide range of groups including traders, medical practitioners, plant chemists, TM students, academics, regulators as well as the pharmaceutical industry. User services will also have to be made available. This repository should then become the official certification centre for raw materials. The drug industry can get the raw materials certified from the centre.

xv) To ensure quality, there should be Statutory State Drug Testing Laboratories. It is necessary to designate safety evaluation centres with Good Laboratory Practices (GLP) norms. This will facilitate the acceptance of the drugs at a global level.

4.5.9.0 Research, Technology Development and Extension

4.5.9.1 Research on standardisation of quality, safety and efficacy for the best traditional products is sub-critical. Very little value has been built on the indigenous and traditional knowledge. The All India Coordinated Research Project of ICAR should be revamped and networks forged with other related research institutions – CSIR, CMAP, CDRI, industries, NGOs and CBOs and ICMR, AYUSH, MoRD, DST & DBT. The network will not only partly offset the problems linked with low investment in the sector, but would also open the gates for wider domestic and global acceptance of traditional knowledge products.
4.5.9.2 Recent studies have shown that in addition to the genetic variation of different populations of a given species and from one part to the other part of the same plant, the GxE effect is generally very high. Using new tools and technologies, the R&D system must fill this knowledge gap so that the future developments could be knowledge-based.

4.5.9.3 Research on all aspects of MAPs with special reference to improving their productivity, medicinal qualities, availability of quality planting materials, storages, cold chains, processing, value addition and adaptability to grow under ex situ conditions should be undertaken. Multi-location testing of promising materials, both local and introduced, should precede recommendations for production in identified agro-geographic locations.

4.5.9.4 ICAR Research Institutions and Agriculture Universities should undertake to evaluate germplasm, identify sub species, and develop varieties. TK leads should be harnessed to help identify research priorities.

4.5.9.5 The TF report on MP had recommended the following, which continues to be of importance –

a. Development of agro-technological packages under different ecological conditions and information on intercropping, rotation cropping and use of bio-fertilisers, organic farming etc.

b. Human Resource Development of farmers by organising training and awareness programme on various aspects of medicinal plants sector development including seminars and conferences.

4.5.10.0 Quality Planting Material

4.5.10.1 One of the major constraints faced by the cultivators of medicinal plants is the non-availability of quality planting material. Given that a large part of the collection is currently from the wild, there is need for synergistic inter-sectoral program between the forestry and agricultural sectors wherein germplasm is supplied by the forestry sector and selection, breeding and agro-trials is done by the agricultural sector, for promotion of cultivation.

4.5.10.2 Planting Material Supply Network (PMSN) in the form of Herbal Bio-villages must be set up so that small scale farmers can generate material for large scale farmers.
Plant Tissue culture units of R&D institutes should provide certified nucleus stock to small farmers.

4.5.10.3 Village level Medicinal Plant Nurseries and Seed Production Centres of commercially viable plant species managed by trained women SHGs and agricultural/botany graduates can develop as suppliers of quality planting material. They should have back-up support from the R&D institutions and forward linkage with concerned Institutions and Farmers’ forums. The National Medicinal Plant Board through their State wings can coordinate this programme and buy back and distribute to farmers through appropriate delivery points. Seed Banks may be established for plants that are in demand for commercial use.

4.5.10.4 Tissue Culture for large-scale production of medicinal plant seedlings and introduction of such facilities at village/community level in the areas potential for medicinal plant cultivation managed by trained educated housewives or unemployed botany/agriculture graduates and attached to some reputed local organizations (private/NGO or Govt.) can play an important role.

4.5.10.5 For protection of different endangered medicinal plant species, encouragement should be given to Government and semi-government tissue culture laboratories for multiplication of endangered species so that planting material can be supplied on large scale.

4.5.10.6 Large-scale availability of high quality planting material can be promoted by developing a protocol for bulk production of super genotypes and seedlings through a network of nursery of medicinal plants.

4.5.10.7 Collection and sale of forest tree seeds by the Forest departments is also a source for planting material.

4.5.10.8 State Agricultural Universities maybe assisted to establish quality control laboratories so as to fix quality parameters for various plant species and their varieties.

4.5.11.0 Marketing

4.5.11.1 Assurance of market is the major factor for giving impetus to cultivation. Closely linked is the development of related infrastructure, need for network of godowns for storage and on-site post harvest facilities. Market research should be strengthened and
geared to identify the most appropriate species, real time information on supply and demand and trade balance, pricing and price levels and parity, and diversification prospect.

4.5.11.2 Market Infrastructure:
i) NABARD and/or Ministry for Rural Development should support the establishment of a network of decentralized scientifically designed storage godowns in rural areas – that could store harvested produce. NGOs & CBOs should also be encouraged to manage these godowns. Primary value addition at the collectors and farmers level should also be studied and adequate infrastructure support like quality testing lab, drying yards, raw drug processing unit, packing unit be set up in identified districts.

ii) Post harvest technology for the plants, their grading, packaging and method of storage need to be developed. Small cost effective processing units to serve the need of a cluster of villages will be a good idea. Primary processing at village level will reduce problem of storage and the risk involved.

iii) Being matters of health and nutrition concern, GAP, GMP, HCCAP and other such measures should be routinely adopted in the production–processing–consumption chain. This calls for intensive training and educational efforts to create quality, standards and trade literacy and awareness at all levels and among all stakeholders.

iv) Research organizations must devise rapid methods for analysis of quality attributes of the raw and finished products for pricing, adulteration control and IPR protection. The quality measures should be harmonized with international standards and guidelines especially to capture new opportunities in the globalised economy and to ward off non-tariff barriers to trade.

4.5.11.3 Demand Forecasting:
i) An efficient agency, say a research institute should be identified to establish a long-term MIS that could be supported by MoRD and the NMPB. Through Market intelligence, the industry must define the quantity of plants required for at least 3-4 years so that farmers can be informed accordingly and necessary facilities could be extended to the farmers to realize the production target. Marketing chains should be studied and restructured with a view to increase profitability to growers.
ii) Industry must spell out the quality of produce that would be acceptable to them at a fixed price for a fixed period. R&D organizations should be in a position to generate the desired material if not available and make the input available for cultivation. Appropriate packages of incentives and subsidy for cultivation and product development must be devised on case-to-case basis in area specific mode and on the criteria of marketing.

iii) Detailed studies should be undertaken on plants that have the highest global demand and a systematic approach devised to export them. The TF report on MP had recommended focused strategies to popularise twelve major Indian Plants For Various Ailments in the World Market and listed the plants –

2. Bala (*Sida Cordifolia*) for neurological disorders.
4. Geloy-Gaduchi (*Tinospora cordifolia*) As immuno-modular
5. Chiraita (*Swertia Chirata*) for liver disorder
6. Kutki (*Picrorrhiza kurroa*) for liver disorder
7. Gudmar (*Gymnema sylvestre*) for diabetes
8. Ashoka (*Saraca asoca*) Uterine Tonic
9. Satavari (*Asparagus racemosus*) Anti-Ulcer, Aprodisiacs
10. Amala (Amalaki) (*Emblica officinalis*) for Rasayana, Geriatrics
11. Arjuna (*Terminalia arjuna*) for Cardiac disorders
12. Gugglu (*Commiphora wightii*) for cholesterol related disorders, Arthritis

iii) There is a need to conduct extensive R & D on these plants not only to improve their varieties, enhance availability but also to establish their efficacy in various clinical conditions mentioned above. While undertaking this research there has to be active interface with the industry so that there is proper demand assessment and the research leads to patents being obtained and new drugs being marketed for public benefit and for exports. A well-formulated strategy has to be worked out for placing the product in the world market. Indian Missions abroad should be equipped to play a positive role in dissemination of information on Medicinal Plant-based products.

4.5.11.4 *Contract farming*, a new opportunity elaborated in the new APMC Act, is ideally suited for promoting the cultivation of medicinal plants and crops. Appropriate codes of
conduct on contract farming suited to the needs and aspirations of the various stakeholders, especially the small and marginal farmers, should be formulated and judiciously implemented. The extant success as well as unsuccessful experiences of contract farming in this sector should be critically analysed and necessary institutional and service supports should be provided to rapidly multiply the successful experiences. Promotion of cooperative farming and **Small Medicinal Plant Farmers’ Estates** may also be explored. More Farmers’ groups like *Gram Mooligai, Jeevani, Sanjeevani*, should be organized to take up MP cultivation in a focused manner. Lease of common property land for the purpose may be explored.

4.5.11.5 In order to give the power of economies of scale to small farmers, **Medicinal Plants Growers’ Association** each covering about 100 ha could be formed on the model of SHGs. Capacity building in the areas of cultivation and marketing will have to be organised. Such growers’ association can enter into MoU with companies to outsource raw materials for drugs. Herbal estates could also be promoted for bringing about an end-to-end approach in relation to medicinal plants and herbal medicine. Currently such community-based enterprises constitute even less than 0.01 percent of the medicinal plant production and trade. This should be raised to the tune of at least 5 to 10 percent during the next 4 to 5 years. MoRD should promote direct financing of innovative NGOs & CBOs through its employment programs for this purpose.

**4.5.12.0 Pricing**

4.5.12.1 There is no organized pricing policy for MAP products, raw or processed. There is often a huge disparity in the prices of wild harvests and cultivated harvests, the former being much cheaper. This price disparity is the main deterrent to the domestication and cultivation of medicinal plants. A transparent and adequately researched and scientifically assessed pricing policy and system should be in place in the Forestry and Agricultural sectors to bring price parity for all harvests. Uttaranchal has initiated this approach and its outcome should be closely monitored both by the State and National Medicinal Plant Boards and, if found encouraging, the approach should be adopted/adapted in other States.
4.5.12.2 The above move will help also in minimizing, if not completely eliminating, the unsustainable indiscriminate wild collections, as also in promoting sustained production through organized cultivation. The industry would thus need to be more quality conscious and nature-friendly.

4.5.12.3 The Commission on Agricultural Costs and Prices (CACP) of the Ministry of Agriculture, in close consultation with the Ministry of Environment and Forests, and Department of Ayush of the Ministry of Health, particularly the NMPB, and Ministry of Commerce, should address the problem of pricing. A special Working Group, involving the various stakeholders - the growers, the foresters, the gatherers, the traders, the industry and the practitioners, should be constituted to critically examine issues and to suggest guidelines for price fixation and to declare prices of medicinal plant produce.

4.5.13.0 Agro-ecologically and Socio-economically Differentiated Approach

i) Striking a balance between Conservation – Collection – Cultivation - Production, collection and marketing of Medicinal Plants/Crops have so far generally been on ad-hoc basis. Flash success stories such as those on vanilla and Safed Muesli, (Chlorophytum borivilianum) have enthused several medium to large-scale farmers and corporate houses to diversify towards Medicinal and Aromatic Crops (MACs), often ignoring agro-ecological suitability. This “quick fix” approach, with little understanding and appraisal of medium to long-term marketing and pricing trends, has often been short-lived and shaky. The supplies soon outpaced demand and the resultant price crashes and market failures adversely affected the farmers.

ii) The NMPB has previously identified 32 priority species. These needs to be reprioritized and differentiated, based on a set of criteria and indicators as listed below and State-wise lists prepared:

   (i) domestic and export demand
   (ii) ecological sustainability
   (iii) social acceptability
   (iv) financial viability
   (v) agro-technological feasibility
(vi) availability of quality planting materials
(vii) market chain product storage and distribution, and
(viii) regulatory support.

iii) Using the above criteria and other new and emerging indicators, the prioritization process should be kept in a dynamic mode. Special attention should be given to matching the soil, water, biodiversity and cultural attributes with the sustained and enhanced production of the intended and potential species particularly to facilitate creation of effective export zones to ensure judicious supply-demand management. The State Medicinal Plant Boards should provide packets of ready cultivation procedures and marketing aspects to farmers. The priority lists should be reviewed periodically, say once in three years.

iv) For a smooth and gradual transition from wild harvest to cultivated production of the MAPs, the following aspects must be addressed:

- Threat status of various species should be re-assessed so that time bound cultivation strategies of different groups can be drawn. A tentative classification may have categories like critically endangered perennials, endangered but highly regenerative, vulnerable but collected by destructive means, under threat due to high level of consumption etc.

- Special attention should be paid to endangered, vulnerable and threatened species for their conservation and cultivation, and on case to case basis impose restriction or even ban harvesting of endangered species from their natural habitats

- While part of the requirement may be met by sustainable harvesting from the wild by tribal and forest communities / dwellers, bulk of the requirement should be met through planned and suitably organized cultivation by area-specific local farmers. Further, for species in larger demand, the supply should be entirely based on cultivation

- Areas rich in medicinal plants can be developed into Herbal Sanctuaries, so that this unique biological wealth can be safeguarded and conserved for posterity. The TF report on MP had recommended the establishment of 200 Medicinal Plant Conservation Areas (MPCA) covering all ecosystems, forest
types and sub-types in the country, (inside protected areas viz. national park, wild life sanctuary, biosphere reserves, preservation plots etc.) for in-situ conservation of important species.

- Species not amenable to commercial farming need to be conserved in their natural ecosystem for regulated utilization. A mission mode approach needs to be adopted for developing this area. The rare medicinal plants should be conserved in well-established gardens. Medicinal plant conservation areas need to be identified across the country, in different climatic and agro-ecological regions

- Over-harvested endangered perennial MAP species and tree medicinal plants in high demand should be planted in public-private partnership framework as agro forestry systems on priority basis. Degraded forestlands and wastelands should be planted with such tree species, which will not only provide a sort of “forest” cover but would also become important source of income and employment.

v) State Agricultural Universities, Department of Agriculture and nurseries of the Department of Horticulture should undertake the programme of collection and conservation of different species of medicinal plants prevalent in a region and their multiplication on a large scale. KVKs and NGOs working in the area can assist in the process. Many of the medicinal trees will need 8-10 years for gestation and readiness for economic growth. Farmers need to undertake a cropping system, which will be suitable to give them economic return from the first year onwards. Therefore intercropping with species of shrubs and trees as a package should be developed through State Agricultural Universities.

vi) An end-to-end approach, linking the producer, processor, industry and the consumer, with effective backward-forward linkages, involving the partnership of farmers, research and extension services, credit and input support, processing and market is a success story of a mega project on guggal in the arid zones of Rajasthan. The public-private partnership (PPP) is functioning in a model form with a win-win situation for all partners. Based on supply-demand analysis and agro-ecological compatibility, the guggal experience should be multiplied not only for guggal alone but also for other MACs. In
order to capture scale of economies, small farmers estates (SFE) and MAP self help
groups, especially women SHGs, for the various domains should be created and
supported through formal credit, training and group marketing. Such an approach will
also be helpful in adoption of the quality, safety and efficacy standards.

vii) **Herbal Biovalleys** may be developed on the model of the Silicon Valley for
computer software, for providing the infrastructure needed for the conservation and
sustainable use of medicinal plants. The Herbal Biovalley will provide the biological
software essential for a dynamic medicinal plant industry. The infrastructure for seed
multiplication including tissue culture facilities, establishment of nurseries of elite
material, validation, certification and producer-oriented marketing and other centralised
facilities to facilitate efficient decentralized production, will have to be provided. A
Project Design Team may be immediately constituted with members drawn from the
NMPB, NBDB, NABARD and APEDA, to prepare a Business Plan for the world’s first
Herbal Biovalley in Kerala as recommended by the Kerala Commission on WTO
Concerns in Agriculture, and at other suitable locations in Western and Eastern Ghats and
western, central, eastern Himalayas and in the NE region.

**4.5.14.0 Organic Farming of MAPs**

The demand for organic food and other products has been growing rapidly.
Organically grown MAPs are seen as “doubly green” products and have tremendous
global demand and appeal. Hill States like Uttarakhand have declared themselves as
Organic States and organic pockets are being set aside in other States, where MAP
species, most suited to the settings, constitute the preferred crops. However, the organic
movement is yet to be streamlined in terms of selection and use or detoxification of sites,
standardization and application of production protocols, certification of the process and
the product, pricing and marketing. The various stakeholders, led by NMPB, must
develop a detailed road map and monitoring mechanism for organic MAPs industry
addressing production, certification, pricing and marketing issues.
4.5.15.0 Information Portal on Medicinal and Aromatic Plants

4.5.15.1 Database and information on various aspects of MAPs are highly inadequate. The NBMP was supposed to have established the information portal, but the work is far from satisfactory. The information system must be strengthened and a competent agency (University or research institute) must undertake comprehensive survey to have full real time information on demand and supply and species and domain-wise production, pricing and marketing. Databases on GAP (good agricultural practices) and GMP (good manufacturing practices), indigenous and traditional knowledge of various medicinal, nutraceutical, aromatic, cosmetic and agri-chemical products should be created. The library database on TK on medicinal plants should be linked to the portal.

4.5.15.2 Details of medicinal plant programs of all Government departments and ministries should be given. There should be a national database on the medicinal plants of India with State-wise checklists and reliable information on botanical identities, distribution, threat status and agricultural information.

4.5.15.3 The reorganized and strengthened NMPB and its corresponding State level Boards, in close collaboration with the National Bureau for Plant Genetic Resources (NBPGR), should prepare detailed biodiversity registers, especially identifying indigenous and traditional uses of the germplasm. The need of the hour is to document the indigenous knowledge related to Indian herbs and plants and their medicinal and other uses and convert it into easily navigable computerized databases for easy access.

4.5.15.4 An inventory of raw materials used by the industry needs to be built up. The state government should make the listing of raw materials (medicinal plants) consumed by each manufacturer within its domain mandatory. This will help in determining those medicinal plants that are in high demand and also establish a case for cultivation of those plants that are on the verge of extinction. This information can then be integrated at the national level.

4.5.15.5 With the thrust on creating village knowledge centers across the country, SHGs of medicinal plants may be formed in biodiversity rich areas, and rural youth trained in information and data management system. Necessary hardware and connectivity should be provided by the public sector in the early stages, which in due course of time should be supplemented by the private sector and financial and banking institutions.
4.5.16.0 **Financial requirement**
The TF Report on MP had in 2000, recommended an allocation of Rs.1000crore for development the sector. It is recommended that an equivalent amount be made available to the proposed National Mission on MAPs in order to enable it to launch a dynamic programme in the areas of conservation, cultivation, scientific validation, and marketing under distinct brand names. To quote the TF report on MP: “a comprehensive package of assistance and incentives is needed to promote medicinal plant sector as a thrust industry, on the lines of gems, jewellery and info-tech”.

4.5.17.0 **Acknowledgements**
A two-day consultation on Sustainable Management of Medicinal Plant Resources with the different stakeholders – medicinal plant cultivators, research institutes, government officials, industry, bankers and NGOs, was organised in Bangalore in collaboration with the Foundation for Revitalization of Local Health Traditions (FRLHT) and the University of Agricultural Sciences, Bangalore, to deliberate on the core issues facing the sector and the steps needed to address them. Special thanks are due to FRLHT for giving their comments on the paper.
CHAPTER - 4.6

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

ORGANIC FARMING

4.6.1 There is a growing interest in organic farming practices in several parts of India, partly due to an expectation of higher prices for organically produced farm commodities. Some states like Uttaranchal would like to be known as an “Organic Farming State”. The National Academy of Agricultural Sciences (NAAS) has issued a Policy Paper on Organic Farming, which concludes that while synthetic pesticides can be avoided, complete exclusion of fertilizers may not be advisable under all situations. NAAS recommends that “a holistic approach involving Integrated Nutrient Management (INM), Integrated Pest Management (IPM), enhanced input use efficiency and adoption of region – specific promising cropping systems would be the best organic farming strategy for India.” To begin with, the practice of organic farming should be for low volume, high value crops like spices, medicinal plants, fruits and vegetables. NAAS has also emphasized the need for intensive research on soil fertility and plant health management and on issues relating to microbial contamination of food arising from the use of farm yard manures. (Organic Farming: Approaches and Possibilities in the context of Indian Agriculture, Policy Paper 30, NAAS, February 2005).

4.6.2 The Tenth Five Year Plan provides for the establishment of a National Institute of Organic Farming and Certification. Internationally acceptable certification standards and institutional structures are urgently needed. The International Federation of Organic Agriculture Movement (IFOAM) is the leading international organization which sets the guiding principles for organic farming. IFOAM has defined organic agriculture as follows:

“Organic Agriculture includes all agricultural systems that promote environmentally, socially and economically sound production of food and fibers. Recycling nutrients and strengthening natural processes help to maintain soil fertility ad
ensure sustained production. Pests and diseases are controlled with naturally occurring means and substances according to both traditional as well as modern scientific knowledge. Organic agriculture excludes synthetic fertilizers and pesticides, and genetically modified organisms”.

4.6.3 In order to develop a well-defined strategy for helping farm families take to organic farming, particularly in medicinal and horticultural plants, NCF organized a consultation with IFOAM in March 2005, at the M S Swaminathan Research Foundation, Chennai. Dr Bernward Geier, Dr Beatrix Tappeser and other leading foreign and Indian experts participated in the consultation.

4.6.4 The main principles of organic farming are the following:

To work as much as possible within a closed system, and draw upon local resources

i. To maintain the long-term fertility of soils
ii. To avoid all forms of pollution that may result from agricultural techniques
iii. To produce foodstuffs of high nutritional quality and sufficient quantity
iv. To reduce the use of fossil energy in agricultural practice to a minimum
v. To give livestock conditions of life that conform to their physiological needs and to humanitarian principles
vi. To make it possible for agricultural producers to earn a living through their work and develop their potentialities as human beings

4.6.5 The basic focus of organic farming should be first, to produce farm products for the home market; and second for the export market when there are prospects for obtaining a premium price. The global market for organic food is estimated at US$ 30 billion of which India has currently less than 0.1% market share. It will be useful to prepare Organic Farming Took Kits, based on IFOAM principles, to assist farmers on the do’s and dont’s relating to the production of organic farm produce. It is also desirable to promote the formation of Small Farmers’ Organic Agriculture Estates to confer the power of scale at the production and post-harvest phases of farming for farm women and men owning small holdings. It will also be necessary to develop and introduce low cost but nationally and internationally acceptable certification standards and procedures.

4.6.6 There are a large number of farm families practicing organic farming in different parts of the country. There are also local level organic farmers’ associations. It will be advisable to organize a National Federation of Organic Farmers’ Associations on the pattern of IFOAM. Farm schools on the lines recommended by NCF in its first report also may be established in the farms of outstanding organic farmers. Farmer to farmer
learning on organic farming procedures through the establishment of such Farm Schools as well as through the establishment of Organic Farmers’ Clubs will be useful, since organic farming is not defined by what we do not do, but by what we do. Diverse certification procedures cause confusion and hence National Certification mechanisms and agencies are essential.

### 4.6.7 Constraints and Opportunities

**4.6.7.1** Indian soils are both hungry and thirsty. The great challenge in organic farming is the maintenance and enhancement of soil productivity through the provision of the needed macro- and micro- nutrients. How can we ensure that yields do not go down affecting adversely the marketable surplus available to small producers? The Chinese model of integrated organic and inorganic farming is ideal for small farmers but this is not acceptable to IFOAM. IPM and INS procedures which do not include mineral fertilizers or chemical pesticides are however acceptable. This will call for more research on biopesticides, bio-fertilizers, herbal pesticides and genetic resistance. **There is need for greater investment on research relating to the development of the biological software essential for linking crop productivity and quality in organic farming. In particular, there is need for more research on soil health enhancing efficient fauna and micro-organisms.** In this context, ICAR should develop high accuracy, low cost and rapid result giving soil-testing procedures based on nano-technology.

**4.6.7.2** Genetically modified crops are presently excluded from organic farming by IFOAM. Like China, we may have to keep an open mind on this issue. A blend of Mendelian and Molecular breeding and pre-breeding and farmer participatory breeding may help to combine the beneficial features of organic farming and Recombinant DNA technology particularly in staple crops. Our National Agricultural Research System will have to develop **bio-organic farming methodologies**, which can help to enhance productivity without associated ecological harm, by integrating the best in frontier science with the best in traditional wisdom.

**4.6.7.3** Presently, Indian farmers are not getting premium prices for organically grown farm communities. There is need for greater consumer education. For convincing consumers, the nutritional and health advantages of organic foods will have to be clearly
established. The highest priority will have to go to natural method of pest management, since pesticide residues in water and food are becoming major public health problems. The research back-up at present for successful organic farming is inadequate. Organic farming needs even greater research support than chemical farming.

4.6.7.4 Under our conditions, higher productivity and better quality are both essential. Krishi Vigyan Kendras can organize special training programmes for explaining to farmers the dos and don'ts relating to organic agriculture. Organic Farming Zones can be promoted under the National Horticulture Mission for fruits, vegetables, tea, spices and medicinal plants, so that certification and quality control become easy. Cost of certification also has to come down, to enable small farmers to get certification.

4.6.7.5 Above all, more market research is needed. Small farmers, who may lose to some extent in yield by not applying mineral fertilizers, should not suffer in income due to lack of higher prices in the market. Organisations like the Spices Board are doing good work in helping small producers grow organic spices for the export market. High value products like basmati rice, will benefit further in relation to net return, if they can also be marketed as genuine Organic Basmati Rice. Organic Cotton Cultivation has been successfully popularized in Maharashtra. The Maharashtra experience needs to be replicated in other cotton growing areas.

4.6.7.6 IFOAM’s principles are based both on ethical and scientific considerations. In the Indian context, priority to organic farming will have to go both to horticulture and plantation crops as well as to crops like cotton where heavy doses of chemical pesticides are applied. Medicinal plants should be cultivated only by organic methods. Ultimately, income enhancement and work security for farmers, and nutritive quality and freedom from pesticide residues for consumers should be the bottom line of all agricultural technologies.

4.6.7.7 Small farmers practicing crop-livestock mixed farming are able to take to organic farming more effectively than those who have no farm animals. In Assam and Northeast India, there is heavy rain during May-September (Southwest Monsoon period). Fertilizer application results in considerable leaching losses and hence farmers avoid
making investment in mineral fertilizers during the monsoon season. Therefore, this season is ideal for raising organic rice and other crops. Similarly, there are opportunities for developing Andaman and Nicobar Islands into organic farming islands. **It would be useful to develop a national strategy for organic farming, specifying regions, crops and seasons, ideal for raising crops through organic farming techniques.** Thus, research, extension and capacity building activities in relation to organic farming need considerable strengthening. Ultimately, net income per hectare will determine farmers’ continued interest in organic farming.
CHAPTER - 4.7

ENHANCING PRODUCTIVITY, PROFITABILITY, STABILITY AND SUSTAINABILITY

BIOFUELS

4.7.1 There has of late been much interest among farmers and State Governments in exploring the economics of growing plants like Jatropha and sugarcane for the production of bio-diesel and bioethanol. Farmers’ organizations have to get proper extension advice on the advisability of shifting their land use to the cultivation of crops for bio-fuel production. A well-defined Biofuel policy based on science and economics needs to be developed jointly by the Ministries of Agriculture, Rural Development, Petroleum, Non-Conventional Energy Sources (MNES) and Science and Technology. ICAR and CSIR will have to be actively associated. Based on a detailed discussion with experts in this field, we wish to offer the following suggestions -

4.7.2 There is a growing oil intensification of the Indian economy and more than 70% of the oil used in the country is imported. The oil import bill is over 3% of GDP and is likely to increase further, since crude oil prices are projected to rise to as much as US $ 90 per barrel. Hence, we have to step up our efforts in mobilizing both nuclear energy and all forms of non-renewable energy sources. Bio-fuels derived from plant-based resources assume importance in this context.

4.7.3 International Scenario

Among the major countries in the world in bioethanol production, Brazil is a front-runner, and has been using with gasoline, 22% ethanol blend produced from molasses and sugarcane juice. USA uses corn as the main source of bioethanol. Thailand uses sugarcane as well as cassava for ethanol. Japan, Germany, Canada, Australia, Indonesia, South Africa, Sweden are the other leading countries using ethanol blends. Bio-diesel is being used in USA, Austria, Finland, France, Germany, Greece, Czech Republic, Ireland, Italy, Spain and Sweden. The main sources of bio-diesel in these countries are rapeseed, sunflower, olive oils, which are however edible oils and are not appropriate in the Indian context, where we are importing nearly 50% of our edible oil requirements.
4.7.4 Indian Scenario

Use of ethanol as automotive fuel was first made in Mysore in 1938. Dual fuel operation in diesel engines was experimented at the Indian Institute of Science (IISc), Bangalore, in 1950. Oil crisis in the seventies, prompted the Government to test performance of ethanol-gasoline blends in cars, scooters, three wheelers and tractors in the 1980s. Methanol diesel blends were successfully demonstrated in DTC buses during 1986-92, followed by 93 Government vehicles using 10% gasohol during 1993-95 under a MNES R&D project. R&D in bio-diesel has taken up at IIT Delhi, IOC(R&D), IISc. Bangalore, Tezpur University, IIT Chennai etc. Ministry of Petroleum and Natural Gas have taken up pilot projects on 5% ethanol blends in gasoline in nine States since January, 2003.

4.7.5.0 Plants of Potential Value

4.7.5.1 The major source of bio-diesel in India is non-edible oil seeds. The technology for production is indigenously available. Bio-diesel provides bio-degradability, non-toxicity and is sulphur-free. The oxygen content is about 10%, which gives better emission characteristics in terms of CO, HC & PM.

4.7.5.2 The production potential for bio-diesel is nearly 20 million tonnes per annum. Only a few million tonnes have been utilized (due to lack of demand). Also from about 100 varieties of oil seeds, only 10-12 varieties have been tapped so far. Non-edible oils are being tested for production of bio-diesel. Estimated potential varies from 0.1 to 20 million tones, out of which 20 to 25% has been utilized. More than 100 non-edible oil bearing trees exist in India.
4.7.5.3 The important potential tree species for bio-diesel in India are as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Botanical Name</th>
<th>Oil content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neem</td>
<td><em>Azadirachta indica</em></td>
<td>20</td>
</tr>
<tr>
<td>Karanja</td>
<td><em>Pongamia pinnata</em></td>
<td>27-39</td>
</tr>
<tr>
<td>Kusum</td>
<td><em>Schleichera</em></td>
<td>34</td>
</tr>
<tr>
<td>Pilu</td>
<td><em>Salvadora oleoides</em></td>
<td>33</td>
</tr>
<tr>
<td>Ratanjot</td>
<td><em>Jatropha curcas</em></td>
<td>30-40</td>
</tr>
<tr>
<td>Mahua</td>
<td><em>Madhuca indica</em></td>
<td>35</td>
</tr>
<tr>
<td>Bhikal</td>
<td><em>Prinsepia utilis</em></td>
<td>37</td>
</tr>
<tr>
<td>Undi</td>
<td><em>C.inophyllum</em></td>
<td>50-73</td>
</tr>
<tr>
<td>Thumba</td>
<td><em>C.colocynthis</em></td>
<td>21</td>
</tr>
<tr>
<td>Sal</td>
<td><em>Shorea robusta</em></td>
<td>20</td>
</tr>
<tr>
<td>Nahor</td>
<td><em>Mesua ferrea</em></td>
<td>45</td>
</tr>
<tr>
<td>Jojoba</td>
<td><em>S.chinensis</em></td>
<td>50</td>
</tr>
</tbody>
</table>

4.7.6 National Bio-diesel Strategy

4.7.6.1 Bio-diesel can be made from both, virgin or used vegetable oils (edible and non-edible). Bio-diesel needs no separate infrastructure for storage and dispensing as the existing facilities can be used. Also handling bio-diesel is safer. In addition, plantations of *Jatropha* and *Pongamia* would lead to gainful utilization of wasteland, of which there is more than 50 million hectares in the country. At a national level, a bio-diesel programme has the potential to create employment opportunities on a large scale, particularly in rural areas in the various activities along the production-use chain, such as growing plants, collection of oil-bearing seeds, extracting oil from the seeds through expeller units, trans-esterification for making bio-diesel for blending and use with conventional diesels for distribution at retail outlets. A systems approach is necessary for ensuring that the different components of bio-diesel programme are effectively coordinated and bio-diesel becomes a cost effective alternative.

4.7.7 Research, Extension and Demonstrations

4.7.7.1 The yield from the petro-plants need to be significantly increased and the efficiency of trans-esterification also has to be significantly enhanced, so that the bio-diesel production becomes economically viable. For this purpose, there is urgent need of
creating interdisciplinary research groups including agronomists, biotech researchers and energy technologists who could work together in the thrust areas for R&D, such as: genetically modified high yielding petro-plants, design and development of continuous Bio-diesel reactors, improving process efficiency and energy optimization for decentralized production.

4.7.7.2 Demonstration activities on bio-diesel currently under progress in the country include programmes of MNES. The Ministry of Petroleum including IOC has also entered into a MoU with Indian Railways for a study on the complete value chain of bio-diesel. In line with this, IOC has taken up plantation on 70 hectares of Railway land at Surendra Nagar in Gujarat. More than one lakh saplings of Jatropha have been planted at the site. Tests have been conducted with 5 percent, 10 percent and 20 percent blends of Jatropha bio-diesel in diesel, on diesel locomotive engine for power specific fuel consumption, firing pressure and exhaust gas temperatures. Trial runs on Shatabdi and Jan Shatabdi Express trains have been carried out with 5 percent and 10 percent bio-diesel. IOC has jointly with Haryana Roadways, also launched field trials on 40 buses of Gurgaon depot in April, 2004,

4.7.8 National Mission on Biofuels

4.7.8.1 The Planning Commission in coordination with various Ministries and Agencies prepared a Report on Biofuels in 2002-2003, which has proposed a National Mission on Biofuels from Jatropha plantations. A Detailed Project Report has also been prepared for this Mission and the Ministry of Rural Development has been assigned the task of implementation with the following targets: By 2006-07, Jatropha cultivation on 2 lakh ha of degraded forest land and 2 lakh ha of non-forest land, to yield 5% bio-diesel blend with petroleum diesel; 20% blend is proposed by 2011-12. However, the detailed project report for this mission is still under the process of finalisation and the mission is yet to start. Meanwhile, various activities focused on Bio-diesel, are being taken up by other Ministries, including in particular Ministry for Agriculture, Ministry of Petroleum and MNES.

4.7.8.2 As stated above, a number of Ministries and Agencies both in the public and private sectors are working on different aspects of biofuels including bio-ethanol and biodiesel. The Ministry of Petroleum including the oil companies under it and in particular IOC (R&D) have been active in carrying on demonstration trials effect of biofuels on engine performance. The Ministry of Non-Conventional Energy Sources has been taking up R&D and Demonstration Projects on technologies for conversion of fuel stock into biofuel and the utilization of the biofuel for different end users. MNES has taken up a Village Demonstration Project in selected villages to demonstrate the use of biofuels in stationary engines. The Department of Science and Technology, Department of Scientific and Industrial Research & CSIR have been also active in technology development in commercialization of different aspects of Biofuel technologies. The Department of Biotechnology is taking up activities for genetic engineering for increasing yield and quality. Ministry of Environment is focusing on afforestation as well as environment issues.

4.7.9 Need for Convergence and Synergy in Technology, Public Policy as Sectoral Responsibility

4.7.9.1 If we wish to make speedy and steady progress, there is no alternative except to bringing about integrated action among various Government Departments and research agencies. The Ministries / agencies which should work together are indicated in table 2 below:
<table>
<thead>
<tr>
<th>S.No</th>
<th>Action</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identification of seeds and developing suitable methods for extraction of oil from them and processing them to convert to biofuels, blending of biofuels; and modification in engine technology, use of biofuel as transport fuel, evolving methods to use rotten and excess food grains for ethanol production; developing policy frame work.</td>
<td>ICAR, CSIR, Ministry of Non-Conventional Energy Sources, Ministry of Science and Technology.</td>
</tr>
<tr>
<td>2</td>
<td>Availability of biofuel particularly ethanol for transport sector without hampering its availability to chemical and chemical beverage industries.</td>
<td>Ministry of Food and Consumer Affairs/ Ministry of Chemical and Petrochemicals</td>
</tr>
<tr>
<td>3</td>
<td>Pricing of biofuels including taxation</td>
<td>Ministry of Finance and State Governments</td>
</tr>
<tr>
<td>4</td>
<td>Storage of Seeds and biofuels</td>
<td>Ministry of Food and Consumer Affairs and Ministry of Petroleum and Natural Gas</td>
</tr>
<tr>
<td>5</td>
<td>Distribution network and use in automobiles and other oil based engines</td>
<td>Ministry of Petroleum and Natural Gas</td>
</tr>
<tr>
<td>6</td>
<td>Availability of land and cultivation of crops to produce feedstock for biofuels</td>
<td>Ministry of Rural Development/Ministry of Agriculture and Ministry of Environment and Forest</td>
</tr>
<tr>
<td>7</td>
<td>Production of biofuels</td>
<td>Ministry of Food-processing, Ministry of Industry and Small Scale Industry.</td>
</tr>
<tr>
<td>8</td>
<td>Plant genetics for increasing yield and quality</td>
<td>ICAR, Department of Biotechnology</td>
</tr>
<tr>
<td>9</td>
<td>Environmental issues</td>
<td>Ministry of Environment and Forest.</td>
</tr>
<tr>
<td>10.</td>
<td>Field Action Plan</td>
<td>State Governments</td>
</tr>
</tbody>
</table>
4.7.9.1 Ensuring the Sustainability and Success of the Biofuel Programme

4.7.10.1 Farmers need to be assisted to undertake farming of crops used in ethanol and other biofuels, by ensuring purchase of these products at a minimum support price by government and industrial units, educating them about the species for biofuels, and cultivation techniques, and providing them with high quality seeds/saplings etc. Quality control and certification of the planting material are urgently needed.

4.7.10.2 Suitable mechanisms need to be developed to collect and store agri-residues such as rice straw, so that these wastes which are otherwise burnt, become a commercial commodity for farmers and would be available for ethanol production. This should be supported by developing the necessary industrial infrastructure to process the collected biomass for production of ethanol/other biofuels and the by product industrial wastes so generated, could be used as manure.

4.7.10.3 Use of wasteland may be encouraged to develop plantations of neem, karanja, jatropha and other such species for bio-diesel production. Mechanisms need to be developed to collect oilseeds from forests. The wood generated from plantations could be utilized as feedstock for wood gasification to generate electricity. Wasteland should be used as collection centres for agri-residue. This process will have multiple benefits like land reclamation, employment generation, decentralized electricity generation etc.

4.7.10.4 Extensive support needs to be provided to R&D institutions to work on developing suitable process development for biofuels from various feedstock and for developing agronomic practices for growing crops for biofuels in wasteland. ICAR and CSIR should jointly undertake this function in cooperation with State Agricultural Universities.

4.7.10.5 Panchayati Raj institutions have a major role to play in creating awareness among people about Jatropha and other species, for cultivation in wasteland, common land and farm hedges. Panchayats/clusters of Panchayats have to be identified for this purpose. There is need for collaboration with State and Central Government organizations - National Seed and Vegetable Oil Development Board, National Dairy Development Board etc.
4.7.10.6 Industrial sector needs to be encouraged to increase ethanol production from all available feedstock such as cereals, agri-residues, and starch-based crops besides optimizing the present level of production from molasses. The production of bio-diesel from various non-edible oils seeds also needs to be encouraged. For this purpose, necessary incentives such as soft loans for establishing new industries, updating existing industry and tax holiday, need to be provided.

4.7.10.7 In order to accomplish these tasks a 'National Biofuel Board' may be set up. The Board should develop a Roadmap for use of biofuels in petrol and diesel engines in a time bound manner besides taking necessary steps to introduce the policy measures, some of which have been proposed above. The Board should be supported with appropriate financial resources.

4.7.11 Farmers’ Perceptions

4.7.11.1 Farmers are getting confused signals about the economic viability of the programmes suggested to them. They are not sure about the quality of seeds / planting material given to them. They are not yet clear whether there will be a buy back arrangement on terms favourable to the growers. Factors relating to cost, risk and return determine farmers’ acceptance and enthusiasm in relation to new programmes. The sooner a farmer-centric National Biofuel Board comes into existence with the active support and participation of all stakeholders, including farmers’ and women’s organizations, the greater will be the prospect for making progress at the speed the country needs urgently to ensure economically affordable energy security.

4.7.11.2 The success or failure of the Biofuels programme will depend on our ability to ensure that the processing units are able to source the required quantity of raw material at the right time, in right quantities and at economically viable prices. Many dedro-thermal plants have failed because of inadequate linkages with raw material supply. The feedstock for the biofuel industry has to come from agriculture. Unless the interests of biofuel farmers are protected, the investment made at the processing end will go to waste.
4.7.11.3 We, therefore suggest that the proposed **National Biofuel Board** may have the following composition:

**Chairperson:** The Member, Planning Commission, in charge of Energy

**Members:**
- Member (Agriculture) in charge of feedstock production
- Member (Processing and quality control)
- Member (Marketing, industry-farmer linkages through contract purchase etc.)
- Member (Centre-State coordination, linkages with private sector, global technology watch)

4.7.11.4 A Board of the above kind may function like the Atomic Energy Commission with specific targets, autonomy and accountability. It can then attend to bio-feedstock production, use and marketing in an integrated manner with benefits to both farmers and the country.
CHAPTER 5
AGRICULTURAL MARKET REFORMS

5.1 Agriculture marketing includes all activities in the movement of agricultural produce from farm where it is produced to the consumers/industries and trade as per the demand. This covers physical handling and transportation, initial processing and packaging, grading and quality control for sales transaction for meeting the requirements of the different consumers/users and storage. Marketing plays the vital function of providing an outlet for the produce of the farmers and a supply line to the consumers/users. An efficient marketing system is essential for the development of the agriculture sector, providing incentives to the farmers for commercialization, increasing production and giving appropriate signals for production planning and research activities. It should encourage competition among the traders and protect the interest of the small and marginal farmers whose bargaining and holding capacities are limited.

5.2 In an agrarian economy like India, the fluctuations and the levels of prices of farm produce have considerable impact on the growth of production, the inter-sectoral distribution of income and the purchasing power with the majority of the rural population, which to a large extent determines the growth trajectory of many industries. The Government have, therefore, to constantly watch and intervene, when necessary, in the matters concerning agriculture marketing.

5.3 Some of the characteristic features of the agricultural produce marketing in India at the time of Independence were (a) sales immediately after harvest mainly for meeting the cash needs – mostly distress sale at discounted prices, sale of ungraded produce, loose carrying of the produce and lack of on-farm storage facilities (b) predominant role of the village trader and inter locking of credit and commodity market (c) Use of unstandardised weights/measures by the traders and high market charges which included charges like ‘mudat’ ‘dharmada’ ‘arähat’ etc. (d) direct sale by farmers and absence of farmers’ organizations to reach volumes and protect the interests of the small producers.

5.4 Three basic requirements for building a sound agricultural economy are a productive technology package, efficient delivery of services alongwith remunerative and stable market prices for the produce. One has to remember that the market could inflict
underserved losses on the farmer, even when he had applied modern technology and produced efficiently. This is more so now. Presently market led production is the key to an efficient production system. Better prices and larger surpluses would come to the producers who understand the market better and produce what the customers want. The situation was different at the time of Independence when the economy was less open, there was shortage of production against demand and the customers did not have much choice. At that time, the important issue was to save the farmers from the malpractices of the traders and facilitate growth and development of an orderly marketing arrangements.

5.5 In view of the above, after independence, the Government introduced various measures broadly covering the development and extension of marketing network and the actual regulation of the conduct of market. Government interventions covered not only market yard but also trading, stocking, quality maintenance, grading etc. Measures were also introduced by the Government for intervention in prices, procurement and also in import and export of agriculture commodities. Various instruments of fiscal and monetary policies of the Government also impact the cost of performing various marketing functions including transportation, stocking and trading in the markets.

5.6 Organized marketing was promoted through a network of regulated markets. A massive programme for creation of the marketing network was taken up. As on 31st March 2004, as many as 7418 markets had been brought under the ambit of regulated markets. Most of these markets are wholesale markets. In addition, out of 27,294 rural periodical markets [village haats, shanties etc], nearly 15% function under the regulated framework. The basic objective of setting up the network of markets was to protect the interests of the farmers and eliminate various malpractices of the traders. Fair play and transparency in transactions was aimed at. Most of the State Governments and the Union Territories enacted legislations (APMC Act) to provide measures for development of agriculture produce markets.

5.6.1 In view of the supply side constraints, the need for orderly functioning of the markets and protecting the interests of the producers and consumers, besides the APMC Acts various other legal enactments were promulgated by the Centre and the State Govts. These included the following:
Prevention of Food Adulteration Act, 1954
Essential Commodities Act, 1955
Standards of Weights & Measurement Act, 1976
Prevention of Black Marketing & Maintenance of Supply of Essential Commodities Act, 1980
Consumer Protection Act, 1986
Bureau of Indian Standards Act, 1986
Agriculture Produce (Grading & Marketing) Act, 1986

5.6.2 In addition, there are also specific orders covering various products like meat, vegetable oils, milk & milk products, fruit and fruit products, pulses, edible oilseeds, edible oils, solvent extracted oil, deoiled meals etc. The recourse to the provisions under these orders etc is mainly intended to be given during periods of scarcity and to stop the malpractices. Some of these orders also cover activities like storing, packing, quality, blending, processing etc. The Government of India also regulates future trading in agricultural commodities. These Acts and orders were promulgated during periods of scarcity and have perhaps outlived their utility. These need a revisit and may be scrapping in many cases.

**Box-1**

**Essential Commodities Act**
The multiplicity of Acts and Government orders for regulating the conduct of market functionaries and processing units is not only restricting competition among those who deal and ultimately buy farmers’ produce but also increase the transaction cost for marketing operations. There is a need to review the Essential Commodities Act and other legal instruments, which impact the marketing and processing activities. The Task force on Employment Opportunities (Planning Commission 2001) had observed ‘The Essential Commodities Act is a central legislation which provides an umbrella under which the States are enabled to impose all kinds of restrictions on the storage; transport and processing of agricultural produce. These controls were traditionally justified on the ground that they were necessary to control hoarding and other type of speculative activity, but the fact is that they do not work in times of genuine scarcity and they are not needed in normal times. Besides, they are typically misused by lower level of administration and become an instrument of harassment and corruption’.

_Tenth Five Year Plan Document [Para 7.8.11]_

**5.7.0 Strengths of the Regulated Marketing System**

5.7.1 The main strength of the agricultural produce marketing system, in India is the huge network of markets. As on 31st March 2004, as many as 7418 markets were under the ambit of the regulated markets. Most of these were wholesale markets. In addition, out of
the 27,294 rural periodical markets, about 15% functioned under the regulated framework. The regulated markets, have also achieved certain amount of success in providing transparent transactional methods/marketing practices, basic amenities and services conducive to an efficient marketing system. Some of the developments in the marketing system at the primary market level and farmers marketing practices are: [a] The marketed surplus per farm has gone up. The overall marketed surplus-output ratio is estimated to have improved from 33.4% in 1950-51 to 64.1% in 1999-2000 [b] There has been some standardization of market-charges and the liability has generally shifted to the buyers [c] The quality of market information, available is much better than what it was during the ‘fifties and sixties’ [d] The market sales have increased [e] There are sectors where sales through the cooperative or groups are substantial [f] Inspite of the restrictive features, the system has made space for contract farming/direct marketing /other innovative practices like ITC’s e-choupal etc.

5.7.2 According to a study [1991] the expenses of the farmers in respect of commission, weighing, hamali, brokerage etc, for marketing their produce came down by about 50%. In a recent study done by the Karnataka State Agriculture Prices Commission [2002] in respect of 3408 farmers, revealed that about 29% of the sample farmers sold their sample produce through the regulated markets. The farmers cited competitive prices [52.4%] correct weighment [20.1%], easy and early payment [12.4%], quick transaction [1.5%], and no buyer at village (4%) as reasons for their using the regulated markets. It was also revealed by the above study that the farmers received higher prices in respect of Paddy, Soybean, Ragi, Greengram, Bengalgram and Groundnut by selling in the regulated markets. However, in case of Tur, the highest price was at the farm gate, where as in the case of Maize and Jowar, the farmers selling in the rural periodic market received the highest price.

5.8.0 Weaknesses of the Regulated Marketing System
5.8.1 However, inspite of the development of the regulated agriculture produce marketing system, several weaknesses such as, distress sales immediately after harvest, absence of grading and packaging at the farm level and inter-locking of credit and commodity markets continued. Further, the regulated marketing system did not offer the farmers virtually any options/choices, the market charges became high and the farmers complain
about lack of transparency in weighing & auction as also the poor treatment given to them at the market yards. There is a need to have more transparency in the auction systems and curbing the manipulations of prices by the traders. The other weaknesses in the present marketing system are listed below:

- Thin spread of the regulated markets in many States
- Inadequate development of the rural periodic markets which are the first contact point for the growers
- Inadequate infrastructural facilities at the regulated markets.
- Large variations in the market fee/charges across the States
- Variations in the entry tax/octroi and sales tax
- Lack of transparency in auctions and other trade related activities
- Failure to develop a common trade language
- Inefficient working environment

5.8.2 The Karnataka study (2002) referred to earlier, indicates that inspite of better prices in the Regulated Markets, nearly 71% of the sample farmers chose not to sell at the regulated markets.

Table 1: Farmers unable to use Regulated Markets - Reasons

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Reason Cited</th>
<th>Percentage of sample farmers not selling through the regulated markets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reasons Related to Markets/Marketing Practices</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Distance</td>
<td>31.2</td>
</tr>
<tr>
<td>2.</td>
<td>No knowledge of regulated market</td>
<td>8.0</td>
</tr>
<tr>
<td>3.</td>
<td>Payment delay</td>
<td>7.8</td>
</tr>
<tr>
<td>4.</td>
<td>No provision for Paddy sale</td>
<td>5.4</td>
</tr>
<tr>
<td>5.</td>
<td>Harassment by Hamals/Coiliees/cheating in the weighment/removing 4-5 Kgs</td>
<td>3.1</td>
</tr>
<tr>
<td>6.</td>
<td>Long wait for weighing</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Reasons not related to the Regulated Markets</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Good price at the local market</td>
<td>18.4</td>
</tr>
<tr>
<td>8.</td>
<td>Small quantity</td>
<td>12.7</td>
</tr>
<tr>
<td>9.</td>
<td>Advance taken</td>
<td>9.0</td>
</tr>
<tr>
<td>10.</td>
<td>Others</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
It is clear from the above findings that the regulated markets could have performed better with more developmental efforts and professional management. The APMCs and the State Agriculture Marketing Boards also need to pay more attention to curb manipulations in the marketing system. Coupled with the fact that only around 29% of the sample farmers used the regulated markets is a sad commentary on the performance of the APMCs/ Market Boards.

**Box-2**

**Regulated Markets- Karnataka**

The major operational weaknesses at the Mandi are [a] existence of malpractices such as unauthorized charging of commission from the farmers, considerable amount of produce taken away as sample, arbitrary deduction from the weight and lack of transparency in transactions. [b] Bureaucratisation in the management of regulated markets has prevented them to become farmer-friendly institutions. It is understood that more than 80% of the market committees have been superceded. [c] The traders, commission agents, other functionaries including weighmen / hammals /coolies etc. have in many places formed strong associations and do not allow entry of new persons. [d] While most of the APMCs and the SAMBs are financially well placed, adequate investments in the development/improvements/modernization of the market yards have not been made. There are instances where the funds have been diverted to the Government accounts. [e] Adequate investment in development of rural primary markets [haats/shanties etc.], which are the first contact point for the farmer, have not been made.

The farmers feel that there should be arrangements for supply of their daily domestic requirements and key inputs required for cultivation in the Market Yard itself. To improve the operations at the Mandis, it may be useful to have a more broad based board consisting of representatives of genuine farmers, traders and even commission agents. Holding of regular election of market committees and State Agriculture Marketing Boards are also equally important.

*Extracts from the Report of the study done by Karnataka State Agriculture Price Commission-2002*

5.8.3 The variations in market charges and taxation in different State/UTs is shown at Appendix I. The taxes and levies charged in certain states on the primary transactions are very high. In Punjab, it worked out to 11.5% and Haryana 10.58%. Some States also levied ‘Rural Development Cess’ and ‘Infrastructure Cess’. Another issue is the present system of levy of fee at multiple points in the regulated market. An option could be to have a single point levy of market fee to cover the entire process of marketing by the farmers. The paradigm of efficiency in marketing and produce handling rests on the reduction in the transaction cost.
The complex tax structure and multiplicity of state-level taxes distort the process of trade and marketing. Inter-state and Centre-State harmonization of tax laws and their administrative systems can facilitate the simplification of the tax regime. Octroi on transport of goods, where still in force, needs to be looked at and phased out. The permit system for the transport vehicles [issue of national permit] needs to be reviewed. The harassment to which the operators are subjected to [insistence on showing the drafts paid for obtaining the national permit or demanding payment for tax and fee at the border check posts.] needs to be curbed. The move towards a nation-wide uniform value added tax [VAT] is desirable. VAT is a multi-stage tax, which is levied on the value added at each stage. As each input going into final product is taxed only once, this tax avoids cascading and multiple incidences, and should be easy to monitor and implement. The state VAT, with a harmonized rate structure across the states, could replace all other sales taxes and other taxes like turnover tax, octoroi and entry tax etc.

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5.8.4 The major constraint of the regulatory framework of the agricultural produce marketing system is that it discouraged investments by the private sector, allowed certain monopolistic practices to develop and generally discouraged free trade and competition. It is surprising to note that a processor has to pay a fee on commodities brought into the notified area for processing without any service/value addition by the regulatory authority. In the present arrangement the farmers have no choice. In case they want to sell their produce in the wholesale market, they have to come to the regulated markets. Absence of choice and competition has adversely affected the development of markets and interest of the farmers and consumers in the changed circumstances.

5.9.0 Marketing Infrastructure - Amendments to the APMC Act, etc.

5.9.1 Let us now look at the marketing infrastructure for the agricultural produce marketing in India. The infrastructure is important for performance of various marketing functions, broadening and deepening of the market and also transfer of appropriate price signals for improving the marketing efficiency. As already stated, there are 7418 markets under the ambit of regulated markets. This works out to one market for 459 Sq. Kms. In Assam the coverage for each market is 2257 Sq. Kms followed by Himachal Pradesh [1600 Sq. Kms.], Orissa [1053 Sq. Kms], Rajasthan [830 Sq. Kms], Madhya Pradesh including Chattisgarh [719 Sq. Kms], Gujarat [490 Sq. Kms.], Tamil Nadu [481 Sq. Kms], Uttar Pradesh including Uttaranchal [476 Sq. Kms]. The thin spread makes it difficult for the farmers to bring their produce to the regulated market particularly in areas where the road connectivity is not upto the mark. The need is to give a greater
focus to the development of rural periodic markets, which are the first contact point for the farmers. The States where the coverage was better than the all India average were Punjab [74 Sq. Kms], West Bengal [152 Sq. Kms], Haryana [155 Sq. Kms], Bihar including Jharkhand [214 Sq. Kms], Andhra Pradesh [319 Sq. Kms], Maharashtra [359 Sq. Kms] and Karnataka [406 Sq. Kms]. Infrastructural facilities help in reduction in marketing costs, which help in improving the realisation of the growers and reducing the price, which the consumer pays. The infrastructural facilities in most of the regulated markets are inadequate. The table below indicates the lack of facilities at these markets.
Table 2: Lack of Facilities/Amenities at the Regulated Markets

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Facility/Amenity</th>
<th>Percentage of Regulated Market Yards not having the facility/Amenities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Common Auction Platform</td>
<td>33</td>
</tr>
<tr>
<td>2.</td>
<td>Price Display Boards</td>
<td>39</td>
</tr>
<tr>
<td>3.</td>
<td>Common Drying Yards</td>
<td>74</td>
</tr>
<tr>
<td>4.</td>
<td>Grading Equipment</td>
<td>70</td>
</tr>
<tr>
<td>5.</td>
<td>Agriculture Input shop</td>
<td>71</td>
</tr>
<tr>
<td>6.</td>
<td>Drinking Water taps</td>
<td>72</td>
</tr>
<tr>
<td>7.</td>
<td>Seating Benches</td>
<td>72</td>
</tr>
<tr>
<td>8.</td>
<td>Pledge Financing</td>
<td>83</td>
</tr>
<tr>
<td>9.</td>
<td>Public Address System</td>
<td>66</td>
</tr>
<tr>
<td>10.</td>
<td>Drainage System</td>
<td>45</td>
</tr>
<tr>
<td>11.</td>
<td>Cold Storage</td>
<td>91</td>
</tr>
<tr>
<td>12.</td>
<td>Storage godown</td>
<td>26</td>
</tr>
<tr>
<td>13.</td>
<td>Weighing Equipment</td>
<td>15</td>
</tr>
<tr>
<td>14.</td>
<td>Toilets</td>
<td>12</td>
</tr>
<tr>
<td>15.</td>
<td>Bathrooms</td>
<td>43</td>
</tr>
<tr>
<td>16.</td>
<td>Electric lights</td>
<td>11</td>
</tr>
<tr>
<td>17.</td>
<td>Boundary walls</td>
<td>16</td>
</tr>
<tr>
<td>18.</td>
<td>Internal roads</td>
<td>11</td>
</tr>
<tr>
<td>19.</td>
<td>Garbage disposal system</td>
<td>16</td>
</tr>
<tr>
<td>20.</td>
<td>Banks</td>
<td>58</td>
</tr>
<tr>
<td>21.</td>
<td>Post Office</td>
<td>72</td>
</tr>
<tr>
<td>22.</td>
<td>Security Post</td>
<td>58</td>
</tr>
<tr>
<td>23.</td>
<td>Processing Unit</td>
<td>93</td>
</tr>
</tbody>
</table>

5.9.2 The Directorate of Marketing and Inspections, Government of India have established Central and Regional laboratories for certification under the AGMARK system. So far, grade standards have been notified for 164 commodities. During, 2003-04 (upto December) commodities valued at about only Rs.3525 crore were graded for
internal trade and about Rs.30 crore for export purposes. Standardization and appropriate grading arrangements/facilities are important. While for exports, the grading according to laid down standards is compulsory, for commodities sold in the domestic markets, grading has remained voluntary. **This is a serious bottleneck in our market system, which necessitates sale of individual farmer’s lot leading to delays and exploitation in pricing and also makes scientific and transparent auction system difficult to introduce.** It may be necessary to have quality standards for all agricultural commodities and compulsory grading system may be introduced in a phased manner.

5.9.3 The Inter-Ministerial Task Force on Agriculture Marketing Reforms, which gave its Report in May 2002, observed as under “High investments and entrepreneurial skills are required for creation and management of the agriculture marketing infrastructure. The situation of control by the State has to be eased to facilitate greater participation of the private sector, particularly to engender massive investments required for the development of marketing infrastructures and other supporting services. Investment requirements for the development of marketing, storage, cold storage infrastructure in the country during the Xth Plan has been estimated to the order of Rs.12, 230 crore.”

*Table 3: Estimates for marketing infrastructure development*

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Infrastructure</th>
<th>Physical No.</th>
<th>Outlays required (Rs. in Crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Wholesale markets</td>
<td>561</td>
<td>1,122</td>
</tr>
<tr>
<td>II</td>
<td>Rural Primary Markets</td>
<td>6,984</td>
<td>2,793</td>
</tr>
<tr>
<td>III</td>
<td>Grading, standardization and quality control units at village/market level</td>
<td>1,000</td>
<td>80</td>
</tr>
<tr>
<td>IV</td>
<td>Strengthening AGMARK laboratories/modernizing testing facilities/awareness and training programmes</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>V</td>
<td>Godowns in private sector/FCI/CWC/SWC/NCDC/Rural godowns</td>
<td>129.82 lakh tones capacity</td>
<td>3,480</td>
</tr>
<tr>
<td>VI</td>
<td>Cold storage/onion godowns/cold chain etc.</td>
<td>56 lakh tones</td>
<td>4,720</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>12,230</td>
</tr>
</tbody>
</table>
5.9.4 The Task Force further observed that in order to encourage private sector to make large investment for developing alternate marketing infrastructure and supporting services, the provision of the APMC Act would need modification to create a lawful role for the private sector in the marketing development. **There was also a need to** [a] reduce regulatory controls and simplify procedures [b] making complementary investment by the State and Central Government [c] providing subsidy to the private sector initiatives to attain economic viability [d] ensuring adequate credit flows to agriculture marketing and [e] declaring the market development projects as ‘infrastructure projects’ within the meaning of Section 10(23G) of the Income Tax Act. To attract promoting agencies to take up infrastructure projects, the Central/State Governments need to additionally extend support in the allocation of suitable land to set up the markets, provision of village land for Farmers Associations and collection centers, deregulation of area from the APMC Act where new markets were to be set up, ensure fast approval of foreign technical assistance, import of equipment and for services like electricity, water, sewage, telephones, etc. The Task Force also felt that the Central Government support for investment in market infrastructure might be linked with deregulation and reforms in the agriculture-marketing sector.

5.9.5 Following main amendments in the APMC Act were suggested: -

- Enabling private and cooperative sectors to establish and operate (including levy of service charge) agriculture marketing infrastructure and supporting services.
- Direct marketing of agriculture commodities from producing areas and farmer’s fields, without the necessity of going through licenced traders and regulated markets.
- Permitting ‘Contract Farming’ programmes by processing or marketing firms. Incidence of taxes by way of market fee, cess, duties, taxes etc. on procurement of agriculture produce under the above programme be waived or minimized.
- Rationalisation of levy of market fee by introducing single point levy of market fee in the entire process of marketing in the State

5.9.6 The progress in amendment of the APMC Act in different States and the Union territories is given at Appendix II. It would be seen that there is no APMC Act in Kerala,
Manipur, Andaman & Nicobar, Dadra & Nagar Haveli, Lakshdweep and Daman & Diu. In case of Tamil Nadu, the Act provides necessary reforms and hence no amendment is required. Madhya Pradesh, Himachal Pradesh, Sikkim, Andhra Pradesh, Nagaland have made the requisite amendments. In the case of Maharashtra, Rajasthan, Haryana, Karnataka, Gujarat, Punjab and NCT, Delhi part of the reforms have been completed. In most of these States, further amendments are likely to come about in due course. In the case of States like Orissa, Assam, Mizoram, Arunachal Pradesh, Tripura, Chattisgarh, Meghalaya, Jammu & Kashmir, Uttar Pradesh, Uttranchal, Goa, West Bengal, Pondicherry and Chandigarh some administrative action has been initiated but the reform process would take time. In the case of Bihar and Jharkhand, the administrative work is also yet to start. **The Govt. of India is attaching considerable importance to the reform of the APMC Act and is playing a very proactive role.** However, the response from some of the state is not adequate. The Government of India have circulated a draft of amended APMC Act and the draft of agreement for Contract Farming to the States for their guidance and further action. The Agriculture Ministry also held a conference of the State Ministers incharge of Agriculture Marketing in November 2004 at Bangalore under the Chairmanship of the Hon’ble Union Minister for Agriculture for evolving a nation wide consensus on reforms in marketing sector and to accelerate the pace of its implementation. It was felt that the reforms in APMC Acts were necessary for creating a nation wide integration of the agriculture markets, facilitating emergence of agriculture markets in private and cooperative sectors and creating a conducive environment for private sector investment in the market infrastructure.

5.9.7 The Inter Ministerial Group also made certain recommendations for promotion of forward and futures markets in agricultural commodities, development of negotiable warehouse receipt system and deepening of marketing credit etc. which are discussed in subsequent paragraphs.

5.9.8 The role of the APMCs and the State Agriculture Marketing Boards [SAMBs] needs to change from regulation to development in the changed production and demand environment. The APMCs and SAMBs should be primarily involved in grading, branding and packaging and building up markets for the local products in domestic and even international markets.
5.9.9 The Government of India have also announced a reform linked Central Sector Scheme “Development of Marketing Infrastructure, Grading and Standardization” during X\textsuperscript{th} plan period. Under the scheme, assistance is available for agri-infrastructure projects to those States, who undertake suggested reforms in the APMC Act.

5.10.0 The Producer’s Perspective
5.10.1 Discussions with farmers across the country give the impression that they consider ‘market’ as a major constraint for further diversification and commercialization of their agriculture. More and more farmers have begun to realize that market led production is the key. The farmers appeared to be quite wary of the advice of the extension staff, which is generally not based on sound knowledge of the market. The present marketing arrangements, which primarily focus on regulation rather than development and innovations, is falling much below their changing expectations. In future, product-quality and specialty products are going to be important in both domestic and international markets. The extension staff and the farmers need training and guidance in maintenance of quality standards and specifications. The extension agencies/NGOs/PRIs could play a role in the knowledge dissemination. The Indian agriculture needs to move from low value agriculture to high value agriculture. There will be need to improve infrastructure for quality testing facilities [laboratories] and related infrastructure at all the levels. There is urgent need to provide extensive training to the farmers. The concept of ‘Farm Schools’ for lateral training of farmers needs to be pursued. The farmers would also need proactive advice on matters relating to land use with a clear view on the market. Such proactive advice may have to be based on meteorological, marketing and management information [taking into account soil characteristics, irrigation water availability and other agro-ecological conditions]. A restructured State land Use Boards supported by a team of technical experts/agencies could perhaps render such advice to the farmers. There have been instances where the farmers in large number switched over to certain commercial crops which did not have large enough market to absorb the increased production leading to a crash in prices.

5.10.2 In developed countries, it is fairly common for the farmers to organize themselves under the banner of the commodity that they produce. Farmers producing pulses in USA are organized under UNIGRAIN that decides about production and marketing of pulses
to obtain better prices for the pulses and links itself with producers of products made from pulses. It communicates with the Government on important policies relating to prices/tariffs etc. It also disseminates information to all pulses growers on market trends etc. Plain Cotton Cooperative Association [PCCA] in another farmer owned organization in USA. Such organizations could play an important role in developing market orientation of the growers in our country and could also generally help in articulating farmer’s issues on commodity basis. The DMI in the Agriculture Ministry could perhaps take a lead and encourage formation of commodity wise farmer’s organizations. The National Egg Coordination Committee is a fine example of the producer’s organization, which has done very well in development of poultry industry.

Box-4

National Egg Coordination Committee (NECC)

A movement of Farmers, for the Farmers

The NECC played a crucial role in promoting the production and consumption of eggs and is trying to lead the poultry sector to the path of profitability. NECC advertising campaign, which used to appear regularly on television in the early 1990s, certainly caught the imagination of the nation. A catchy tune combined with visuals was used to promote the consumption of eggs. The campaign's creativity won many accolades. But its success was really felt when egg consumption went up significantly and this benefited farmers across the country. In effect, it was farmers (more than 25000), under the banner of the NECC, who began the movement, causing a revolution of sorts. With its faith in farmers and in marketing techniques and its commitment towards the cause of agriculture, the NECC has contributed towards bolstering India's poultry sector.

In 1981, the egg industry was hit by an unprecedented crisis. At that time, traders who did not take into account the cost of production or the demand and supply situation determined the price of egg. Eggs were procured at artificially lowered prices. Once they built up enough stock, prices would be increased. During the high-price season traders did not buy eggs from the farmers. The price of egg was thus manipulated so that eggs could be bought at a low price and sold at a higher price. Obviously, this system did not benefit either the producer or the consumer. The NECC has expanded its scope to include:

- The fixing of remunerative egg prices across the country;
- Price support operations in cooperation with the National Agricultural Cooperative Marketing Federation of India (NAFED);
- Market intervention through Agrocorpex India Limited (ACIL), a marketing company with only poultry farmers as shareholders, promoted by the NECC;
- Rural market development by promoting distribution channels; Including eggs in the Noon Meal Programme for school children introduced by the government of Tamil Nadu;
- Mass communication programmes to promote egg consumption.
With an increase in demand for eggs, poultry is one of the fastest growing segments in the country. A study on the Indian food industry done by the Confederation of Indian Industry (CII) and management consultants McKinsey, says: "The poultry sector has the potential to grow at 20 per cent per annum over the next 10 years." The study has set a target of Rs.4, 80,000 crores a year by 2005 for this sector.

5.11.0 Direct Interventions in Marketing by the Government

5.11.1 Besides the administered price regime which covers declaration of minimum support price (MSP) for selected crops, statutory minimum price (SMP) for sugar cane, levy price for rice and sugar and the central issue prices for rice, wheat and coarse cereals for sale under the Public Distribution System (PDS), there is also direct entry of Government through the public agencies in the market. Stocks of rice and wheat are maintained by the State, cereals and sugar are distributed through the PDS at prices lower than the market and there are open market operations by public agencies to ensure orderly price movement of important agricultural commodities. The Cotton Corporation of India, the National Agricultural Cooperative Marketing Federation of India (NAFED), the Jute Corporation of India, the TRIFED and the state level marketing federations also undertake open market operations. In addition, the Government have also encouraged cooperative organizations to undertake marketing functions on behalf of the farmers (through these have not been much of a success except in some sectors). The Government have also been intervening in the market under the Market Intervention Scheme (MIS) in respect of commodities not covered by MSP, but on a selective basis. This role needs to be strengthened particularly in the case of sensitive commodities.

5.11.2 However, notwithstanding the direct intervention by the Government, the markets of agriculture commodities have been largely dominated by individual traders in the private sector. The private trade handles about 80% of the marketed surplus of agriculture commodities. It is estimated that there are about 20 lakh wholesalers and nearly 50 lakh retailers, which include nearly 4 lakh shops operating under the Public Distribution System. Besides the traders, the processors also enter the market. The hullers, shellers, rice mills, wheat millers, pulses (dal) mills and other processors including expellers, crushers, solvent extraction units, oil refining units etc. are the bulk buyers in the market. These processors are very large in number and operate at different levels of scale,
mechanization and efficiency. The role of processors has also increased in certain commodities. Bakeries, flour mills, dal mills, fruits/vegetable processors enter the market directly and are buying more. The consumer is also consuming more of bakery products/flour rather than buying wheat and processing it in the home or in the neighbourhood ‘Chakki’.

5.11.3 The market for fruits, vegetables, meat, poultry products etc. is also dominated by the private sector. Processed fruits/vegetables/meat products etc. still form a very negligible part of the total market. However, with increase in urban purchasing power and changing life style the market for processed food is growing and is set to grow rapidly in the coming years. Though, large companies are getting into the processed food sector, at present the sector is dominated by the unorganized sector.

5.11.4 In spite of the fact that the agriculture produce market sector has a very large number of players, due to infrastructural bottlenecks, geographically dispersed market places, absence of a well organized futures market, there are localized monopolistic tendencies and manipulations which often adversely affect the interest of growers.

5.12.0 Agriculture Price Policy
5.12.1 Agriculture price policy instruments are used to influence the level and fluctuation in prices and importantly the spread from the farm gate level price received by the producer and the price paid by the ultimate consumer. While initially, the State was mainly concerned with regulating the private traders, imports and distribution of food-grains etc. at low prices, after the mid sixties, the focus was on using the price policy for increasing the domestic production and providing food-grain to the consumer at reasonable prices. **In India, it is important to note that the producers are also the major consumers of food-grains unlike in many other countries where the farmers constitute a very small percentage of the population.** The Commission for Agriculture Costs and Prices [CACP] has a major responsibility in the matter. The CACP is required to monitor the movements in the terms of trade for agriculture sector and the fair sharing of the gains arising from the application of technology and public investment in agriculture between the farmers and the consumer.
5.12.2 The 25 commodities covered under the Minimum Support Price account for over 80% of the gross cropped area and 75% of the value of output. Some other commodities, which are not covered under the MSP, are included under the Market Intervention Scheme [MIS] discussed earlier.

5.12.3 The Govt. while fixing the level of the support price for a commodity keeps in view the various factors including (a) the cost of production (b) change in input prices (c) input-output parity (d) trend in market prices (e) demand and supply situation (f) inter-crop price parity (g) effect on industrial cost structure (h) effect on general price level (i) effect on cost of living index (j) international price situation (k) the parity between price paid and prices received by the farmers.

5.12.4 The cost of production is one of the main considerations in deciding the level of the MSP. However, it is not easy to decide the cost of production. The cost of production of the same crop varies between regions and between farmers of the same region. The CACP recommends the MSP on the basis of the weighted average cost of production in states giving consideration to the variability of the cost of production over the States, taking into account also the factors of production, paid as well as the imputed values of unpaid factors in fixed and variable cost of production. The risk factor and the marketing and post harvest expenses are however, not taken into account. The CACP could look into these aspects.

5.12.5 An important issue is the poor implementation of the MSP in all regions except Punjab, Haryana, Andhra Pradesh, to some extent UP and MP and consequently the market price often rule lower than the MSP. Further, except wheat and paddy, the MSP mechanism rarely benefits farmers of the remaining crops. **There is need for a much stronger protection of MSP in different regions of the country for all commodities.** The Eastern region needs special attention because of the widespread rural poverty in the region as also the fact that the region has considerable potential to improve productivity, if adequate care was taken regarding pricing, marketing, technology and credit support.

5.12.6 Another connected issue is the delay in issue of support price [MSP]. The announcement could influence the decision of the farmers in allocation of land and other
resources only if it is made well before the sowing season. While announcement for Rabi have been often well in time, the MSP for Kharif in the past had been delayed.

5.12.7 Not withstanding the above constraints, the MSP may have to be continued in the foreseeable future and its implementation should be improved. However, the strategies may have to change in view of the changed circumstances. We are not facing scarcity conditions and the economy is much more open than what it was earlier. The High Level Committee on Long Term Grain Policy 2002 (under the Chairmanship of Prof. Abhijit Sen has favoured the MSP around the national floor level prices with all India open ended operations. However, to protect the farmers from market risks, the above Committee suggested price and income insurance coupled with negotiable warehouse receipt system.. These developments may take time and hence the change in strategy may have to be gradual. The commodities, which are not covered under the MSP, market intervention on a selective basis also needs to be resorted to for ensuring that the prices realized by the farmers are stabilized. Price behaviour of sensitive commodities like onions, potatoes, tomatoes etc. needs to be closely watched particularly during the glut season for need based market intervention under MIS. However, the policies regarding monopoly procurement of cotton in Maharashtra, levy on rice mills etc. need to be reviewed.

5.12.8 The small and marginal farmers are more concerned about the cost of production and more particularly the cost of paid out inputs. Any strategies to minimize subsidies on inputs and compensating the farmers by allowing increase in prices would need to be examined very carefully as most of the marginal farmers in particular are likely to be net buyers of agriculture commodities. However, there is no doubt that input subsidies need a closer look and a much better focus.

5.12.9 The pricing policy has contributed towards achieving self-sufficiency in food-grains and also assisted in commercialisation and diversification of our agriculture. In spite of general criticism that populism and not economic consideration are responsible for various decisions, the Government have, to a large extend balanced sharing the gains of technology and public investment between the farmers and the consumers. However, as stated earlier, the MSP could not be effectively ensured across the country and the
prices in different parts of the country have often been lower than the MSP. Perhaps it could also be said that the price signals, research, extension and public policy together could have contributed more in improving the dryland agriculture and greater diversification and faster movement from low value agriculture to high

value agriculture in the country. It is also very important that the import tariffs on farm commodities produced in the resource poor regions (particularly dryland) like oilseeds are carefully monitored and maintained at levels to provide enough incentives to the dryland farmers.

**Box 5**

<table>
<thead>
<tr>
<th>Long-Term Grain Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The High Level Committee on Long Term Grain Policy—2002 under the Chairmanship of Prof. Abhijit Sen had examined the various aspects connected with the Minimum Support Price [MSP] and Price Support Operations. The Committee had observed as under:</td>
</tr>
<tr>
<td>“MSP policy was critical in India’s achievement of food grains self sufficiency but is now grossly distorted. Nonetheless we are convinced that MSP policy should continue, but with immediate correction. We recommend.</td>
</tr>
<tr>
<td>1. The Central Government should announce the MSP policy before the sowing season on recommendations of the CACP.</td>
</tr>
<tr>
<td>[a] The CACP should be made an empowered statutory body.</td>
</tr>
<tr>
<td>[b] In recommending MSPs, which should apply on Fair Average Quality [FAQ] grain, the CACP should go strictly on the basis of C2 cost of production (i.e., all costs including imputed costs of family labour, owned capital and rental on land) in more efficient regions.</td>
</tr>
<tr>
<td>[c] The CACP should also indicate its estimates of A2 + FL costs (i.e., costs actually paid plus imputed value of family value labour) for relatively high cost regions.</td>
</tr>
<tr>
<td>[d] The CACP should recommend only a single MSP for paddy.</td>
</tr>
<tr>
<td>[e] The MSP, set at a floor price on the recommendations of the CACP, should have a statutory status. In particular, the responsibilities of the Central Government and obligations of the State Governments should be defined clearly.</td>
</tr>
<tr>
<td>[f] All agencies, Central, State, Cooperative or Private, which are a part of public grain management, should be legally bound by the MSP policy.</td>
</tr>
<tr>
<td>[g] If the present situation continues, where some States impose excessive levies on MSP purchase, the Central Government may announce its MSP policy by declaring a procurement price inclusive of an uniform 4% allowance for such levies over the MSP.</td>
</tr>
<tr>
<td>2. Once the Government announces the MSP, it should underwrite open-ended purchase of FAQ grains to assure the growers an adequate return to their cost. It should be the responsibility of the Central Government to make the fiscal and banking provisions necessary to enforce MSP throughout the country”.</td>
</tr>
</tbody>
</table>
5.13.0 Other Issues

5.13.1 With the international agriculture commodity price scenario and forecasts generally indicating stable prices during the next three-four years, there is urgency to bring about improvement in the efficiency of production and marketing to ensure that our agriculture remains competitive. Inefficient post harvest operations, infrastructural constraints, too many intermediaries, little value addition and the regulatory rather than the developmental and promotional to the marketing are some of the factors, which have been coming in the way of efficient functioning of the markets for agricultural produce. Harvesting and post harvest operations are as important as the production process itself. Unfortunately, harvesting, threshing etc. are inefficiently done, which leads to considerable loss in value. For example, the losses to the farmer in rice crop for different post harvest operations have been estimated at harvesting (1 to 2%), stacking, bundling, storing (2 to 7%), farm level haulage (1 to 3%) and drying (1 to 5%). Then, there are the milling losses of about 2 to 3 %. Storage is another serious problem in our supply chain. A Planning Commission Study showed 6.8% loss due to storage, pests and rodents [5%] and moisture/birds etc. [1.8%]. According to the National Institute of Agriculture Marketing (2000) and the study of John Moore & others (1973) the average losses under wheat, maize and pulses were estimated at 7%, 10% and 9% respectively. The post harvest and storage losses for fruits and vegetables were huge and varied between 14% (Apples) and 70% (Papayas). The losses for Citrus (57.5%) Banana (50%), Cauliflower (49%), Tomato (27.5%), Onions (25.5%) and Potato (22.5%) were quite high. The situation of storage of the perishable commodities is very unsatisfactory both regarding adequacy as well as operational efficiency. The cold storage capacity is grossly inadequate. Further, the costs of creation of cold storage facility as well as the operational costs are much higher than similar facilities, say, in the USA. Poor transportation arrangements and handling are other areas of concern particularly for perishables like fruits and vegetables. Except in few cases, fruits and vegetables are often packed in gunny bags, some times vegetables are stashed on top of each other in the trucks etc., the handling is extremely poor with the transporter refusing to accept any responsibility for proper handling leading to deterioration in quality. Bullock carts, tractors, trolleys, trucks are generally used for transportation of agriculture produce from the farm gate.
Fruits/vegetables are often transported to long distance from farms to Markets in open trucks/trolleys etc. losing quality, weight, water and even quantity all to the detriment of the grower. The constraints [other than those at the Market] could be summed up as under:

- Inefficient harvesting and post harvest handling
- Lack of storage facilities at the farm level
- Problems of proper transportation from farm to mandi, huge costs and long time involved.
- Constraints in transportation from mandi - general lack of wagons, silos and sometimes even bagging materials.

5.13.2 The PRIs/ NGOs/ SHGs could play an important role in improving the awareness of the farmers about the post harvest losses some of which could be reduced by use of slightly different equipments or simple improvements in handling the produce. There is need for introducing post-harvest technology wing in every Krishi Vigyan Kendra (KVK).

5.13.3 Another problem is the large number of intermediaries in the marketing chain. There are often 6 to 7 and sometimes even 8 intermediaries before the produce reaches the consumers. Each intermediary adds margins. Costs are involved in intermediation, which can be minimized by improving efficiency, but not eliminated. It is however, important to reduce the large margins, which are added at each stage. These margins sometimes add up to 100% to 150% without significant value addition. According to available information from various studies, the producer gets about 25% to 30% of the consumer’s price in the case of wheat, maize and rice. However, the milk producers under the ‘Anand model’ get about 60% of the final price. In fruits and vegetables, the mark ups by the intermediaries touch about 60% of the costs while the same is reportedly about 6 to 8% in the USA. High-mark up means low returns to the farmers as a percentage of the retail price and secondly the consumer pays a high price. There is a need for tightening the supply chain and eliminate some of the intermediaries. This is important and needs all efforts for promotion. Normally 3-4 intermediaries between the producer and the consumer should be able to discharge all the functions. Farmer’s own organizations (cooperatives and others) for aggregation and dealing with the Mandi level
organization would help in eliminating at least two/three intermediaries. As price received by farmers in direct sales to the consumer is better [in absolute terms and also in proportion to the price paid by the consumer] and the consumer also pays a lower price, some of the States are experimenting with ‘Farmers’ Markets’ Apni Mandi or ‘Rythu Bazaars’ for fruits and vegetables etc. These experiments and replications need to be encouraged Contract Farming, ITC’s e-choupal, SAFAL etc. are initiatives to improve the supply chain.

Box - 6

National Dairy Development Board (NDDB)

An Institution of National Importance

Due to very wide dispersal of producing and consuming units of milk, the unorganized sector continues to dominate the milk marketing in India. However, the market structure for milk is constantly changing. The organized sector now handles above 20% of the milk output in the country. The cooperative sector accounts for nearly 50% of this. There are over 1.10 lakh milk producers cooperatives federated into district milk unions and State Dairy Federations, which have organic links with the Mother Dairy at the national level. It is heartening to note that the milk producers in the Anand Model of milk production get net of intermediation, about 60% of the final price. In other basic foods, the returns are as low as 30% of the final price. NDDB supports the development of dairy cooperatives by providing them financial assistance and technical expertise. Over the years, brands in milk products created by cooperatives have become synonymous with quality and value. Brands like Amul (GCMMF), Vijaya (AP), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) and Gokul (Kolhapur) are among those that have earned customer confidence. The Dairy Cooperative Network i) includes 170 milk unions ii) operates in over 338 districts iii) covers nearly 1,08574 village level societies iv) is owned by nearly 12 million farmer members.

Milk Production
- India's milk production increased from 21.2 million MT in 1968 to 88.1 million MT in 2003-04.
- Per capita availability of milk presently is 231 grams per day, up from 112 grams per day in 1968-69.
- India's 3.8 percent annual growth of milk production surpasses the 2 per cent growth in population; the net increase in availability is around 2 per cent per year.

Marketing
- In 2003-04, average daily cooperative milk marketing stood at 148.75 lakh litres; annual growth has averaged about 4.2 per cent compounded over the last five years.
- Dairy Cooperatives now market milk in about 200 cities including metros and some 550 smaller towns.
- During the last decade, the daily milk supply per 1,000 urban consumers has increased from 17.5 to 52.0 litres.

Innovation
- Bulk vending - saving money.
- Milk travels as far as 2,200 kilometers to deficit areas, carried by innovative rail and road milk tankers.
- Ninety-five percent of dairy equipment is produced in India, saving valuable foreign exchange.

Macro Impact
- The annual value of India's milk production amounts to about Rs. 880 billion.
- Dairy cooperatives generate employment opportunities for some 12 million farm families.

In sum, NDDB is a unique example of an organisational innovation with a focus on human resource and co-operative development in India. By placing technology and professional management in the hands of the village societies it has helped to raise the standard of living of millions of poor people. These processes prove that true development is the development of the people and this could be achieved through putting the instruments of development in the hands of the people.
5.13.4 Value addition is another issue. In spite of a large chain of intermediaries the value addition is almost insignificant. The jute bag in which the farmer had packed the potatoes is most likely to reach the retailer and sometimes the buyer, who would spend considerable time in selecting the potatoes while bargaining about the price with the shopkeeper. There would be considerable mark up but virtually no value addition. The worst situation is in the case of vegetables/fruit. Since only about 2% of the fruits/vegetables are processed, there is also very little backward linkages from the processors. However, of late the consumers have started showing their preference for buying processed/semi processed/convenient foods, which is likely to give a boost to backward linkages.

5.13.5 With the implementation of the Horticulture Mission, the production of fruits and vegetables is likely to register substantial increase. The growth of processing industries will be essential to bring better returns to the farmers, particularly, in the matter of the prices of non-tables fruits. The Government may consider encouraging setting up processing zones in rural areas for processing of fruits/vegetables for domestic market on the pattern of processing zones for exports. The possibilities of extending Income-Tax and other benefits/concessions to these units for 5 years on the lines of concessions available for the export oriented units may be considered. The packaging costs of the food processing industry are rather high. It is important to develop cost effective packaging options for the development of the processing of fruits and vegetables.

5.13.6 The fresh fruits and vegetables do have large export potential particularly to the Middle East and Western countries with large Indian population. However, poor infrastructure [storage, transportation, cargo space/rates, facilities at the air/sea ports, etc.] lack of adequate institutional support [credit, market development] and insufficient research efforts are constraints in realizing the potential

5.14.0 Marketing through Pre-Production Agreed Arrangement
5.14.1 In the case of certain vegetable/fruit crops and also specialty crops a new agribusiness model of pre-production agreements between the farmers and corporate houses/processing companies/others are being practiced. These arrangements are being loosely referred to as contract farming though in may of these cases there is no formal
contracts between the farmers and the prospective buyers. Attempts are being increasingly made for building up linkages between ‘farm and the market’. Since the agro-based and food industry requires timely and adequate inputs of the needed quality, several of these business houses have attempted to establish convenient system/models for the purpose. Some of these attempts in certain pockets including contract farming arrangements tried in India are the tomato crop in Punjab [Hindustan liver Ltd & Pepsi] mustard crop in Punjab [Markfed- a cooperative organisation], potatoes [Mc Donalds], wheat in Madhya Pradesh [Rallis & Hindustan Liver Ltd], maize [Venkateshwara Hatcheries Ltd], basmati rice in Punjab, western UP [Pepsi] cotton in Combatore, Tamil Nadu [Appachi Cotton Company (ACC)], Barley in Belgaum, Karnataka [Ugar Sugar Works Ltd] etc.

5.14.2 In several of these cases, there have been gains in productivity after adoption of the above system as the farmers had the benefit of a higher degree of managerial services, technical extension, quality seeds/plants, fertilizers and credit etc. the models have usually been successful in case of crops with niche markets or export potential. It is not clear whether these models would work in case of other crops as well. While it appears almost certain that the productivity could go up initially but problems do start emerging thereafter. In Punjab, where Pepsi & HLL tried these arrangements for tomato, potato and chilli some farmers reported problems like poor technical assistance, delayed payments, manipulations of norms etc by the purchaser. It was reported that some farmers had to wait at the factory gate for a day or so leading to weight loss of tomatoes with the result the firm received more concentrated produce at the same price.

5.14.3 The crucial aspects of these arrangements are those relating to price fixation and dispute resolution. The arrangement which does not fix the price, does not shift the market risk from the producer to the buyer; where the price is specified in the agreement and the prevailing price at the point of marketing is higher, the grower would try to avoid selling under the agreement and would sell in the market. If however, the price is lower, the buyer would try to buy in the open market rather than from the farmers with whom there was the agreement. So, there is an unusual situation, if there is no fixed price, both the grower and the buyer are exposed to market risks and if there is a fixed price in the agreement, there are complications in enforcing it. In a ‘niche’ market or a specialized product the situation is different. In some cases the processor/trader [buyer] might have
already entered into a sale contract or have an export order where the specialized product is needed. Here the market price has no relevance and for both the grower and buyer, it is ‘win-win’ situation to continue working for each other. In the case of other commodities, if the idea is long-term relationship, both the parties may keep temptations to deviate in abeyance. However, such situations where one of the parties is unwilling to honour cannot be ruled out completely. Enforceability of the agreements in the court of law is another issue. It is extremely doubtful whether an individual farmer could take a company to court. For the company also, going to the court against one farmer may not be worthwhile, as the damages awarded may not justify the cost. Under the circumstances, the parties may prefer to have only an understanding with each other. While it is a fact that the purchasers are financially stronger and farmers have weak bargaining strength, often the farmers have local clout to make things difficult for the purchasers. The companies sometimes use a system of reward and punishment to ensure that a long-term relationship develops. Instances of boycotting the entire village [where some farmers ditch the purchaser] or denying certain other benefits to the defaulting farmers and rewarding/honouring them in public functions where they continue supplying produce are not uncommon.

5.14.4 As long as the bargaining power between the two parties is unequal, the models would remain fragile. One way perhaps could be that the producers form groups or cooperatives, which in turn may deal with the purchaser. This would empower the producers and the group/cooperative could become a better guardian of their interests and the arrangements would have better strengths as regard enforceability. Ultimately, these models have to sustain on the momentum of each group’s self interest, each party is closely hooked to each other and if any one link breaks, it is not good for the model as a whole. One has also to remember that the possibilities exist that the purchaser will in due course reduce the prices and other benefits offered to the growers. The important issue is whether the grower is better off as compared to the earlier farming situation or not. If so, this is worthwhile. If the grower is too much worried about the larger share going to the purchaser, it will not help. The attempts however, should be to improve the bargaining power of the producers as mentioned in the earlier paragraph.
5.14.5 It may also be useful to look at the conventional ‘Contract Farming’ model. The contract farming is defined as a system for the production and supply of agricultural/ horticulture produce under forward contracts between producers and buyers. The essence of such an arrangement is the commitment of the producer/seller to provide an agricultural commodity of a certain type at a time and a price and in quality required by a known and committed buyer. The contract farming arrangements could contribute to a) facilitating emergence and growth of processing/trading units b) export of produce from the small farmers c) encouraging high quality production d) enable producers/purchasers to realize economies of scale e) allocation of risks between the producer and the purchaser. While the farmer bears the production related risks, the purchaser bears the market risks f) better credit linkage g) better managerial focus h) better input availability. The contract farming agreements could be broadly classified into three, not mutually exclusive categories: a) market-speciation b) resource providing and c) production management.

5.14.6 There are only limited experiments in contract farming in India excepting in sugarcane cultivation and some niche products, however, the Government have circulated ‘Contract Farming Agreement and its Model Specifications’ among the States. As regards the dispute settlement, the suggestion is to have a body representing the sponsor, farmers and other interested like the Market Committee as the Forum, which could act as arbitrator. The suggestion is that the APMC Act when revised may have an appropriate provision for compulsory registration of all contract farming agreements and the procedure for settlement of disputes arising there from. While providing for a ‘Forum’ for settlement of disputes is desirable, compulsory registration may perhaps not be the most appropriate strategy for contract farming. Another suggestion made is a clause to ensure that the sponsor/purchaser shall not have any right whatsoever over the title or possession of producers land. This is generally welcome to ensure that apprehensions of the producers losing their land are laid to rest.

5.14.7 One also needs to take note of some criticism of contract farming. The first is that the purchaser is quite likely to be interested in short-term gains/profit maximization and may, therefore, suggest practices, which in the long run are not good for the land/other assets of the producer. The purchaser has the option of ‘moving on’ after a few years of
'exploitation' of an area. The second issue relates to possible shifts in favour of export-oriented crops at the cost of crops providing basic food. The third is the preference for the larger producers in choice of partners by the purchaser, ignoring the small landowners. Such practices over a long time could encourage the small farmers to enter into sub-agreements with the larger farmers thereby adding a tier between the grower and buyer or to sell/lease out their land and work as labourers.

5.14.8 It is early to form any clear judgment about contract farming. However, there is no denial that the model offers possibilities of scale economies and also helps in building linkages in the value chain, linking producers directly with the processor/trader. With changing consumption pattern and increasing demand for processed/specialty foods both by local population and exports, these arrangements could multiply in future. The need for the State is to play a proactive role in these developments and not be satisfied by only regulating these developments. **The urgency is to work out a code of conduct for contract farming which is farmer centric to ensure that the interests of the farmers particularly the small farmers are not compromised. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/cooperatives to deal with the buyer on their behalf, one has to be rather cautious about the contract farming system in India.**

5.15.0 Recent Initiatives in Developing Alternate Markets

**ITC’s E-Choupal**

5.15.1 ITC’s E-Choupal provides the farmer an alternate route to the Mandi, without going through the regulated market or the compulsion of selling to the corporate at a predetermined price [under contract farming], as also access to good quality input. It is already covering over 29,000 villages, about 3.1 million farmers through 5,050 Choupals. The ITC has an ambitious plan of covering 10 million farmers and 1 lakh villages with a business turnover of over Rs. 10,000 crore by 2010. The Choupal provides live quotes of not only ITC’s own prices but also prevailing prices in the Mandis across the State. The internet kiosks, [initial capital cost funded by ITC] but operated and managed by a local village person [Sanchalak] also provide information regarding weather, farm practices, risk management, prices of inputs, the price quotes for certain agriculture commodities and an offer to purchase his produce without going through the regulated markets. The
model appears to be an improvement over the contract farming models in as much as the prices are basically determined by the market system of demand and supply. For the ITC, the benefit comes from lower cost of procurement and quality raw material. The ITC also gets a fee from various companies [37 as reported] that sell their products through the e-choupal. These companies display their products on the site, offer special prices and also train the farmers in the usage of their products. The ITC gets a commission on the sales. The Sanchalak gets 5% on all the sales through his kiosk.

5.15.2 In marketing his produce through the e-choupal, the farmer also saves the labour charges, middlemen commission, handling charges and perhaps also in certain unauthorized charges which he may have to pay in the regulated markets. Further, there are no doubts about the weighment [electronic weighing scales are used] and the payment is prompt. The farmers appear to be quite happy with this marketing option now available to them. The ITC purchased 60,000 tons of crop through e-choupal in 2001-02. In 2003-04 it was 2,10,000 tons and in four months of 2004-05, the crop purchased was 1,80,000 tons. Under the arrangements, the farmers could either bring the produce to the ITC warehouse/factory and get reimbursed for the transportation cost, or could hand over at one of the collection centers or Sanchalaks. The crops covered are soybeans, wheat, coffee and shrimp [in Andhra Pradesh under Aqua-e-choupal]. The company has plans to expand into other crops like spices. The company saves on procurement costs and gets the desired quality.

5.15.3 The States covered under the above project either amended the APMC Act or allowed exemptions to enable the ITC to purchase the agricultural produce outside APMC. The experiment has provided the farmer an alternative, a business model for the ITC to shorten the supply chain and a delivery system to the companies to reach the rural areas. It is really a supply chain innovation, which has tremendous potential. It is reasonable to expect other companies to learn, innovate/change as per their requirements and try similar models for reaching the rural areas in future.

5.16.0 The SAFAL System of the NDDB

5.16.1 The National Dairy Development Board [NDDB] has introduced a model for direct sale of vegetables/fruits under SAFAL in Karnataka. Under this system the farmer
associations cover the farmers in a cluster of villages and serve as collection and grading centers. The produce so aggregated and graded is properly packed in plastic trays and supplied at the central auction centre. The Auction Centre operates in a most transparent manner, where premium is on quality. The entire auction system is computerized. In Bangalore, an extremely well laid out market yard with excellent facilities including electronic auction platforms have been developed by the NDDB. The NDDB has also developed a modern retail structure with prices linked to the auction prices, to ensure competition and transparency among retailers. Also in Delhi, there are a very large number of retail outlets for fruits/vegetables etc. under SAFAL model. The APMC Act was amended in SAFAL areas to enable the cooperative sector to take initiative in setting up such producer- oriented markets. The need is however, to develop low cost models for large-scale replication.

5.16.2 These initiatives which in farmers a choice need to be supported and replicated. These could bring competition in agricultural produce marketing and benefit the farmers.

5.17.0 Financial impediments - Negotiable warehouse Receipt system
5.17.1 According to the Report of the Inter-Ministerial Task Force on Agriculture Marketing Reform, micro level studies reveal that the small farm holdings contribute nearly 54% of the marketable surplus and distress sale by these small farmers account for about 50% of the marketable surplus. The farmers do sell their produce to square off their debts soon after harvesting. It is normal for a farmer to get 10-15% discounted price for spot payment for his produce. The solution partly lies in providing them access to safe and scientific storage and an easy farmer friendly pledge/marketing finance system. The total pledge loans given by the banks to the farmers are not much. The commercial banks do not report this as the present MIS does not provide for it, separately and the total pledge loan extended by the cooperatives to their members is negligible though cooperative system provided well over Rs. 25,000 crore as crop loan during, 2002-03. Linking of credit with marketing could improve the quality and quantum of credit flow. The National Bank for Agriculture & Rural Development (NABARD) could play a role in these developments.

5.17.2 While development of rural godowns would help the farmers in storage of their produce and get a better price, an important area for improving marketing [as we have
moved from scarcity to surplus agricultural production] and bringing liquidity in the
system is the encouragement of instrument based or secondary markets by development
of negotiable warehouse receipt system. The banks are presently reluctant to advance
loans against the warehousing receipts of Central Warehousing Corporation (CWC) when
the holder thereof is not the person in whose favour the receipt was originally issued.
Transferability of the warehouse receipt is limited by the fact that the original owner
cannot transfer it to another person without clearing the banks due. While the State
Warehouse Act provide that a warehouse receipt is transferable by endorsement and shall
entitle the holder to receive the goods specified therein on same terms and condition on
which the person who originally deposited the goods, would have been entitled to
receive, due to the above shortcoming the usage of the warehouse receipts as a financial
instrument has not picked up.

5.17.3 The need is to establish a more secure system. If the bankers on the basis of
prescribed norms could accredit the warehouses and the warehouse could provide
certification about the quality and quantity of goods, the receipts would have much more
negotiability. However, this presupposes availability of acceptable grading norms &
standards of the goods kept in the warehouse (which may be acceptable across the
country) and the reliability of the certification system. It is hoped that in due course, with
the development of appropriate legal framework, these receipts could be maintained as
dematerialized securities in the securities depositories and used for settlement etc.

5.17.4 However, the crucial issues are evolving of commercially acceptable quality
standards in respect of different commodities, the accrediting agency working efficiently
to improve confidence, having arrangements for gathering appropriate market
intelligence about pricing and analyzing it for linkage with quality/standards of the
commodities accepted for storage.
5.17.5 The banking system also needs to develop the credit business potential of financing projects for improving/modernization of markets, storage including cold storage facilities, rural based transport operators etc. NABARD could take the lead in assessing the potential and developing model schemes etc. The ICICIs strategy to look at the entire value chain of a product for exposure could help in reducing risks and improve cash flow trappings both of which are important for a banking institution. The public sector banks also need to innovate and bring some aggressiveness in agriculture credit if they want to take this business away from the informal agencies particularly the traders and commission agents. In this context, it may be appropriate to recall the observation of the Advisory Committee on Flow of Credit to Agriculture under the Chairmanship of Shri V.S. Vyas [RBI-2004] on the potential of credit for marketing, ‘In the context of commercialization of agriculture, marketing of agriculture produce has emerged as a challenging area. It requires smooth channels for transport of produce, physical infrastructure such as warehousing, market complex and credit support to producers. The credit needs for the development of market infrastructure for agriculture sector will be enhanced in the context of commercialization and globalization’.

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**Box-7**


a. To promote development of a national warehousing receipt system for agricultural commodities, as a part of its policy of ensuring that Indian agriculture is globally competitive while enhancing rural welfare and food security.

b. To declare CWC and SWC as Accreditation Agencies for certified warehouses for warehouse receipt.

c. Lay down various standards, specifications for certified warehouses, so also rules and regulations for managing them including fidelity aspects.

d. All licensed warehouses to confirm to the minimum professional standards in order to provide confidence to lenders and public in general. They will be encouraged to develop their own code of conduct for self-regulation.

e. Existing warehousing laws may be suitably amended. A formal regulatory authority may be constituted to enforce standards and protect the interest of those holding warehouse receipt against negligence, malpractices or fraud. The regulatory authority has to be structured to ensure its complete autonomy and freedom form political interferences.

f. To produce latest information system for warehouse receipt to help in identifying ownership of produce, transferors of lien, holder of lien, hypothecation of receipt for loan and trading of the produce in the context of spot delivery.

g. On the negotiability of the instrument i.e., warehouse receipt there may be incidence of various taxes and levies, which should be exempted for five years to begin with, to make these receipts popular.

h. The negotiability of warehouse receipts require amendments to various Acts of Central and State Governments which may have to be looked into.
5.18.0 Commodity Forward Trading

5.18.1 The Forward Market Commission regulates forward trading under the Forward Contracts [Regulation] Act [FCA], 1952 with the main objective of guarding against unhealthy speculation in commodities. Forward or futures trading is done in the recognized exchanges registered under the FCA. There are both single and multi commodity exchanges. While India has a long history of futures markets in agricultural commodities, during the mid sixties to 2002 forward trading was banned for most of the commodities. The situation was reviewed from time to time by experts and the Kushro Committee in early eighties and later the Kabra Committee [1994] recommended reintroduction of futures trading in several agricultural commodities. The Govt. of India have permitted futures trading in many commodities now, including wheat, gram, coarse cereals, kharif pulses, peas, rice, paddy, khandasari sugar, sugar, gur, coffee, potato, turmeric, cotton, raw jute, major edible oils, oilseeds and their cakes, rice barn, chillies, cloves, ginger, rubber, pepper, silk etc. At present 3 national level exchanges and 21 regional exchanges are operating. The experts have estimated potential of futures trading of about Rs. 55 lakh crore annually.

5.18.2 Forward and futures markets enable sellers and buyers to reduce uncertainty and the consequent risk through price discovery ahead of actual production. By aligning their functioning with spot markets, the forward/futures markets can work as a tool to handle complex situations arising from good and bad harvest through stabilizing supplies and prices. The futures market would give signals to the producers to increase/decrease the area under a particular crop. The processors could hedge price risks and avoid storing of goods. An efficient futures market is essential for development of processing industries. The preconditions for the development of futures market are (a) Free commodity market where price is determined by market forces without too much government interference (b) sufficient fluctuations in prices (c) presence of active players in the market (d) large supply and demand of the commodity (e) standardization of produce to be traded (f) proper storage arrangements and a free movement of commodities.
5.18.3 The Inter-Ministerial Task Force on Agriculture Marketing had among others suggested (a) making the Forward Marketing Commission [FMC] an autonomous body like SEBI and (b) amending FMC Act to enable options trading. These suggestion need to be favourably considered. Further the trading procedures could be improved by introducing time stamping obligation and the monitoring of prices by the Exchange officials on a minute–to-minute basis. These prices also need to be disseminated widely with the help of IT. The length of the trading time should also not be very long which adversely affects liquidity and makes close monitoring of the functioning difficult.

5.18.4 A notable recent development has been the establishment of NCDEX [National Commodities and Derivative Exchange] jointly by NABARD, National Stock Exchange, ICICI Bank and LIC. Later, IFFCO, CRISIL, PNB and Canara Bank have also joined it. It is a national level commodity exchange, set up on modern lines on the pattern of NSE where management and ownership is completely different from the trading members. It is now the largest exchange in Asia after Japan and China. Trading is on line through nearly 6000 terminals covering 33 agriculture commodities. Over 430 cities and towns are covered, in December 2004, it reported average daily volume of Rs. 1619 crore and has about 55% share among all commodity exchanges working in India. The NCDEX has over 50 warehouses accredited and more are likely to be accredited. It is learnt that the NCMSL [an off-shoot of NCDEX] is proposing to have 1,000 warehouses across the country by 2007.

5.19.0 Use of information Technology (IT)

5.19.1 IT involves the electronic processing, storing and communication of information. Anything, which could be represented in digital form, is covered by the term information. Use of IT in agriculture marketing is becoming increasingly indispensable. Encouragement needs to be provided to generate and host useful portals, websites database information packages and other software on agriculture marketing. The farmers would increasingly require more and more information about demand, prices, availability of inputs, quality specification, market and transportation charges, arrivals in market, international prices, forecasts of weather, prices and production, rules and regulation at the destination market, legal provision regarding storage, transportation,
labeling, tracing the origin, phyto-sanitary requirements, research findings etc. A subsistence farmer or one who produces low value output for rural periodic market does not need information on these aspects in such details and coverage. High value, market led production would rest on these details. Benefits of off-season and pre-season or end season production, peak demand and high prices period in domestic and international markets would be important details for the crop and variety to be cultivated by modern farmers. Setting up of information kiosks in the markets should be encouraged to enable the farmers to exploit the opportunities being provided by the information revolution.

5.19.2 Agricultural produce marketing requires connectivity between the markets/exporters/growers/traders/industries/consumers through a network with national and international linkages. There is need of such network through which day-to-day commodity arrivals, prevailing rates, export related information could be available.

5.19.3 For penetration of Information Technology at the grass root level i.e., the farmers, the APMC staff, the extension personnel etc. have to be computer literate. Massive programme for computer literacy may have to be undertaken.

5.19.4 An important barrier to realizing the economic benefits of IT is the initial up-front cost of investing in new infrastructure – both hardware and software, the availability of electric power and training. The initial investment cost is coming down and the ITC’s e-choupal business model has shown that the initial cost could be recovered in as short a period as 18 months. While it may not be so in most cases and hence State support may be needed. As regards availability of assured power, battery back ups are partial solution but solar technologies appear to be more promising. Again, ITC’s e-choupal has solar power backup and VSAT connectivity. Training of rural kiosk operators and other field personnel is important and would be an on-going process.

5.19.5 Some of the better known IT initiatives in rural areas are Gyandoot in Dhar district of MP which provided a range of e-governance related information, ITC’s e-choupal, TARA haat operating mainly in Bundelkhand [UP] and in Punjab with a mix of e-governance services and market price information etc. and the NDDB- Karnataka Govt’s SAFAL project which has a completely IT based marketing set up. The above experiments and many other similar initiatives are indicative that there is a potential of
using IT in marketing of agriculture produce or other aspects relating to agriculture and the perceived difficulties of high initial cost, lack of assured supply of electricity or the non-availability of trained manpower etc. can be overcome with imagination and a strong development orientation. The Village Knowledge Centres under the Programme Every Village a Knowledge Centre could impart trade and quality literacy among farm men and women.

5.20.0 Concluding Remarks
5.20.1 The Mid-term Appraisal of the Xth Plan has observed under the Box “The Way Forward” as under
‘Change agriculture marketing laws of the States and facilitate contract farming to help develop the marketing links that are necessary for raising the efficiency of agriculture. Link Central assistance to the initiation of market reforms in order to bring about changes in the Agriculture Produce Marketing Committee (APMC) Acts. However, since transaction costs and contract enforcement can work against small farmers, this must be accompanied by steps to empower the cooperatives/Panchayats to negotiate on behalf of such farmers.’

5.21.0 Summary of Recommendations
5.21.1.0 Legal Issues
5.21.1.1 The State Agriculture Produce Marketing Acts need to be amended to provide for among others, encouraging the private sector or cooperatives to establish markets, develop marketing infrastructure and supporting services, collect charges and allowing marketing without the necessity of going through APMC/licensed traders. Further, the market fee and other charges needs to be rationalized. While the Government of India is attaching considerable importance to amendments of the APMC Act and have also circulated a draft of the amended APMC Act, the response from the some of the States is not adequate. [Para 5.9.5 & 5.9.6]

5.21.1.2 There is an urgent need to undertake a review of the Essential Commodities Act and other legal instruments covering marketing, storing and processing of agriculture produce; some of these Acts and Orders appear to have outlived their utility. [Box-1]
5.21.1.3 The complex tax structure and multiplicity of State level taxes distort the process of trade and marketing. Inter-State and Center-State harmonization of tax law and their administrative system could help in simplification of tax regime which in term would facilitate internal trade. [Box – 3]

5.21.2.0 Markets

5.21.2.1 The coverage of regulated agriculture markets needs improvement. On All India basis, the average coverage of a regulated market is 459 sq. kms. Some of the States where the coverage is below the all India average are: Assam [2257 sq. kms], H.P. [1600 sq. kms], Orissa [1053 sq. kms], Rajasthan [830 sq. kms] and MP including Chattisgarh [719 sq. kms]. The thin spread of regulated markets in areas where road connectivity is also not good makes it difficult for the farmers to reach the market. In the Karnataka Study of 3408 farmers, nearly 22.15% indicated distance as a reason for not selling their produce at the regulated markets. [Para 5.9.1, Para 5.7.1 & Para 5.8.2]

5.21.2.2 There is a need for focused attention on improving the rural periodic markets, which are the first contact point for the farmers. [Para 5.9.1]

5.21.2.3 The infrastructure facilities at most of the regulated markets are inadequate. There is need for considerable improvement particularly for cleaning/grading/drying/storing of the produce, installation of electronic weighing machines, availability of clean drinking water and other amenities for the farmers. [Para 5.9.1]

5.21.3.0 Marketing

5.21.3.1 Auction systems at the regulated markets need to be more transparent so as to avoid any possibility of manipulation of prices by the traders and build the confidence of the farmers. [Para 5.8.1]

5.21.3.2 Professionalisation of the existing regulated markets and restoration of elected boards be given priority. [Box –2]

5.21.3.3 The behaviour/attitude of the Hamals/coolies/weighing men is a source of irritation to the farmers for whom the markets have been developed. Many farmers complain of long delay [necessitating overnight stay] in the markets. [Para 5.8.1]
5.21.3.4 The role of the APMCs/ SAMBs should change from regulatory focus to promotion of grading, branding, packaging and the development of distant and international markets for the local products. [Para 5.9.8]

5.21.3.5 Restructured Land Use Boards supported by a team of experts at the State level should give pro-active advice to the farmers based on meteorological, marketing and managerial information in the matters regarding the choice of crops/varieties/timing etc. Modern high value agriculture would involve greater risks and the farmer would benefit from information based advice rather than scattered information/hearsay/advice by people without strong technical support. [Para 5.10.1]

5.21.3.6 Commodity based farmer’s organizations may be established. These organizations could play an important role in developing market orientation among the farmers and could also articulate farmer’s issues on commodity basis. The DMI in the Agriculture Ministry could take a lead in this matter and facilitate establishment and growth of such farmer’s organizations. [Para 5.10.2]

5.21.3.7 Initiatives, which provide farmer a choice like the ITC’s e-Choupal or NDDB led SAFAL, should be supported and replicated. [Para 5.16.2]

5.21.3.7 Product quality is the key to better prices. Training of farmers in maintenance of quality standards/specification should receive greater attention. The extension agencies/NGOs/PRIs could play a role in this knowledge dissemination. [Para 5.10.1]

5.21.4.0 Post Harvest Operations

5.21.4.1 There is need to improve post harvest operations and handling of produce. The losses in harvesting, threshing, farm storage, packing, transportation from farm to Mandi are quite substantial. These need to be controlled and eliminated. The extension staff/PRIs could play an important role in educating the farmers in better post-harvest practices. There is a need for introducing a post harvest technology wing in every Krishi Vigyan Kendra [KVK]. [Para 5.13.1 & 5.13.2]

5.21.4.2 A strong emphasis on grading is necessary. There is need for fixing quality standards for all agricultural commodities and a need for introducing compulsory grading before sale in the regulated markets in a phased manner. [Para 5.9.2]
5.21.5.0 Supply Chain
5.21.5.1 There are too many intermediaries in the supply chain. Their margins as compared to the value addition provided are unreasonably large. Tightening of the supply chain is called for. The role of the cooperatives in marketing needs to be expanded. To begin with, they could aggregate the produce, improve post harvest handling and provide much needed pledge finance to the farmers. [Para 5.13.3]

(iii) The direct marketing by farmers needs to be encouraged by providing them opportunities for direct sale to consumers in the regulated markets, as also by developing special markets/bazaars for the purpose. [Para 5.13.3]

5.21.6.0 Government Interventions
5.21.6.1 Delay in issue of the Minimum Support Price (MSP) particularly in respect of Kharif crops needs to be avoided. [Para 5.12.6]

5.21.6.2 Implementation of MSP across the regions needs improvement. Except Punjab, Haryana, U.P and Andhra Pradesh to some extent, the prices of agricultural commodities covered under MSP in other States often rule below the MSP in absence of any government intervention. Not withstanding the weaknesses, the MSP may have to be continued in the foreseeable future and its implementation improved. The eastern region needs special attention because of the widespread poverty as also the potential to improve productivity provided the farmers get better prices for their produce. [Para 5.12.5 & 5.12.7]

5.21.6.3 The small and marginal farmers are more concerned about the paid out prices of the purchased inputs. Any decision to reduce subsidies on inputs and allowing compensatory increase in output prices may have to be carefully examined and analysed, as most marginal farmers are net buyer of food grains etc. [Para 5.12.8]

5.21.6.4 The price behaviour of sensitive commodities like milk, potatoes, onions, tomatoes, etc. needs to be closely watched particularly during the glut and off-season for need-based intervention under ‘Market Intervention’ Scheme of the Government of India. [Para 5.12.7]
5.21.6.5 The import tariffs on farm products like oil seeds produced in resource poor particularly dryland areas need to be carefully monitored and maintained at level to provide sufficient incentives to the dryland farmers. [Para 5.12.9]

5.21.6.6 In view of the likely expansion of horticulture production under the Horticulture Mission, the Government may consider promoting processing zones in the rural areas by providing them the Income-Tax and other benefits/concessions on the lines of those available to the Units in the export oriented zones. Further, there is also the need to reduce the high packaging costs and development of cost effective packaging/marketing options. [Para 5.13.5]

5.21.7.0 Financial Aspects
5.21.7.1 There is a need for substantial increase in marketing credit. Credit availability for eliminating distress sales is important. Pledge loans to farmers should be liberalized and encouraged. NABARD could play its promotional and developmental role in improving institutional credit flow for developing infrastructural facilities in the markets. [Para 5.17.1 & 17 5.17.5]

5.21.7.2 There is a need to encourage instrument based or secondary markets of agriculture produce. The constraints in improving the negotiability of the warehouse receipts need to be removed. [Paras 5.17.2 & 5.17.3]

5.21.7.3 Futures trading in commodities is important. It enables sellers and buyers to reduce uncertainty and consequent risks through price discovery and hedging well ahead of actual production. It needs to be encouraged. For better supervision and regulation a SEBI like autonomous body may be created. Option trading also needs to be permitted. [Para 5.18.3]

5.21.8.0 Contract Farming
5.21.8.1 The Government may work out a farmer centric ‘Code of Conduct’ for contract farming arrangements, which should form the basis of all contract farming agreements and also encourage development of farmer’s groups/organisations to negotiate with the purchasers and take care of the interests of the small farmers. Till such time a cautious approach is needed towards contract farming in India. [Para 5.14.8]
5.21.8.2 While prompt settlement of disputes is crucial to Contract Farming arrangements, compulsory registration of Contract Farming agreements with the APMC may not be insisted upon. [Para 5.14.6]

5.21.9.0. Others

5.21.9.1 Indian agriculture must move from low value agriculture to high value agriculture. There is an urgent need to provide extensive training to the farmers and also creation of quality testing laboratories and other infrastructure for the purpose in rural areas. The concept of ‘Farm-Schools’ for lateral training of the farmers needs to be pursued. [Para 5.10.1]

5.21.9.2 The permit system for issue of ‘national permit’ to the transport operators needs to be reviewed. The harassment to which the truck operators are subjected to [insistence on showing the draft paid for obtaining the national permit/or demanding payment at border check posts] need to be curbed. [Box – 3]

5.21.10.0 Use of IT

5.21.10.1 Encouragement needs to be provided to generate and host useful portals, websites, database information packages and other software on agricultural marketing- Organizations including corporates may be supported in their IT based ventures to improve agriculture and agricultural marketing. [Para 5.19.1]

5.21.10.2 Setting up of information kiosks in the markets may be encouraged to enable the farmers to exploit the opportunities being provided by the information revolution. [Para 5.19.1]

Acknowledgement

The National Commission on Farmers acknowledges the cooperation extended by the Department of Agriculture and the State Agricultural Marketing Boards of Madhya Pradesh and Karnataka in organizing consultations with the officers of the Government of India, State Governments, Banks, NGO’s, Industry and farmers on the subject at Bhopal and Bangalore respectively. The sharing of knowledge and experiences by the participants in the above meetings has been of great help in preparation of their note.
## Appendix I

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the State</th>
<th>Market fee</th>
<th>License fee Rs. per annum</th>
<th>Market charges Rs. per unit</th>
<th>Commissi on Charges</th>
<th>Octro i</th>
<th>Sales Tax</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Andhra Pradesh</td>
<td>All commodities -1% (Except fish where it is 0.50%)</td>
<td>Traders- ‘A’—125 ‘B’—75 ‘C’—50 ‘D’—25</td>
<td>1. Weighing 0.50 to 0.75 2. Unloading 0.50 to 0.75 3. Brokers—nil 4. Hamal—0.50 to 0.75 5. Cleaning 0.75 to 1.00 6. Loading 0.50 to 0.75</td>
<td>F &amp; V-4% Others- 1 to 2%</td>
<td>nil</td>
<td>All commodities (except Maize, Jowar, Ragi, Bajra, coarse grains) 4%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Assam</td>
<td>All Commodities —1%</td>
<td>Traders – Rs.10</td>
<td>nil</td>
<td>nil</td>
<td>All commodities (except rice, wheat, pulm, f&amp;v, fish, gur, atta, maida etc.)—4 to 8%</td>
<td>* Not collected as markets are not in operation</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Delhi</td>
<td>F &amp; V—1% Food grains—1%</td>
<td>Traders – ‘A’—100 ‘B’—100 ‘C’—100 ‘D’—100 ‘E’—50</td>
<td>1. Weighing —0.70/bag 2. Unloading —0.70/bag 3. Brokers—nil 4. Hamal—nil 5. Cleaning —0.40/bag</td>
<td>F &amp; V –6% Food Grains &amp; Pulses- 2.5% Chillies- 2.5%</td>
<td>nil</td>
<td>F &amp; V- nil Oilseeds- 3% Methi-7%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gujarat</td>
<td>All commodities -0.5%</td>
<td>1. Comm.Agents- Rs.100/annu 2. Traders ‘A’- 75 ‘B’-50</td>
<td>1. Weighing 1 to 2.5 depending upon weight of bag 2. Unloading</td>
<td>1. F &amp; V 6% 2. Food Grains 2% 0.2 to 4% 1. Spices —3% 2. Aniseed —2% 3. Cotton —4%</td>
<td>nil</td>
<td>Other agricultural commodity exempted from Sales Tax</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>All Commodities</td>
<td>Traders</td>
<td>Weighing</td>
<td>Unloading</td>
<td>Brokers</td>
<td>Hamal</td>
<td>Cleaning</td>
<td>Other Charges</td>
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<tr>
<td>Goa</td>
<td>'A' - 150</td>
<td>ANY</td>
<td>1.0</td>
<td>0.40</td>
<td>0.16</td>
<td>1.0</td>
<td>0.65</td>
<td>5%</td>
</tr>
<tr>
<td>Haryana</td>
<td>'A' - 100</td>
<td>ANY</td>
<td>1.0</td>
<td>0.40</td>
<td>0.16</td>
<td>1.0</td>
<td>0.65</td>
<td>5%</td>
</tr>
<tr>
<td>Karnataka</td>
<td>Food grains - 1%</td>
<td>ANY</td>
<td>0.50 to 3</td>
<td>1 to 3</td>
<td>0.50 to 10</td>
<td>1 to 3</td>
<td>0.65</td>
<td>5%</td>
</tr>
<tr>
<td>Kerala</td>
<td>No APMC</td>
<td>ANY</td>
<td>0.50 to 3</td>
<td>1 to 3</td>
<td>0.50 to 10</td>
<td>1 to 3</td>
<td>0.65</td>
<td>5%</td>
</tr>
<tr>
<td>M.P.</td>
<td>All Commodities - 2%</td>
<td>ANY</td>
<td>0.50 to 3</td>
<td>1 to 3</td>
<td>0.50 to 10</td>
<td>1 to 3</td>
<td>0.65</td>
<td>5%</td>
</tr>
<tr>
<td>State</td>
<td>Commodities</td>
<td>Rate</td>
<td>Weighing</td>
<td>Unloading</td>
<td>Brokers</td>
<td>Hamal</td>
<td>Cleaning</td>
<td>F &amp; V</td>
</tr>
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</tr>
<tr>
<td>Maharashtra</td>
<td>All Commodities- 0.75-1.0%</td>
<td>Rs. 3 to 200</td>
<td>1. weighing-3. Unloading</td>
<td>4. Brokers-5. Cleaning-</td>
<td>Various rates in different market</td>
<td>F &amp; V -7 to 8%</td>
<td>Others- 2 to 4%</td>
<td>Spices-7%</td>
</tr>
<tr>
<td>Nagaland</td>
<td>All commodities -2% Livestock- Rs. 5/head</td>
<td>Traders—100</td>
<td>1. weighing-0.50/Qtl</td>
<td>2. Unloading-5.0/Truck</td>
<td>3. Brokers-nil</td>
<td>4. Hamal-nil</td>
<td>5. Cleaning-nil</td>
<td>F &amp; V-nil</td>
</tr>
<tr>
<td>Punjab</td>
<td>2%</td>
<td>N.A.</td>
<td>N.A.</td>
<td>2.5%</td>
<td>Nil</td>
<td>4%</td>
<td>Rural Development Cess 2%Infrastructural Cess 1%</td>
<td></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>All Commodities-1.60%</td>
<td>Traders—200 Comm.Ag—200 CA cum Tr.—300</td>
<td>1. weighing-1 to 2</td>
<td>2. Unloading-0.50 to 1</td>
<td>3. Brokers-2</td>
<td>4. Hamal-1 to 4</td>
<td>5. Cleaning-1 to 2</td>
<td>F &amp; V-nil</td>
</tr>
<tr>
<td>Tripura</td>
<td>All Commodities -2%</td>
<td>Traders-Rs. 20 to 50</td>
<td>1. Weighing-2.50</td>
<td>2. Unloading-2.50</td>
<td>3. Brokers-4. Hamal-5. Cleaning-5.00</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil (for all agricultural commodities)</td>
</tr>
</tbody>
</table>
### Appendix II

**Progress of Reforms in Agricultural Markets (APMC Act) as on 03.05.2005**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Stage of Reforms</th>
<th>Name of States/Union Territories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>States/UTs where there is no APMC Act and hence not requiring reforms</td>
<td>Kerala, Manipur, Andaman &amp; Nicobar Islands, Dadra &amp; Nagar Haveli, Daman &amp; Diu and Lakshdweep</td>
</tr>
<tr>
<td>2.</td>
<td>States/UTs where APMC Act already provides for the reforms</td>
<td>Tamil Nadu</td>
</tr>
<tr>
<td>3.</td>
<td>States/UTs where reforms to APMC Act has been done as suggested</td>
<td>Madhya Pradesh, Himachal Pradesh, Sikkim and Nagaland (Gazette Notification under issues), Andhra Pradesh (ordinance under issue)</td>
</tr>
<tr>
<td>4.</td>
<td>States/UTs where reforms to APMC Act has been done partially</td>
<td>Maharashtra, Rajasthan, Haryana, Punjab, Karnataka, Gujarat and NCT of Delhi</td>
</tr>
<tr>
<td>5.</td>
<td>States/UTs where administrative action is initiated for the reforms</td>
<td>Orissa, Assam, Mizoram, Arunachal Pradesh, Tripura, Chattisgarh, Meghalaya, J&amp;K, Uttranchal, Goa, West Bengal, Uttar Pradesh, Pondicherry and Chandigarh</td>
</tr>
<tr>
<td>6.</td>
<td>States/UTs where there is no progress</td>
<td>Bihar and Jharkhand</td>
</tr>
</tbody>
</table>
### Status of Agricultural Marketing Reforms in different States/UTs as on 3.5.2005

<table>
<thead>
<tr>
<th>S. N.</th>
<th>State/UT</th>
<th>Whether APMC Act amended, if so required to provide for</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direct Marketing</td>
<td>Contract Farming</td>
</tr>
<tr>
<td>a.</td>
<td>States/UTs where there is no APMC Act and hence not requiring reforms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Kerala</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2.</td>
<td>Manipur</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3.</td>
<td>Andaman &amp; Nicobar Adm.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4.</td>
<td>Dadra &amp; Nagar Haveli</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5.</td>
<td>Lakshadweep</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6.</td>
<td>Daman &amp; Diu</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>b.</td>
<td>States/UTs where APMC Act already provides for the reforms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Tamil Nadu</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>States/UTs</td>
<td>Requisite reforms in APMC Act completed.</td>
<td></td>
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<tr>
<td>-----------</td>
<td>----------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>Yes. Section 36 of the APMC Act provide for sale of notified agricultural produce outside the market yard. Yes. Section 37-A of APMC Act amended to provide for contract farming. Yes. Corporate houses/big traders have been allowed under Section 37(3) of the APMC Act to establish purchase centers outside market yard. E-chaupals of ITC which are in the nature of real time market have become a reality due to this amendment.</td>
<td></td>
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</tr>
<tr>
<td>Himachal Pradesh</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sikkim</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Nagaland</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>States/UTs where reforms to APMC has been done partially</td>
<td>Maharashtra</td>
<td>Requisite reforms in APMC Act partially completed.</td>
<td></td>
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</tr>
<tr>
<td>Amendment Bill to provide for establishment of direct markets (farmers/consumers) proposed to be introduced in the ensuing Session of Legislative Assembly.</td>
<td>Not yet. Amendment Bill to support contract farming proposed to be introduced in the ensuing Session of Legislative Assembly.</td>
<td>Yes. A new Chapter 1-A under Section 5-A inserted in APMC Act to provide for establishment of integrated produce market for fruits, vegetables and flowers in private and cooperative sectors.</td>
<td></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>Yes. Already allowed under the APMC Act. ITC, for instance, permitted to directly purchase from farmers in 8 market areas.</td>
<td>Yes. No restriction under the APMC Act on contract farming. The farmer and the company can enter into agreement for contract farming.</td>
<td>Not yet. While cooperative marketing sector is allowed to set up markets, private sector is not so permitted. Amendment Bill is likely to be placed in the Legislative Assembly in the ensuing Session.</td>
</tr>
<tr>
<td>Haryana</td>
<td>Yes. Direct marketing by the producers is already allowed under the APMC Act</td>
<td>Not yet. State Government has approved amendment to the APMC Act to provide for contract farming. The amendment is awaiting assent of Central Government before its introduction in the State Legislative Assembly.</td>
<td>Not yet. State Government has approved amendment to APMC Act under which business premises of a sponsor company under the contract farming agreement is deemed as a market yard, thus, paving way for setting up of markets in private sector. The amendment is Requisite reforms in APMC Act partially completed.</td>
</tr>
</tbody>
</table>
|   | Karnataka | Yes | Not Yet | Not Yet. Only NDDB is permitted
|   | Karnataka | Yes | Not Yet | Requisite reforms in APMC Act partially completed. The proposal for amendment of APMC Act is being examined in consultation with the Director of Agriculture Marketing.
|   | Gujarat | Not Yet | Yes | Not Yet
|   | Gujarat | Not Yet | Yes | The matter has been discussed in the State Cooperative Council. The draft amendment is being processed by Legal Department.
|   | Punjab | Yes. Already permitted under the APMC Act under Rule 24(1) and widely practiced. | Yes. Already permitted under the APMC Act under Rule 30(B)(ii)(iii) and widely practiced. | Not yet. Requisite amendment to APMC Act has been drafted and is in advance stage of enactment.
|   | Punjab | Yes. Already permitted under the APMC Act under Rule 24(1) and widely practiced. | Not Yet | Requisite reforms to APMC Act partially completed.
|   | NCT of Delhi | Yes. Farmers’ market established by the Govt. | Not Yet | Not yet. State Govt. has said that the APMC Act already provides for setting up of market in private & Cooperative
|   | NCT of Delhi | Yes. Farmers’ market established by the Govt. | Not Yet | Requisite reforms to APMC Act partially completed.
Sectors with
the consent of
area Marketing
Committee. But
this is not in
consonance
with the
provisions
made in the
model law.

e. States/UTs where administrative action is initiated for the reforms

<table>
<thead>
<tr>
<th>No.</th>
<th>State</th>
<th>Status</th>
<th>Status</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Orissa</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Requisite reforms to APMC Act not completed. The amendment proposal for establishment of private markets and contract farming Amendment Bill has been placed in Orissa Assembly on 6.4.05 but the same could not be passed due to opposition from some of the members as the proposed amendment in APMC Act violates some provision of Gram Panchayat Act. The Bill has been deferred to future period.</td>
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<tr>
<td>21</td>
<td>Assam</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<td></td>
<td>The amendment of the APMC Act is under consideration of the Govt.</td>
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<td>22</td>
<td>Mizoram</td>
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<td>Not Yet</td>
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<td>The amendment of the APMC Act is under consideration of the Govt.</td>
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<td>23</td>
<td>Arunachal Pradesh</td>
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<td>Not Yet</td>
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<td></td>
<td>The amendment of the APMC Act is under consideration of the Govt.</td>
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<td>24</td>
<td>Tripura</td>
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<td>Not Yet</td>
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<td></td>
<td>The amendment of the APMC Act is under consideration of the Govt.</td>
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<tr>
<td>25</td>
<td>Chattisgrah</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<td></td>
<td>The amendment of the APMC Act is under the review of Prawar Sammiti and will be put up before the next State Legislative Assembly.</td>
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<tr>
<td>26</td>
<td>Meghalaya</td>
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<td>Not Yet</td>
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<td>The amendment of the APMC Act is under consideration of the Govt.</td>
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<td>No.</td>
<td>State</td>
<td>Status 1</td>
<td>Status 2</td>
<td>Status 3</td>
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<tr>
<td>27.</td>
<td>Jammu &amp; Kashmir</td>
<td>Not Yet</td>
<td>Not yet</td>
<td>Not Yet</td>
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<tr>
<td>28.</td>
<td>Uttar Pradesh</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<tr>
<td>29.</td>
<td>Uttaranchal</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<td>30.</td>
<td>Goa</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<tr>
<td>31.</td>
<td>West Bengal</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<tr>
<td>32.</td>
<td>Pondicherry</td>
<td>Not Yet</td>
<td>Not Yet</td>
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<td>33.</td>
<td>Chandigarh</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
</tr>
</tbody>
</table>

f. States/UTs where there is no progress

<table>
<thead>
<tr>
<th>No.</th>
<th>State</th>
<th>Status 1</th>
<th>Status 2</th>
<th>Status 3</th>
<th>Status 4</th>
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<tr>
<td>34.</td>
<td>Bihar</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>No progress made</td>
</tr>
<tr>
<td>35.</td>
<td>Jharkhand</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>Not Yet</td>
<td>No progress made</td>
</tr>
</tbody>
</table>


## Annexure-1

### Annexure I A : Suggestions sent by NCF relating to National Rural Employment Guarantee Bill, 2004

#### Recommendations for the Amendment of the Proposed National Rural Employment Guarantee Bill, 2004

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Reference</th>
<th>Description in the Bill</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chapter I Point (2) (u)</td>
<td>Clause to be added</td>
<td>In the text, “he/him/his” may be construed to include “she/her/her”</td>
</tr>
<tr>
<td>2</td>
<td>Chapter II Point 3 (l)</td>
<td>Save as otherwise provided, the State Government shall, in such rural area in the State and for such period as may be notified by the Central Government, provide to every poor household whose adult members volunteer to do unskilled manual work not less than one hundred days of such work in a financial year in accordance with the Scheme made under this Act.</td>
<td>Save as otherwise provided, the State Government shall, in such rural area in the State and for such period as may be notified by the Central Government, provide to every household whose adult members volunteer to do unskilled manual work not less than one hundred and eighty days of such work in a financial year in accordance with the Scheme made under this Act, provided that at least 50 percent of the person days of employment should be reserved for women.</td>
</tr>
<tr>
<td>3</td>
<td>Chapter III</td>
<td>Clause to be added</td>
<td>Thirty days of compensation (including prenatal &amp; post natal periods) for loss of wages for pregnant &amp; lactating women should be paid, when the women is the sole bread winner of the household. She should be allowed to return to work when she requires work to complete the quota of the stipulated number of days.</td>
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<tr>
<td>Chapter</td>
<td>Point</td>
<td>Text</td>
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<tr>
<td>III</td>
<td>6 (1)</td>
<td>Not-with-standing anything contained in the Minimum Wages Act, 1948, the Central Government may, by notification, specify the wage rate for the purposes of this Act: Provided that different rates of wages may be specified for different areas. Until such time as a wage rate is fixed by the Central Government in respect of any area in a State, the minimum wage fixed by the State Government under Section 3 of the Minimum Wages Act, 1948 for agricultural labourers shall be considered as the wage rate applicable to that area.</td>
<td></td>
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<td></td>
<td>6 (2)</td>
<td></td>
<td></td>
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<tr>
<td>III</td>
<td>7 (3)</td>
<td>The liability of the State Government to pay unemployment allowance to a household during any financial year shall cease as soon as x x x x</td>
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<td></td>
<td></td>
<td>It would be responsibility of the State government to pay unemployment allowance to eligible house hold if the Central Government has placed the necessary resources with the State government. The liability of the State Government to pay unemployment allowance to a household during any financial year shall seize as soon as x x x x x x</td>
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</tr>
<tr>
<td>IV</td>
<td>17 (2)</td>
<td>The Gram Sabha shall conduct regular social audit to all the projects under the 10 scheme taken up within the Gram Panchayat.</td>
<td></td>
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<tr>
<td></td>
<td>17 (3)</td>
<td>The Gram Sabha shall conduct regular social and gender audit to all the projects under the 10 scheme taken up within the Gram Panchayat. The Gram Panchayat shall make available all the relevant document including the muster roles, bills, vouchers measurement books, copies of sanction orders and other connected books of accounts and papers of Gram Sabha for the</td>
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<td></td>
<td></td>
<td>The Gram Panchayat shall make available all the relevant document including the muster roles, bills, vouchers measurement books, copies of sanction orders and other connected books of accounts and papers of Gram Sabha for the</td>
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<td></td>
<td>Schedule I Clause 1</td>
<td>The focus of the Scheme shall be on the following works in their order of priority:</td>
<td>The focus of the Scheme shall be on the following works in their order of priority:</td>
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<tr>
<td>7.</td>
<td>The focus of the Scheme shall be on the following works in their order of priority:</td>
<td>a) water conservation and water harvesting;</td>
<td>a) water conservation and water harvesting;</td>
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<td></td>
<td>a) water conservation and water harvesting;</td>
<td>b) drought proofing (including afforestation and tree plantation);</td>
<td>b) drought proofing (including afforestation and tree plantation);</td>
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<td>b) drought proofing (including afforestation and tree plantation);</td>
<td>c) irrigation canals including micro and minor irrigation works;</td>
<td>c) irrigation canals including micro and minor irrigation works;</td>
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<td>c) irrigation canals including micro and minor irrigation works;</td>
<td>d) provision of irrigation facility to land owned by households belonging to the Scheduled Castes and Scheduled Tribes;</td>
<td>d) provision of irrigation facility to land owned by households belonging to the Scheduled Castes and Scheduled Tribes;</td>
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<td></td>
<td>d) provision of irrigation facility to land owned by households belonging to the Scheduled Castes and Scheduled Tribes;</td>
<td>e) renovation of traditional water bodies including desilting of tanks;</td>
<td>e) renovation of traditional water bodies including desilting of tanks;</td>
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<td></td>
<td>e) renovation of traditional water bodies including desilting of tanks;</td>
<td>f) land development;</td>
<td>f) land development;</td>
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<tr>
<td></td>
<td>f) land development;</td>
<td>g) floor control and protection works including drainage in water logged areas;</td>
<td>g) floor control and protection works including drainage in water logged areas;</td>
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<td></td>
<td>g) floor control and protection works including drainage in water logged areas;</td>
<td>h) rural connectivity to provide all-weather access; and</td>
<td>h) rural connectivity to provide all-weather access; and</td>
</tr>
<tr>
<td></td>
<td>h) rural connectivity to provide all-weather access; and</td>
<td>i) any other work which maybe notified by the Central Government</td>
<td>i) any other work which maybe notified by the Central Government</td>
</tr>
<tr>
<td></td>
<td>i) any other work which maybe notified by the Central Government</td>
<td>j) any other work which might be notified by the Central Government</td>
<td>j) any other work which might be notified by the Central Government</td>
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Further preferred work will include activities which could contribute to human resource development, directly or indirectly or which could enhance quality of life or render public service more effective.
<p>| | | |</p>
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<td>service eg. education, child care, health care, sanitation, provision of drinking water and other community services in consonance with felt needs of the community.</td>
</tr>
<tr>
<td>8</td>
<td>Schedule I Clause 7</td>
<td>When wages are directly linked with the quantity of work, the wages shall be paid according to the schedule of rates fixed by the State Government for different types of work every year, in consultation with the State Council. It must be ensured that this does not work to the disadvantage of women.</td>
</tr>
<tr>
<td>9</td>
<td>Schedule II Clause 13 (A)</td>
<td>A new work under the Scheme shall be commenced only if (a) at least fifty labourers become available for such work.</td>
</tr>
<tr>
<td>10</td>
<td>Schedule II Clause 20</td>
<td>The Gram Panchayat shall prepare and maintain or cause to be prepared and maintained such registers, vouchers and other documents in such form and in such manner as may be specified in the Scheme containing particular of job cards and passbooks issued, name, age and address of the head of the household and the adult members of the household registered with the Gram Panchayat. The Gram Panchayat shall prepare and maintain or cause to be prepared and maintained such registers, vouchers and other documents in such form and in such manner as may be specified in the Scheme containing particular of job cards and passbooks issued, name, age and address of the head of the household and the adult members of the household registered with the Gram Panchayat and this shall be verified and approved in the Gram Sabha meetings.</td>
</tr>
<tr>
<td>11</td>
<td>Schedule II Section 27</td>
<td>The facilities of safe drinking water, shade for children and periods of rest, first aid box with adequate material for emergency treatment for minor injuries and other health hazards connected with the work being performed shall be provided. The facilities of safe drinking water, hygienic latrines for men and women separately, shade for men and women workers, safe shelter for children with temporary boundary fencing, periods of rest, first aid box with adequate material for emergency treatment for minor injuries and other health hazards connected with the work being performed shall be provided.</td>
</tr>
<tr>
<td></td>
<td>Schedule II Clause 28</td>
<td>In case where at least twenty women are employed at a worksite, provision shall be made for one of them to be deputized to look after any children under the age of six years who may be brought to the worksite, if need arises.</td>
</tr>
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</tr>
<tr>
<td>12</td>
<td>Schedule II Clause 28</td>
<td>The wages under a Scheme may be paid either wholly in cash or in cash and kind provided that at least one fourth of the wages shall be paid in cash only.</td>
</tr>
</tbody>
</table>
Annexure-I
Annexure-I B : Rationale for the recommendations in Annexure-IA

1. In order to increase the gender sensitivity of the Act, it is necessary to clarify that the term ‘his’ wherever it appears in the Act shall include the term ‘her’.

2. (a) The benefit of Employment Guarantee Act should not be restricted only for the poor households but should extend to every household, especially since the Common Minimum Programme also does not speak of Employment Guarantee only for poor households but promises it for rural/urban poor and lower middle class households.

(b) It is felt that an Employment Guarantee for 100 days per household is too low to make a meaningful dent on poverty, especially since both on farm and off farm employment availability and growth continues to be low.

(c) It is considered desirable to provide for a 50 percent reservation for women. It is actually noted that Tenth Plan also provides for a Women Component Plan stipulating at least 30 percent resources allocation for women. However, since minimum wages are being offered under the proposed Act, there is a strong possibility of male members of a household cornering the employment potential available and hence the need for a 50 percent reservation for women, thereby freeing the men to undertake other activities in the rural areas. Empowerment of women and sensitivity to their role of as a housewife and a mother as well as their social and biological constraints etc have to be kept in mind by the Proposed Act.

3. The problems of pregnant and lactating women are sought to be recognized by proposing this clause.

4. If the Central Govt. specifies the wage rate, there is risk of social tension and discord if the Central wage rate and State wage are different. Workers working on a project under the Employment Guarantee Act and those working on state
projects nearby may get paid differently although they would put in the same work and face the same financial and social difficulties. This would be iniquitous. It is best to rely on the State Minimum Wage Act which take into consideration the local income and price levels.

5. There have been examples where the State Govt. have not passed on the benefits under various schemes to eligible beneficiaries inspite of release of funds from the Central Govt. It is, therefore, proposed to spell out the responsibility of the State Govt. towards the eligible households clearly and at the same time protect them if they are made pay the eligible households without release of adequate resources from the Central Govt.

6. While providing for social audit for the works under the Act it is equally important to spell out the responsibility of the Gram Sabha for Gender Audit also in order to protect the interest of women workers specially with regard to provision of amenities for them.

7. It is necessary but not sufficient to focus on works creating physical assets. It is well recognized that investment in human resource development and social sector are equally important and yet these sectors have suffered due to inadequacy of resources. Employment Guarantee Act can be used to provide a major push to activities relating to childcare, health care, sanitation etc. which are important for the quality of life and well being in the rural areas.

Some examples of desirable community service in the rural areas which could provide employment to women and which could be funded through wages under the Employment Guarantee Act are:

1. Sweeping the roads,
2. Collection and disposing of garbage,
3. Clearing the clogged drains,
4. Helping for cattle grazing to reduce school drop outs
5. Helping facilitate 100 percent immunization
6. Helping in cooking and distributing mid day meals
7. Helping in providing ICDS services
8. Helping to look after the young children of working women.

8. It is often being observed that Piece Rate System works to the disadvantage of women and they end up getting less for their efforts. It is necessary to protect women workers through the stipulation that piece rate should not work to the detriment of women.

9. Availability of at least 50 persons for starting a work would perhaps be a too rigid requirement. Depending on local population density, lack of availability of other forms of employment and overall hunger and malnutrition, it should be left to the discretion of the local authorities to start a work even if the number of persons available for work is less than 50. In any case such numbers tend to vary on the basis of seasons/festival etc also.

10. Transparency and responsibility can be achieved only if the records maintained in the Gram Panchayats, in this regard are verified and approved in the Gram Sabha meeting also.

11. Gender sensitivity demands separate hygienic latrines and shade for men and women. Further, a women worker cannot work to her potential unless her child is safe at the worksite, protected by a fenced shelter.

12. One of the major reasons for women not coming forth for work is the existence of infants below 2 years of age. Interests of lactating mother who particularly require food and other financial resources for supplementary nutrition can be protected only if adequate child care is available to them at work site. This may require more than one worker for looking after infants depending on the number of worker on the
work site. The child care workers can be provided orientation training to enable them to look after the children at the work site properly. More importantly norms for nutrition for each child per day must be provided in consultation with child care professionals. Considering that 80 percent of the development of the brain of a child takes place during the first eighteen months of child’s life, the need for employment for its mother and adequate child care and nutrition for the infant at the work site is too obvious to need elaboration.

13. Considering that the public distribution system does in many case provide for foodgrains, it is necessary to increase the proportion of cash in the wages so that other requirements of a poor family, particularly health care and nutrition are adequately taken care of.
Annexure II: Suggestions sent by NCF relating to The Seed Bill, 2004

The non-availability of quality seed in adequate quantity at right time and at the right place has emerged as a serious constraint to enhanced and profitable agricultural production in the country. The various stakeholders - public and private sectors and farmers must coherently address this serious problem. In this context, the need for an effective farmer-centric, unambiguous, functional, unbiased and easily implementable Seeds Act to ensure smooth flow of quality seed from the “breeder” to the farmer in the desired quality, at the right time and at reasonable price can hardly be overemphasized.

The interest of all sectors of the society and needs, aspirations and vulnerabilities of farmers, especially small farmers, must be adequately addressed. In India, this assumes prime importance as the country accounts for 25% of the world’s farmers (115 million farm families against hardly 1 million in OECD countries as a whole). Moreover, 80% of the Indian farmers are small and resources-poor.

The Government of India has formulated a draft Seeds Bill 2004, which is being examined by a Standing Committee of the Parliament before its enactment during 2005. Comments have been invited from concerned corners on the Draft Bill. Seed being one of the foremost issues in the priority areas of the work of the National Commission on Farmers, the Commission offers the following comments on this Bill.

1. Object of the Bill:

The Seeds Bill must be farmer-centric. The objective as stated in the Draft Bill does not reflect the role of this Bill in serving Indian farmers and agriculture. This major omission needs to be rectified. Hence the following formulation is suggested:

“To provide for regulating seeds standards and production, processing, sale, export and import of quality seeds to facilitate timely availability of high quality seeds and planting
material in required quantity to farmers at reasonable price for accelerated agricultural development in the country and for matters connected therewith or incidental thereto.”

2. **Judicious Congruence of the Seeds Bill with other Related Acts:**

The Draft Bill does not seem to be in congruence with the National Agricultural and National Seeds Policy. It is also not harmonized with the Protection of Plant Variety and Farmers’ Right (PPVFR) Act (2001), Biodiversity Act (2002), TRIPS, CBD and FAO Gene Treaty. Some of the important concerned developments, such as the increasing role of farmers in participatory breeding, traditional seed systems operated by a majority small holders, seed villages, seed banks etc have not been internalized in the Draft Bill, and this omission should be corrected. The Harmonization process, however, must not reduce the overall economic and ecological benefit, especially the interests of majority of the small farmers, as sometimes the attainment of uniformity of standards may be dictated by the strict but not so relevant procedures of one or the other sister Act. The proposed Central Seed Committee (Sec. 4 of Draft Bill) should pay special attention to this aspect.

The proposed Seeds Act, along with the other above mentioned Acts or conventions and Treaties, when implemented, is bound to bring significant changes in plant breeding and production and distribution of seed. Their influence on priorities and products, including public goods and improvement of vital ‘orphan’ commodities, seed pricing and availability to small farmers, the realization of Farmers Rights and benefit sharing, especially with the tribals and the grassroot conservers and farmers breeders is yet to be felt and known. Therefore, under the guidance of the Principal Technical Advisor (See item no. 9 below), provisions in some of the Articles of the Seeds Bill, viz. Nos 21, 22 and 46, should be kept in a dynamic phase and should evolve to be more inclusive, equitable and participatory. The enabling mechanisms should likewise be adjusted.

3. **Protection of Farmers’ Traditional Rights on Seed and Strengthening Farmers’**
Seed Systems:

Sections 13(1), 21(1), 22(1), 23(1) and 43, notwithstanding their accent on quality assurance, deny the traditional rights of farmers to sell their home-produced seed in their neighborhood. High seed replacement rate with quality seed in all crops is beneficial to both farmers and national agriculture. But, the fact remains that nearly 75% of the current seed replacement is done by the informal traditional farmer seed system. No seed industry now or in near future can satisfactorily saturate the national seed system in all crops. Moreover, seed industry is generally not interested in supplying quality seed in several ‘orphan’ crops, which do not offer profitable business. Therefore, a law that restricts the farmer seed system can neither be realistic nor truly implementable. The Seeds Bill should therefore proactively promote the informal system of seed production and distribution through enhancing quality literacy and awareness of farmers, improving their skills for quality seed production and retooling the nonformal sector to be as good as the formal seeds sector. The private seed industry generally concentrates on the production and marketing of hybrid (F1) seeds. The Farmers’ Seed System and the Commercial Seed System should become mutually reinforcing.

4. Registration Requirements of Variety:

Compulsory registration of variety for its commercial production, processing, sale and export, as detailed in Section 14, is welcome. It is most desirable to safeguard the interest of farmers and national interest, when devised and implemented to serve these ends. But there are certain ambiguities in the Bill. The Process and consequences of registration of variety under Seeds Bill should in principle be made legally consistent with existing national laws such as the PPVFR Act, 2001; the Biological Diversity Act, 2002 and the Patent (Amendment Act) Act, 2002.

A separate clause may be added in the Bill as 14.4 describing the eligibility criteria for the variety to be registered, which should read as “A new variety should be registered under the Act based on VCU (Value in Cultivation and Use) testing conducted
by the CSC accredited centres. This test should be mandatory for all sectors. The existing All India Coordinated Crop Improvement Project (AICCIP) model, which has played a significant role since its existence in multilocation testing of varieties not only for yield but also for adaptation, reaction to insect pests and diseases, providing farmers with widely as well as locally adapted superior varieties, should be adopted by the CSC for VCU testing. However, to make the system more efficient and transparent, the CSC may like to accredit appropriate centers also from private sector in addition to those from SAUs and ICAR.

Disclosure about the pedigree of the variety / hybrids to be registered should be made mandatory to discourage the unauthorized use of PGR and to enable the benefit sharing.

To harmonize the Seed Bill with PPVFR Act, particularly with respect to Farmers’ Rights, a clause on benefit sharing as per the provision of PPVFR should be added. This would help protection of the interest of the public sector institutions as well as of the farmers. It would be adequate if the Bill contains a provision stating that all the rights of farmers provided for in the PPVFR Act will be safeguarded.

Registration for sale should be acquired only for new varieties as in the Seed Act of 1966 which limits the requirement to notified varieties. No registration should be required for extant varieties and landraces.

To ensure transparency, a process for pre-grant opposition to registration of a seed variety must be included in the Seed Bill, like it is in the PPVFR.

5. **The Seed Bill should not Facilitate Biopiracy by Promoting Unregulated Seed Export**
Although Section 37 on “Export of Seeds” has provisions to regulate and restrict seed trade in the interest of the nation, it should be explicit in context of safeguarding and benefiting from our bioresources. While seed export should certainly be promoted to enhance income and employment, it should be conferred to those varieties which are registered under PPVFR Act, and only to those countries which recognize plant breeders’ rights. Such exports will then be linked to export oriented production with pre-identified export destinations. Export for research should be dealt separately with stringent regulations and liability conditions to exclude abuse of such transfer or on reciprocity basis, as stipulated under the Biodiversity Act.

6. **Labeling on Performance, Compensation and Consumer Protection**

Section 6, 19 and 25 stipulate suitable labeling on the container of seeds intended for sale. Expected Performance of the seed based on specified agronomic performance evaluation is one of these labeling contents. Further, Section 20 says that when a registered seed is sold to farmer, a disclosure should be made to farmer on its expected performance and conditions for realizing such performance. But, this will be possible only when the VAC testing, as mentioned under item 4 above, is made compulsory under the authority of the CSC. The compensation for non performance of seed must be regulated through the National Plant Variety Authority and not through the Consumer Protection Forum or the District Consumer Courts as in the present Draft Bill.

7. **Provision of Registration of Transgenic Variety:**

Section 15 (1) affirms requirement to obtain clearance under Environment (Protection) Act to receive registration for a transgenic variety. However, a provision is added for granting provisional registration for a period not exceeding two year for transgenic varieties. This implies that a transgenic variety can secure a provisional registration for seed production and sale before it is officially recommended for general cultivation on the basis on biosafety and environment evaluation by the competent authority under the EPA. This provision on all counts is against public interest and violates
the EPA regulations. The damage done to the environment by the commercialization of the transgenic variety (if any) during the period of provisional registration cannot be undone if later denial of clearance by the EPA comes. The procedures for the release of GM (genetically modified) varieties, already in force, should be strictly followed.

8. **Offences and Punishment:**

   The small token penalties for violations contained in the Seed Bill must be revised. When the declared source of registered material has been accessed illegally, registration would be cancelled and criminal and civil liability will be determined.

9. **Management of the National Seed System**

   Necessary institutional and financial supports should be provided to establish and operate a world-class enabling mechanism to capture the various national and international opportunities consistent with the national agricultural goal. While the Chair (Secretary DOA) of the Central Seed Committee, in consort with the Provincial Seed Committees, will ensure implementation of the programme, an eminent expert in this highly specialized area should be the Principal Technical Advisor, with a tenure of at least five years, who should be responsible for harmonization and coordination between Central and State Governments and among States in all technical matters. A national grid of well-equipped seed testing laboratories operated by highly skilled human resources should be established. Seed, gene and quality literacy should be promoted at all levels, from farmers to policy makers, by organizing training programmes.

10. **Conformity with existing Acts and Procedures**

    The Seeds Bill should not try to undermine the farmer/primary conserver friendly provisions of the PPVFR and Biodiversity Acts. It should not also undermine the existing procedures for the assessment and release of genetically modified crop varieties. Its main
aim should be to strengthen the integrated growth of farmers and commercial seed systems, so that every farm woman and man has access to high quality seed/planting material at the right time and place and at appropriate prices.

In order to adequately address farmers’ concerns, the membership of the Central Seeds Committee (CSC) may be enhanced from seven to twelve which should include at least five farmers/farmers’ representatives. Representation of women farmers, horticulturalists and farmers from disadvantaged areas should be ensured in the Committee to enhance the inclusiveness.
Annexure III : Suggestions made by NCF relating to: Agriculture Credit - Some Issues

The Chairman, National Commission on Farmers along with the members met the Hon’ble Union Minister for Agriculture and Food on 6th April, 2005. The Secretary, Agriculture & Cooperation, Secretary, Food & Public Distribution, Secretary, Animal Husbandry & Dairying, Secretary Department of Women & Child Development, Govt. of India and other senior officers from different departments were present. During the discussions, the Union Minister indicated that while the flow of agricultural credit during 2004 - 05 was likely to reach about Rs.1.08 lakh crore, showing nearly 30% increase over the 2003-04 level, some issues including the rate of interest charged by the Cooperative Banks and the arrangements for providing relief to the farmers in the case of damage to the crops due to natural calamities were causing concern. He desired to have a note covering the above aspects. These issues are discussed in the following paragraphs.

2. With a view to providing the benefit of declining interest rates to agriculture and particularly to the small farmers, the Indian Bank Association had advised the public sector banks in 2003 to reduce their lending rate to not more than 9 percent per annum on crop loans up to a ceiling of Rs.50,000. While the Commercial Banks have by and large, been providing loans to the farmers at low rate of interests, the Cooperative Banks are finding it difficult.

3. The rate of interest charged to the ultimate borrower by the cooperative system in general is in the range of about 11 to 12% per annum. However, in some States like Andhra Pradesh, Karnataka etc. where the State Government is subsidizing cooperative banks, the rate charged to the final borrower is even lower than the rate of interest charged by the Commercial Banks. In other States, where such subsidies are not available, the rate of interest charged by the Primary Agriculture Credit Societies (PACS)
to their members is higher than that charged by the Commercial Banks for agricultural loans.

4. This is mainly due to higher costs of funds and the cumulative impact of the margins retained by the different tiers in the cooperative credit system. One has to remember that the co-operative credit system reaches the ultimate borrowers (nearly 12 crore members of which about 50% are borrowing members*) through 1,12,309 PACS located at the village level, while the Scheduled Commercial Banks had about 32,640 rural branches (as on 31.03.2001) with a total of only 1.96 crore rural borrowing accounts. The reach of the cooperatives is much deeper and it also has a larger network, which enables it to deliver financial services to the members nearly at the doorsteps thus, reducing the borrower’s transaction cost, which he would incur if he were to approach the branch of a commercial bank or the RRB. However, this adds to the transaction cost of the cooperative credit delivery system. As regards the cost of funds, on a macro basis the working funds of the cooperatives consist of deposits (about 80%) and refinance (about 20%**). The cooperative banks offer a higher interest to the depositors and the bulk of their deposits are term deposits, which attract higher interest. The slight concessionality available to them on NABARD refinance is not enough to provide them adequate leverage to dispense credit to the ultimate borrower at the rate of interest comparable to the commercial banks. It may be recalled that earlier, refinance from (NABARD/RBI) used to form over 50% of the total working funds of the cooperative banks and the interest charged by RBI on this line of credit was 3% below the Bank Rate, which provided better leverage to the cooperative banks to lend at lower rate of interest.

5. The interest rate on loans would primarily depend on (a) the cost of funds, (b) transaction cost and (c) risk cost. With the southward trend of the interest rate, the cost of

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* Report of the Task Force under the Chairmanship of Prof. A. Vaidyanathan  
** The Advisory Committee on the flow of credit to Agriculture under Chairmanship of Prof. V. S. Vyas
funds of Commercial Banks has declined. At present the rate of interest on term deposits is in the range of 5 to 6 percent or so while saving deposit rate is 3.5 percent p.a. On the other hand, as stated earlier, the Cooperative Banks have been offering a slightly higher rate of interest to their depositors and bulk of their deposits are in the nature of term deposits. The impact of the declining interest rate has therefore been less in the case of Cooperative Banks, than in the case of Commercial Banks. It is only when the fixed deposits accepted at the higher rate of interest mature, the benefit of low interest rates would have full impact on the overall cost of their funds. Over time, the cost of funds of the Cooperative Banks would decline but it would take comparatively longer time to register the full impact of the downward trend in interest rate.

6. The transaction cost of the banks includes the establishment cost and the cost of management/manpower. There is a need for all banks to keep the transaction cost to the bare minimum by use of IT, innovations in operations and reduction in expenditure on establishment/manpower etc. Further, as the volumes increase the transaction cost tends to come down. While there is scope for the Cooperative Banks to reduce the transaction cost and work more efficiently, the paucity of resources is a constraint in greater use of IT, ATMs and other innovative systems, etc.

7. As stated earlier, the increase in volume reduces the transaction cost of per unit of money lent. While in the case of Commercial Banks, their direct agriculture loans form only around 11 percent of the net bank credit, in the case of Cooperative Banks the percentage may be as high as 60 to 70 percent in some cases. The direct agriculture loans are smaller in size and hence the transaction cost per unit of money lent is higher. While the Commercial Banks have considerable scope of cross subsidization because of a very diverse portfolio, such cross subsidization is extremely limited in the case of the Cooperative Banks.

8. The risk cost is another important component of the total cost of operations of banks. The risk cost emanates from a host of factors including failure of investments, inadequate
returns due to weather/market risks, defaults due to improper appraisal of loans, diversions of loans, poor follow up and inability to realize the securities available to the bank. If the credit risks caused by climatic factors, price fluctuations, poor health/death of the borrower could be covered by appropriate financial instruments (insurance, futures etc), the total risk for the lending institution would be reduced and interest rate on loans could decline. In absence of availability/use of the financial products covering these risks, the banks have to add a component of risk cost based on their past experience and perceptions.

9. The Report of the Advisory Committee on Flow of Credit to Agriculture, under the chairmanship of Prof. V.S. Vyas (2004) had examined the question of reduction in the interest rate on agricultural loans by banks. The Report has provided some details of cost/margins and the impact of reduction in interest rate on agriculture loans by 2% on macro basis by the Commercial Banks and the Cooperative Banks. The details based on the aggregate position of the commercial banks for 2002-03 was as under

<table>
<thead>
<tr>
<th></th>
<th>Percentage to the total assets</th>
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<tbody>
<tr>
<td></td>
<td>Actual</td>
</tr>
<tr>
<td>Cost of funds</td>
<td>5.44</td>
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<tr>
<td>Transaction cost total</td>
<td>2.25</td>
</tr>
<tr>
<td>Risk cost (Provision total)</td>
<td>1.36</td>
</tr>
<tr>
<td></td>
<td>9.05</td>
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<tr>
<td>Returns on loans etc</td>
<td>8.34</td>
</tr>
<tr>
<td>Misc. Incomes</td>
<td>1.66</td>
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<tr>
<td></td>
<td><strong>10.00</strong></td>
</tr>
<tr>
<td>Net Margin (B-A)</td>
<td>0.95</td>
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(*on the basis of the percentage of direct agriculture credit outstanding as a percentage of net bank credit.*)
10. The position of the District Central Cooperative Banks (2002) was as follows:

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<tr>
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<th>Percentage to the total assets</th>
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<tr>
<td></td>
<td>Actual</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>Cost of funds</td>
<td>7.14</td>
</tr>
<tr>
<td>Transaction cost total</td>
<td>1.69</td>
</tr>
<tr>
<td>Risk cost (provision total)</td>
<td>1.91</td>
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<tr>
<td></td>
<td><strong>10.74</strong></td>
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<tr>
<td><strong>B</strong></td>
<td></td>
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<tr>
<td>Returns</td>
<td>10.13</td>
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<tr>
<td>Other Income</td>
<td>0.60</td>
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<tr>
<td></td>
<td><strong>10.73</strong></td>
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<tr>
<td><strong>C</strong></td>
<td></td>
</tr>
<tr>
<td>Net Margin (B-A)</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

*(Assuming 50% of the total outstanding were direct agriculture advances)*

11. It would be seen that the commercial bank's margin was to go down slightly with the reduction of interest rate due to reduction in interest rate on agriculture loans by 2% but in the case of the cooperatives (DCCBs) the reduction would lead to a substantial negative net margin.

12. Interestingly, the transaction cost plus risk cost in the case of both the commercial banks and the cooperative banks was nearly the same (3.61 in the case of commercial banks and 3.60 in the case of cooperative banks). The risk cost at DCCB level at 1.36% was low but it needs to be remembered that the DCCB's do not lend directly to the individual farmers but the credit is routed through the PACS etc, which primarily absorb the credit risk of lending to the ultimate borrower.
13. Presently, the interest rate charged by the DCCBs to the PACS in some of the States is not more than 9% p.a., which is charged by the commercial banks to their clients. However, PACS add about 2 to 2.5 percentage points as their margin, which increases the interest rate, which the ultimate user of credit pays. The PACS have an important role in the cooperative credit system. As a matter of fact, this is the level, which needs maximum attention and support but rarely gets it. Improvement in the financial health of the cooperative credit delivery system on a sustainable basis would be possible only if the PACS were to become more efficient, transparent and financially stronger.

14. While there is a need to improve the efficiency of the cooperative credit system and all efforts need be made to encourage minimizing overhead costs, cost effective usage of IT etc, the items, which offer greater scope of cost reduction are the prevailing high cost of funds and the risk costs. The Advisory Committee on Flow of Credit to Agriculture (Prof. V.S. Vyas Committee) has observed, "considering the fact that old high cost deposits will be retired in a couple of years there appears to be the possibility of the cost of funds going down by 0.5% to 1% across the banks. The decline would be more pronounced in the case of DCCBs and the RRBs, given their large share of high cost deposits." These banks, particularly the cooperatives also need to improve their 'Funds Management' to reduce the cost and improve their earnings. The important issues are whether for a short to medium term period there could be a special dispensation to improve the proportion of NABARD refinance in the total funds of the cooperatives [according to V. S. Vyas Committee, the ratio is 1:4 on a macro basis] and also a reduction in the interest rate charged on the refinance amount. As stated earlier, at one time, the RBI refinance to cooperative banks for crop loans used to be at 3% below the Bank Rate and the proportion of RBI refinance and deposits in the working funds of the cooperatives was about 1:1. While it may not be possible to go back fully to the earlier dispensation for all times, but it could it be tried as a carefully worked out scheme to provide relief particularly to the small/marginal and the dryland farmers who are facing considerable financial stress. This could help.
15. As stated earlier, the matters concerning credit risks in agriculture financing are important and these impact the rate of interest. The present level of recoveries and the prevailing credit discipline under the cooperative credit system are not sustainable. The recoveries at the PACS level have to be much higher. A small-localized institution working at the village level, which has complete information about the investment, state of the crop, credit history of borrowers etc. should have 'no tolerance' to willful defaults. There is a need for considerable improvement in the recovery system, the environment and also introduction of a system of incentive to encourage on time payment.

16. Then, there are the sectoral risks both at the individual level as well as the systemic risks. Efforts to reduce individual risk (by selling stored produce, taking up a group of economic activities etc.) and dissemination of information regarding improved technologies and practices to reduce production risks have to be continued as an on going process. The systemic risks i.e. common to a large group of farmers could be minimized by an effective crop insurance system. Though the recent efforts to introduce new products and to improve the crop insurance schemes are praiseworthy, the system of settlements/verification and delays etc. cause certain amount of resentment and uncertainty in the minds of individual farmer. An insurance cover should fully assure the insured that if a particular event takes place he/she would be compensated for the loss. The present crop insurance does not provide such assurance to the insured farmer/the financing bank. This impacts the credit flow and perception of risk both from the viewpoint of the farmer and the banker. Any improvement in mitigation of crop risks due to climatic factors would help in overall reduction in the interest rates.

17. While interest rate is an important aspect of credit, timeliness and adequacy of credit are also equally important. The ultimate borrower is concerned about the total expenses involved in getting a loan and servicing it. A paper of Anita Gill published in Economic & Political weekly [14-20 August, 2004] based on experience of certain districts of
Punjab observes "Then there are additional costs involved like frequent visits to the institution, fee, submission of documents (which more often than not require payment for services to someone who can fill the forms of the illiterate farmers) etc. All expenses can be added up in the rate of interest and the institutional rate of interest then is almost at par with the informal rate of interest".

18. A rural financial access survey (RFAS 2003) conducted by the World Bank and NCAER in UP and AP has also pointed out about considerable time gap in sanction of loans and substantial expenditure which the small borrower incurs in availing institutional credit in rural areas.

19. It is important that all aspects of the delivery system are looked at closely and improved so that credit to the farmers is adequate, timely, hassle free flexible and at reasonable costs.

**Provision of Relief to the Farmers in case of Natural Calamities**

20. As regards the relief to the farmers in case of loss of crop due to flood/drought etc., farmers in the areas covered by the crop insurance are much better placed. Restructuring/conversion of short-term crop production loans into term loan provides temporary relief to the farmers. The ability of the cooperative banks to provide this temporary relief largely depends on the financial support of NABARD. In the case of the commercial banks which have all India coverage, the flood/drought etc. are likely to impact only a small percentage of their direct agriculture loans as these natural disasters are likely to be localized. Further, since direct agriculture loans form only a small part [around 11 %] of their total loan outstanding, these banks can take care of such restructuring/ conversion from their own funds and the impact on their funds flow/liquidity is very marginal. However, the position of the localized DCCBs in this regard is different. Many of the DCCBs have 60 to 70% of their total outstanding loans for crop loans and a drought/flood in the district could impact most of their crop loan portfolio. If these banks were to provide moratorium on interest/principal and convert these loans into term loans,
their income flow and liquidity would be seriously impaired unless these banks were to get similar relief from NABARD. For obvious reasons, NABARD insists on declaration of 'annawari' and State Government guarantee before it extends conversion facilities to the banks. These are cumbersome and take a time. As a result, conversion of loans gets delayed and the farmer becomes defaulter and ineligible for fresh finance. Another issue is that the total balance under the National Rural Credit Stabilization Fund with NABARD [which is used for converting short-term loans into term loans] as on 31.03.2004 was only about Rs.1104 crore. This need to be strengthened to enable NABARD to have adequate resources for meeting a situation where large part of the country were to be affected by droughts/floods etc in successive years. NABARD on its part has also to look into its procedures/systems/instructions etc to make them more user friendly and to ensure that the conversion facilities are extended expeditiously.

21. While conversion/restructuring provides temporary relief to the farmers [by way of postponement of repayment obligation], it is also necessary to have a long-term remedy to take care of the impairment of the repaying capacity of the farmers due to successive calamities like floods/droughts etc. The V.S. Vyas Committee [referred to earlier] has recommended setting up of an 'Agri Risk Fund' with equal contribution from the Central and State Governments and the banks. Such a 'Fund’ could help in mitigating risks of the lending banks and the hardships of the farmers. The suggestion needs consideration.
ACKNOWLEDGMENT

National Commission on Farmers acknowledges the valuable technical contributions of Ms. R.V. Bhavani, OSD to Chairman, NCF and Research Officers: Dr (Ms.) Laxmi Joshi, Dr. Deepak Rathi, Dr Pavan Kumar Singh and Dr Ramesh Singh and the sincere work of the secretarial staff of the Commission for the preparation of the Second Report.
# National Commission on Farmers

Serving Farmers And Saving Farming  
**2006 : YEAR OF AGRICULTURAL RENEWAL**  
**THIRD REPORT**

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**Chapter II**: Strengthening Agricultural Research: Towards Science Led Evergreen Revolution  
**Chapter III**: Towards an Indian Single Market  
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TERMS OF REFERENCE
FOR
NATIONAL COMMISSION ON FARMERS

- Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.

- Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

- Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

- Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

- Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

- Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of
vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

- Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.

- Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

- Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

- Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.

The Commission is to submit a medium term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as soon as practicable and in any case on or before 13\textsuperscript{th} October, 2006. The Commission, however is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

[Ministry of Agriculture Resolution No.8-2/2003-Policy(ES) dated 18\textsuperscript{th} November, 2004]
COMPOSITION OF THE
NATIONAL COMMISSION ON FARMERS

The composition of the reconstituted National Commission on Farmers is as under:

Chairman
Prof. M.S. Swaminathan

Full-time Members
Dr. Ram Badan Singh
Shri Y.C. Nanda

Part-time Members
Dr. R.L. Pitale
Shri Jagdish Pradhan
Ms. Chanda Nimbkar
Shri Atul Kumar Anjan

Member Secretary
Shri Atul Sinha

[Ministry of Agriculture Resolution No.8-2/2003-Policy (ES) dated 18th November, 2004]
1. 1968 marked the beginning of the green revolution leading to quantum jumps in the productivity and production of wheat and rice. The last 10 years have witnessed a fatigue in the green revolution with the growth rate in foodgrain production falling below population growth. Thus, human numbers are increasing faster than our capacity to make the goal of food for all a reality. At the same time, consumption is not going up due to inadequate purchasing power at the household level. A famine of jobs/livelihoods as a result of poor growth of opportunities for employment in the rural non-farm and off-farm sectors is leading to a famine of food at the household level. According to the Union Planning Commission, we are off-track in achieving the UN Millennium Development Goal of reducing the number of hungry persons by half by 2015. Also, we are off-track in reducing infant and maternal mortality rates and in achieving universal primary education.

2. Our Prime Minister has rightly emphasized the need to double annual foodgrain production from the present 210 million tonnes to 420 million tonnes within the next 10 years, i.e. by 2015, which is also a benchmark year for achieving the UN MDGs. This will call for producing at least 160 million tonnes of rice from 40 million ha and 100 million tonnes of wheat from 25 million ha. Pulses, oil seeds, maize and millets will have to contribute 160 million tonnes. In addition, the national goal is to raise the production of vegetables and fruits to over 300 million tonnes by 2015. Since land is a shrinking resource for agriculture, the pathway for achieving these goals has to be higher productivity per units of arable land and irrigation water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. The average farm size is going down and nearly 80% of the farm families belong to the marginal and small farmer categories. Fortunately, the ownership of livestock is more egalitarian. Enhancing small farm productivity, and increasing small farm income through crop-livestock integrated production systems
and multiple livelihood opportunities through agro-processing and biomass utilization, are essential both to meet food production targets and for reducing hunger, poverty and rural unemployment. Programmes designed to achieve these goals must be engendered, since there is increasing feminisation of agriculture, poverty and under-nutrition, as well as unfortunately HIV/AIDS.

3. 2005 has been a difficult year both for the nation and for farm and fisher families. Beginning with the titanic tsunami of 26 December 2004, and ending with the disastrous earthquake in Kashmir and floods in Tamil Nadu, our farm and fisher families have been subjected to the fury of nature in the form of drought, unseasonal and heavy rains (like the one which caused damage to the onion crop in Maharashtra) and floods. Institutional support to small farmers is weak. The same is true of post-harvest infrastructure. For example, even now paddy is being spread on the roads for drying in many places. The spoilage losses can be as high as 30% in the case of vegetables and fruits. Institutions, which are supposed to help farmers, such as research, extension, credit and input supply agencies, are by and large not pro-poor and pro-women. Mechanisms for risk mitigation are poor or absent. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance. There is no Agricultural Risk Fund. Both risk mitigation and price stabilization are receiving inadequate policy support. The cost of production is invariably higher than the minimum support price, due to ever-increasing prices of diesel and other inputs. Investment in agriculture has suffered a decline over the past two decades. Capital formation in agriculture and allied sectors in relation to GDP started declining in the 1980s and is only now being reversed. This has adversely affected irrigation and rural infrastructure development. An unfortunate consequence of the constellation of hardships faced by small farm families is the growing number of suicides among farmers. The situation is particularly alarming in parts of Vidharba of Maharashtra State. To our shame, the suicide hotspots include Wardha district, where Mahatma Gandhi spent a significant part of his life, fighting for freedom from colonial rule, so that the country can be rid of hunger, poverty and gender injustice.
4. The cost-risk-return structure of farming is becoming adverse. Consequently, indebtedness is growing in rural areas. In Maharashtra over 55% of the State’s farm households are in debt. Average household size of farmers is 5.5 at the All-India level. In the low-income groups, the average size goes up to 6.9. According to NSSO-59th round, the average monthly per capita consumption expenditure of farm households across India was Rs. 503 in 2003. Endemic hunger (i.e., chronic undernutrition), is high both in families without assets like land or livestock, as well as in families with small land holdings without access to irrigation. Policy reform in agriculture is thus overdue. Such policy reform should be pro-small farmer and pro-women and pro-landless agricultural labour. If we do not attend to the problems of small farm and landless agricultural labour families with a sense of urgency and commitment, the “Indian Enigma” of the co-existence of enormous technological capability and entrepreneurship on the one hand, and extensive under-nutrition, poverty and deprivation, on the other, will not only persist, but will lead to social disruption and violence and increasing human insecurity. Without peace and security, enduring economic progress will not be possible. NCF therefore recommends that the agricultural year 2006-07 be designated as the Year of Agricultural Renewal.

5. During this year, an integrated package of measures should be introduced in every part of the country to increase farm productivity and profitability in perpetuity without associated ecological harm. The programmes should cover all our major agro-ecological regions-arid, semi-arid (i.e. dry-farming) hill, coastal and wet (i.e. irrigated or high rainfall) zones. The present agricultural crisis can then be converted into an opportunity for not only reversing the decline, but for taking the agricultural revolution forward by helping farm families to bridge the gap between potential and actual yields in all major farming systems through mutually reinforcing packages of technology, services and public policies. The programmes initiated during the 2006-07: Year of Agricultural Renewal by Central and State Governments, Panchayati Raj institutions, Agricultural, Veterinary, Rural and Women’s Universities and IITs, Private and Public Sector Industries, Civil Society Organisations and Mass Media should be designed to foster productivity, quality, sustainability, profitability and employment revolutions in the farm
sector in all the over 600,000 villages in the country. It should help to promote job-led economic growth in our villages.

6. The following should be the major components of the Action Plan for the Year of Agricultural Renewal. All of them require concurrent and integrated attention.

6.1.1 **Soil Health Enhancement:** Agricultural Universities, ICAR and CSIR Institutes, Krishi Vigyan Kendras, Fertilizer Companies, State Departments of Agriculture and Farmers’ Associations and Panchayati Raj institutions should commemorate 2006-07 as the Year of Soil Health Enhancement. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) located at Hyderabad may be actively associated in this programme. ICRISAT has very valuable information on the soil health status in dry-farming areas, ICRISAT, CRIDA, CAZRI at Jodhpur and the National Bureau of Soil Survey and Land Use Planning of ICAR can provide technical support and assist in monitoring. For this purpose, the following steps need to be taken:

i. Re-tool and re-equip all Soil Testing Laboratories in order to enable them to provide each farm household with a **Soil Health Card**, which contains integrated information on the physics (soil structure, occurrence of hard pan in the subsoil, etc.), chemistry (soil organic matter and macro- and micro-nutrient status), and microbiology (occurrence of earthworms, soil micro-organisms etc.,) of the soils. The Soil Health Cards should stimulate balanced fertilization, including the amelioration of micro-nutrient deficiencies.

ii. Promote through campaigns and demonstrations, the introduction of fodder/ grain legumes in the crop rotations as also the cultivation of green and green-leaf manure crops.

iii. Composting of all agricultural residues and wastes and the use of microbial fertilizers and farmyard manure should be promoted to the maximum extent possible.

iv. Methods of improving soil health through integrated nutrient supply will have to be prescribed and farmers should be assisted to adopt the recommendations.
v. All staff working in Soil Testing Laboratories should be retrained.
vi. Integrated wasteland and biofuels programme should be promoted.

vii. The Agri-clinics programme should be restructured and revitalized and farm graduates should be encouraged to take to a career of self-employment in the rural services sector.

viii. Breeding soils for higher productivity may be undertaken in the case of problem soils and wastelands.

ix. Wasteland development could be linked to the production of biofuel and industrial raw material (for the production of paper and board, rayon, packaging material etc) as well as fodder, firewood etc.

tax. Community Land Care movements may be launched by Panchayats

6.1.2 Soil Health Enhancement holds the key to improving the return from investment in other inputs like seeds and water. Dry-farming areas need particular attention from the point of view of overcoming micro-and macro-nutrient deficiencies. As stressed by the Prime Minister, the second green revolution has to begin in dry-farming areas

6.2.   **Irrigation Water: Supply Augmentation and Demand Management:** Water is a public good and a social resource and not private property. The privatization of water supply distribution is fraught with dangers and could lead to water wars in local communities. **Increasing supply through rainwater harvesting and recharge of the aquifer should become mandatory.** In addition, a nationally debated and accepted strategy for bringing 10 million hectares of new area under irrigation under the Bharat Nirman programme should be developed. The Polavaram Project to be built across the Godavari in Andhra Pradesh is a case in point. Different viewpoints can be reconciled only by dialogue and consensus building. All existing wells and ponds should be renovated. Demand Management through improved irrigation practices, including sprinkler and drip irrigation, should receive priority attention. A Water Literacy movement should be launched and regulations should be developed for the sustainable use of ground water. Seawater farming should be promoted in coastal areas through the cultivation of mangroves, salicornia, casuarina and appropriate halophytic plants. The
conjunctive use of rain, river, ground, sea, and treated sewage water should become the principal method for the effective use of available water resources. In water scarce areas, the land use system should place emphasis on the cultivation of high value – low water requiring crops, such as pulses and oilseeds. Pulses and oilseed villages can be promoted where all farmers work together in harvesting rainwater and sharing the water equitably for growing pulses and oilseeds. Promotion of “Hybrid arhar (pigeon pea) villages” can be the starting point of a pulses revolution. In paddy and sugarcane, water saving methods of cultivation like those inherent in the “System of Rice Intensification” (SRI) methodology should be perfected and popularized. More crops per drop of water should not remain just a slogan. Land use decisions are also water use decisions. Hence, the choice of cropping systems should be based on irrigation water availability including rainfall pattern. Watershed management should be linked to the different Technology Missions as emphasized in our earlier reports, so that the concurrent availability of water and of the other inputs like seeds needed to optimize the benefit from irrigation water can be ensured. Low cost green houses can be promoted in areas where evaporation exceeds precipitation during many months in a year. Panchayats may be assisted in launching water literacy and water quality management programmes.

6.3. **Credit and Insurance:** Credit reform should consist of the following measures:

i. **Interest rate on agricultural loans:** The spread between the deposit and lending interest rates in India is high by international standards. The need is to improve the efficiency in the financial intermediation by controlling both the transaction cost and the risk cost. On the part of the Government, crop insurance as well as the speed and manner in which the debt recovery and settlement process operates would need to be considerably improved. These improvements could be brought about in the medium to long term. A high interest rate means that a greater proportion of income has to be diverted to interest payment. Keeping in view the decline in the profitability of agriculture, and increasing farmers’ distress and indebtedness, the government may consider providing support to the banking system for reducing the rate of interest for crop loans to 4% during the Year of Agricultural Renewal.
ii. **Compounding of interest on arrears:** The compounding of interest on arrears may be applied only in the case of recalcitrant borrowers who do not pay the dues inspite of having adequate repaying capacity. The farmers facing erosion in income and consequently their repaying capacity due to market failure should not be charged compound interest on arrears.

iii. **Shift from micro finance to livelihood finance:** There is an urgent need for a paradigm shift from micro-finance to livelihood finance, as the access of the poor to micro-finance alone is not likely to alleviate their poverty. Livelihood finance is a comprehensive approach to promoting sustainable livelihoods for the poor, which includes financial services, [including insurance for life, health, crops and livestock: infrastructure finance for roads, power, market, telecom etc and investment in human development], agriculture and business development services [including productivity enhancement, local value addition, alternate market linkages etc] and institutional development services [forming and strengthening various producers’ organisations, such as SHGs, water user associations, forest protection committees, credit & commodity cooperatives, empowering Panchayats through capacity building and knowledge centres etc.].

iv. **Access to institutional credit in poverty stricken tribal areas:** Special efforts are required to improve the access to institutional credit in the poverty stricken tribal areas in the dry land agriculture regions like the Kalahandi belt of Orissa/ Palamau region of Jharkhand/ tribal areas of Chattisgarh/ Madhya Pradesh/ Andhra Pradesh and the Vidharba region of Maharashtra.

v. **Agri-risk Fund:** There are areas in our country, which have recurrent and frequent drought/floods etc, which cripple the incomes of the farmers. These farmers become defaulters to the banks and thereby become “push-outs” of the credit system. Rescheduling and restructuring of their loans are not enough in the event of successive natural calamities. The government of India may step in to create an Agriculture-Risk Fund to provide relief [waiver in full:/ part of loan and interest] to the farmers in the case of successive droughts, etc. and also waiver of interest on loans in areas hit by droughts, floods, heavy pest infestation etc. This
Fund should have contributions from the Central Government, State Governments and Banks in a predetermined fashion.

vi. **Distress ‘hot spots’ – moratorium on debt recovery:** There is a need for moratorium on debt recovery including loans from non-institutional sources in distress hotspots, till reasonable profit margins in agriculture operations are restored. The debt recovery may be staggered in easy installments. For this purpose, liquidity support may have to be provided to the localised banks like the RRBs/Cooperative Banks etc.

vii. **Credit for low cost/sustainable agriculture:** There is need for developing suitable project profiles for low input sustainable agriculture and aquaculture. Institutional credit should also be available for viable projects of sustainable farming practices including the upkeep of traditional breeds of cattle.

viii. **Issue of Kisan Credit Card to women farmers:** The Kisan Credit Card (KCC) is a major innovation in agricultural credit. However, inspite of nearly 4.5 crore KCCs issued by the banks, very few cards have been issued to women farmers. As a matter of fact, no separate data are available in this regard. Keeping in view the fact that there are a very large number of women-headed farming families, particularly in the hills and NE Region, special effort is needed to issue KCC to these farmers. The banks may develop proper documentation systems to issue KCCs to women where the land is in the name of the menfolk who do not reside in the rural area [jobs in the cities/army etc] or face similar other situation and the land is cultivated by the wife.

ix. **Distress sale - need for pledge loans:** Distress sale by small/marginal farmers to square off their debts or for immediate consumption purposes soon after harvest is quite common. According to the Report of the Inter-Ministerial Task Force on Agricultural Marketing Reforms, micro-level studies reveal that about 50% of the marketable surplus of small/marginal farmers is disposed off in distress sale. It is normal for a farmer to get 10-15% discounted price for spot payment for his produce. **Pledge loans to farmers need to be liberalised and encouraged to help the farmers to overcome this problem.**
x. **Credit business potential in marketing infrastructure:** The banking system needs to develop credit business potential of financing projects for improving/modernization of markets, storage including cold storage facilities, rural based transport operators, etc.

xi. **Negotiable warehouse receipt:** There is a need to encourage instruments based or secondary markets of agriculture produce. The constraints in improving the negotiability of warehouse receipts need to be removed.

xii. **Pariwar Bima Policy:** An integrated micro insurance policy providing floating cover for various risks i.e., hospitalisation of husband, wife and dependents, natural death, accidental death, permanent total or permanent partial disability and loss/ damage to dwelling unit etc., may be introduced with government support for the poor. The Panchayats and NGOs/ Self Help Groups could be the delivery arrangement for reaching a large number of clients. The government may meet a part of the premium cost as a life saving support towards a safety net for the poor.

xiii. **Rural Insurance Development Fund:** A Rural Insurance Development Fund may be created to take up development work for spreading rural insurance.

xiv. **Crop Insurance:** Crop insurance is covering about 14% of the farmers. The need is to expand the cover to all farmers and all crops in a time bound manner. The scheme needs to be made more farmer friendly and the premium reduced.

xv. Establish **Credit Counseling Centres** where severely indebted farmers can be provided with a **debt rescue package** of information in order to get them out of the debt trap, and thereby save them from committing suicide.

xvi. Establish in every block a **Self-help Group Capacity Building and Mentoring Centre** in order to equip members and managers of SHGs with the needed management, marketing and accounting expertise. The use of Kisan Call Centres needs to be popularized.

xvii. Develop and introduce an integrated credit-cum-crop-livestock-human health insurance package.

xviii. Promote credit and insurance literacy through the **Every Village a Knowledge Centre** movement. For this purpose, introduce policies for more extensive use of Community Radio linked to the internet/ cell phone.
6.4. **Technology:**

i. Technology is the prime mover of change. Both technology fatigue and technology gap should be avoided. This will call for revitalization of research, education and extension systems. It is suggested that all ICAR institutions and Agricultural Universities may commemorate 2006–07 as the **Agricultural Technology Year**. The major aim of this year should be to strengthen participatory research and knowledge management with farming families and the organisation of about 60,000 Lab to Land programmes in the area of post-harvest technology and value addition to primary products. Farm schools should be established in the fields of farmer-achievers in order to foster farmer to farmer learning of new technologies.

ii. Agricultural scientists should state the performance of new varieties and technologies in terms of **net income per hectare**, and not just in terms of yield per hectare. The aim of technological transformation of farming should be to enhance income per hectare on an environmentally sustainable basis.

iii. There should be a proper match between production and post-harvest technologies and a post-harvest technology wing should be added to every Krishi Vigyan Kendra. Also, Lab to Land demonstrations should include post-harvest technology. **About 60,000 Lab to land demonstrations may be organized in the area of post-harvest handling, processing and value addition during 2006-07 to mark the 60th anniversary of our independence. Many of them should be organized in dry-farming areas, where millets, pulses, oilseeds and cotton are grown.** The help of CSIR and the Central Food Technology Research Institute (CFTRI), Mysore should be taken by ICAR while designing the Lab to Land programme. The demonstration should be so designed that they also serve as training ground.

iv. For landless agricultural labour (both women and men), the aim should be to convert them into skilled workers, thereby adding economic value to their time and labour. The training should be in skills which can help in organizing market-
driven enterprises and the training methodology should be based on the principle of learning by doing.

v. Management procedures which can confer the economy and power of scale to small and marginal farm families, such as Small Holders’ Cotton and Horticulture Estates should be popularized. In such estates, production and biomass utilization can receive concurrent attention. Average farm size is going down steeply, and Farmers’ SHGs in the form of joint management units like the Cotton, Horticulture, Aquaculture and other Estates are urgently needed. The SHG movement should cover both the production and post-harvest phases of farming.

vi. Value addition to biomass will help to generate skilled jobs. Rice occupies the largest area in the country and the opportunities for generating more jobs and income by establishing Rice BioParks. Similarly, eco-boards can be produced from cotton stalks.

vii. There should be a pro-nature, pro-poor and pro-woman orientation to technology development and dissemination. Organic Farming and Low External Input Sustainable Agriculture (LEISA) techniques should be promoted along with Integrated Natural Resource Management and Integrated Pest Management (IPM) techniques. The role of women, both as farmers and farm labour is critical for the success of eco-farming practices. Hence, all programmes designed to foster access to technologies must be gender sensitive.

viii. Agricultural and Rural Universities, Home Science colleges and Research Institutes should foster participatory research and knowledge management systems with farm women and men. They should identify farm families from whom other farmers can learn (land to land transfer of technology). Farm Schools should be established in the fields of such farmer-achievers as recommended in the first report of NCF.

ix. New technologies like biotechnology (BT) and Information, Communication Technology (ICT) should be demystified and a cadre of Rural Farm Science Managers should be developed by training a couple of women and men members of every Panchayat/ local body in the management of new technologies, such as
the establishment of refugia in Bt Cotton fields and the detection of spurious seeds by using the Bt detection kit developed by the Central Institute for Cotton Research, Nagpur. Under the 73rd Constitution Amendment, the responsibility of Panchayats includes agriculture and agriculture extension. **Therefore, a Scientist – Panchayat linkage is the need of the hour.** Genome Clubs may be organized in village schools and KVKs to spread genetic literacy. Illegal release of genetically engineered crop varieties like Bt Cotton should be stopped. Spurious seeds will ruin the spread of useful technologies.

x. Inputs are needed for output. Hence, the right inputs should be available at the right time and place at affordable costs. Input supply systems should become farmer-friendly and also controlled by Farmer Self Help Groups to the extent possible. Quality standards should be enforced. The package of technology to be effective must be accompanied by an appropriate package of services in the areas of extension and input supply.

xi. Energy is a key input. The energy sources needed by farm families, both electricity and diesel, should be available in a reliable manner and at affordable price. In addition, solar energy could be tapped where economical. There should be a Panchayat-led integrated energy generation and management movement.

xii. ICT should be effectively harnessed to empower rural men and women through the Every Village a Knowledge Centre Movement with farming system and season specific information.

6.5.1 **Market:** Ultimately, it is only opportunities for assured and remunerative marketing that will determine the economic viability of farming both as a way of life and a means to livelihood. Market reform should begin with production planning, so that every link in the cultivation-consumption-commerce chain receives adequate and timely attention.

6.5.2 The existing State Land Use Boards are not equipped to provide proactive advice to farmers on land use planning. There is an urgent need for a **National Land Use Advisory Service, linked to State and Block Level Land Use Advisory Services** on a
hub and spokes model. These can be virtual organisations with the capacity to link land use decisions with ecological, meteorological and marketing factors on a location and season specific basis. The National Land Use Advisory Service can be linked to the proposed Indian Trade Organisation (ITO) as described later. It should have continuous contact with IMD, ISRO, Agricultural Universities and Departments, Commodity Exchanges and Futures Markets, APEDA, Commodity Boards and all credible national and international sources of information on domestic and international markets. The Land Use Advisory Service should cover crop and animal husbandry, horticulture, inland fisheries, forestry and agro-forestry, and have the capacity to proactively assess potential surpluses and shortages of essential commodities.

6.5.3 The State and Block level Land Use Advisory Service Organisations should have appropriate linkages to data providers at the State and local levels. The Block level Advisory Service can be located in the ISRO supported Village Resource Centres under the Mission 2007: Every Village a Knowledge Centre Movement.

6.5.4 Land use advice should be based on the quantity and quality of the available irrigation water and temperature. The National and State Level Land Use Advisory Services should also monitor the state of crops and issue timely warning on emergent surpluses and shortages. If this is done, situations like the recent onion shortage crisis can be avoided. Without economically and ecologically sound and proactive advice on land and water use, farmers will have to fend for themselves in taking decisions on what to grow. With the spread of agricultural globalisation, this can be disastrous to the economic health of farmers.

6.5.5 Amendment to Acts/legal instruments: The Essential Commodities Act and other legal instruments including the State Agriculture Produce Marketing Committee Acts [APMC Acts] relating to marketing, storage and processing of agriculture produce need to be reviewed in order to meet the requirements of modern agriculture and attracting private capital in this sector. We are glad that the Union Ministry of Agriculture has already taken action in this area.
6.5.6 **Periodic rural market:** There is a need for focused attention for improving the rural periodic markets, which are the first contact point for the farmers and also improving the infrastructural facilities at the regulated markets.

6.5.7 **Role of the APMCs/SAMBs:** The role of the APMCs/State Agriculture Marketing Boards need to change from regulatory focus to promotion of grading, branding, packaging and development of distant and international markets for the local produce.

6.5.8 **Commodity-based farmers’ organisations:** Commodity-based farmers’ organisations should be promoted to facilitate direct farmer-consumer linkage.

6.5.9 **Long supply chain – farmers’ organisations – Direct sales:** The supply chain is long and the intermediaries add their margin with very little/no value addition, leading to increase in the price paid by the ultimate consumer and low share of the producer. Farmers’ organisations/direct sale by farmers to consumers should be promoted.

6.5.10 **Post-harvest Operations:** The losses in harvesting, threshing, farm storage, packaging and transportation from farm to market are substantial resulting in huge loss to the farmer and the nation. The extension staff/PRIs could play an important role in educating the farmers in better post harvest management practices. As stressed earlier there is a need for introducing a Post Harvest Technology Wing in every Krishi Vigyan Kendra [KVK].

6.5.11 **MSP Implementation:** Implementation of MSP across the regions needs considerable improvement. Minimum Support Price arrangement needs to be put in place for many important crops other than paddy and wheat. These include for coarse cereals like millets. Without MSP support, advice to farmers on crop diversification could lead to disastrous results.
6.5.12 MIS: The price behaviour of sensitive commodities needs to be closely watched particularly during the glut periods for need-based intervention under the ‘Market Intervention Scheme’ [MIS] of the Government of India.

6.5.13 Import Tariffs: Import tariffs on farm products produced in resource poor regions deserve to be carefully monitored and maintained at such levels as to provide sufficient incentives to dryland farmers.

6.5.14 Pre–production Agreements to sell: Pre-production agreements for sale between the farmers and corporate houses/processing companies/others are being increasingly used in the case of certain vegetables/ fruits/ medicinal plants etc. These agribusiness models are being loosely referred to as ‘contract farming’ though in many of these cases there is no formal contract between the farmers and the prospective buyer. The advantage of such arrangements could be biased in favour of the agribusiness organisation. However, there are beneficial effects of such arrangements to the farmers in the matter of access to adequate/timely credit, good quality inputs, new technology, employment generation, introduction to new crops, separation of production and marketing risks and better farm practices etc. The need is to develop a comprehensive, clean, equitable and farmer centric model agreement, which cannot be abused against the farmers. Special care needs to be taken regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and arbitration mechanism. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/cooperatives to deal with the agribusiness unit on their behalf, one has to be rather cautious about these arrangements.

7. Thus, the National Agricultural Renewal Year Programme of 2006-07, should deal concurrently with soil health enhancement, augmentation of the area under irrigation coupled with efficiency and equity in water use, credit and insurance reform, technology upgradation and dissemination, and farmer-centred marketing. The aim of the Agricultural Renewal Programme will be enhanced productivity per units of arable land and irrigation water, higher profitability, increased on-farm and off-farm employment
opportunities and long-term environmental sustainability. Distress hot spots should receive priority attention.

8. In a globalised economy, we should develop appropriate institutional instruments and policies to safeguard the livelihood security of nearly 70% of our population who depend on crop and animal husbandry, inland and marine fisheries, forestry and agro-forestry and agro-processing for their work and income security. Risk Mitigation and Price Stabilization Funds will be needed. All Technology Missions and the Small Farmers’ Agri-business Consortium (SFAC) should be restructured under competent professional management. Each Mission should have measurable time-bound goals. The Mission Director, an eminent professional, should be in position at least for a period of 5 years.

9. Farmers need appropriate institutional support to enhance their agricultural competitiveness. Institutional support to confer on small farm families the power and economy of scale is vital to enhance the productivity and profitability of small farms. Multiple livelihood opportunities are essential for ensuring the income security of resource-poor farming families, particularly in rainfed semi-arid, arid and hill regions. Mixed farming and improved post-harvest technology leading to value addition to primary products can help to achieve this goal.

10. The Union Minister for Commerce and Industry and the Government of India have done a commendable job in safeguarding the interests of our farm women and men in the recent negotiations at Hong Kong. They have put together a broad-based coalition of the concerned. Postponement of agreement in agricultural negotiations will however prolong the unequal trade bargain entered into at Marrakesh in 1994. As a national self-empowerment measure, we should consider establishing an Indian Trade Organisation (ITO) and our own boxes for domestic agricultural support on the model of WTO’s Blue, Green and Amber Boxes. The value of our annual agricultural production including livestock in 2002-03 was Rs. 5,60,516 crore1. The value of our

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exports of farm commodities in 2002-03 was Rs. 34,654 crores (6.18 % of total agricultural production). Thus only a small proportion of our agricultural commodities enter the global market, since with a population of over a billion, there is a large home market. **Hence, we must segregate the very modest support we extend to our farmers into two groups – those which are of the nature of life and livelihood saving support to small farm families, and those which could be considered as trade distorting in the global market.**

The Indian Trade Organisation (ITO) can be a virtual organisation, specializing in WTO affairs. It can serve as a brain and information bank for enabling Government to take informed and proactive decisions. It can provide timely advice on potential surpluses and shortages in major agricultural commodities, by maintaining a trade watch. The Indian Trade Organisation should serve as a friend and guide to small farm families and should provide proactive advice on land use and crop planning. It should help to save resource poor farm families from the onslaught of the subsidy, technology and capital driven agri-business paradigm of OECD countries. **For this purpose, the proposed National Land Use Advisory Service can function as an arm of ITO.** In addition, ITO should help to impart trade and quality literacy through the national network of Village Knowledge Centres. It should monitor the arrangements for sanitary and phytosanitary measures and ensure that the codex alimentarius standards of food safety are maintained. The ITO will help to build a long-term memory system in relation to home and external trade and help checkmate adverse global trade trends by stimulating timely national action.

11. A schematic outline of the proposed institutional structures for safeguarding lives and livelihoods in rural India is given below:

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2 Agricultural Statistics at a Glance 2004, Ministry of Agriculture, Govt. of India
Indian Trade Organisation (ITO)
(Professionally-led, 21st Century Virtual Organisation established by the Ministry of Commerce & Ministry of Agriculture and Food)

Two Specialised Wings

Farm Commodities consumed nationally (about 93%)
Ministry of Agriculture and Food
National and State Land Use Advisory Service
Livelihood Security Box
- Life saving support
- Implementation of Special Products (SPs) and Special Safeguard Mechanism (SSM)
- Tariff protection
- Quantitative restriction on imports

Enlarging the basket of Farm and Non-farm Commodities for the export market (about 7%)
Ministry of Commerce
WTO Regulations
Market Intelligence and Early Warning

12. Without the support of appropriate institutional structures, farm families will face increasing distress. It should be emphasized that the proposed ITO should accord priority to problems characteristic of the ‘production by masses’ category of farming. It should continuously emphasise the contrasting policy support needed by farm women and men engaged in subsistence farming, as compared to large agribusiness enterprises.
13. The proposed National and State level Land Use Advisory Services could be a part of ITO since this will help to ensure that the proactive advice on land and water use is based on the best available assessment of home and external trade opportunities.

14. **Launch of the Year of Agricultural Renewal Movement**: This movement which will cover the crop year of 2006-07 should be launched with the support of State Governments, Farmers’ Organisations, Business and Industry, Academia, Civil Society Organisations, Panchayati Raj Institutions and Mass Media. The year should end with the adoption by Parliament of a **National Policy for Farmers**, which will help to assure farm women and men that “Jai Kisan” is not an empty slogan. NCF will provide to the Ministry of Agriculture a draft National Policy for Farmers in April 2006, so that it can be widely discussed with farmers’ organisations during May - December 2006 and finally adopted before the 60th anniversary of our independence. We must put faces before figures, if we are to understand the sad plight of farm families. To assure farmers that Government measures agricultural progress not merely on the basis of production targets, but also on the basis of real growth in farmers’ income, figures on annual growth rate in farmers’ income should be given. Such a change in mindset, which regards farm families as the custodians of food security and national sovereignty and not just as “beneficiaries” of small Government programmes, will become explicit by redesignating the Ministry of Agriculture as the “**Ministry of Agriculture and Farmers’ Welfare**”.

15. The various components of the Year of Agricultural Renewal can be discussed and finalized by the Agriculture Coordination Committee chaired by the Prime Minister and the NDC Committee on Agriculture chaired by the Union Minister for Agriculture and Food. State Governments and Panchayati Raj Institutions will have to play the principal role in developing the precise strategies for soil health enhancement, water conservation and equitable and efficient use, credit and insurance, technology choice and delivery, and home and external marketing. The Government of India will have to take urgent steps to protect the over 600 million strong Indian farming community from the onslaught of the highly subsidized agri-business paradigm. International prices of farm commodities often give the wrong impression that farmers in OECD countries are more
efficient. According to Oxfam, the United States provided to about 25000 cotton farmers nearly US Dollars 3.8 billion in subsidies during 2004. No wonder they captured 40% share of global trade in cotton. The MSP for cotton should be worked out on the basis of what an undistorted price of cotton per quintal would be. **The need to announce an advance bonus of Rs. 550 per quintal is urgent in the case of cotton.** It should be noted that cotton farmers constitute a large proportion of those who have committed suicide.

16. **Indian Farmers and Bharat Nirman:** Bharat Nirman will help to foster job-led economic growth in villages and bring about a shift from unskilled to skilled work in the case of women and men without assets like land, livestock or fish pond. Improved communication (roads and telephones) and provision of electricity will help to open up new opportunities in the rural manufacturing and trade sectors. Gandhiji’s dictum that “Gram Swaraj is the pathway to Poorna Swaraj” should be the guiding spirit behind Bharat Nirman.

17. **We offer the following suggestions to ensure that the new deal to rural India also results in a new deal to farm and fisher families.**

17.1.1 **Consultation and Consensus:** Ten million ha of additional land are to be brought under irrigation by 2009. This will consist of the following steps:

   i. Completion of ongoing major and medium irrigation projects: 4.2 mha
   ii. Minor irrigation
   iii. Surface water: 1.00 mha
   iv. Ground water: 1.80 mha
   v. Enhancing utilization of completed projects 2.00 mha
   vi. Ground water development for small and marginal farmers, tribal and Dalits: 1.00 mha
17.1.2 As mentioned earlier, there are ongoing debates in all these areas from the environmental, political and social points of view. Frequently matters have to be settled by courts. Therefore the precise strategy for irrigation water security should be discussed in multi-stakeholder consultations at the State level as soon as possible so that continuous conflicts and litigation can be avoided.

17.2 Capacity Building: At least one woman and one male member of every one of the about 240,000 Panchayats/local bodies should be trained to become Members of a Bharat Nirman Corps. Bharat Nirman will then become everybody’s business. The training of the Members of the Bharat Nirman Corps can be done by Agricultural, Rural and Women’s Universities, IITs and by appropriate NGOs, Farmers’ Organisations, NABARD and Financial Institutions and Business and Industry.

17.3 Care and Management of the Infrastructure: Steps should be taken to ensure that there are adequate funds and institutional structures to maintain and improve the infrastructure created at enormous expenditure. The Gram Sabha should be involved in the process of providing oversight and advice.

17.4 Convergence and Synergy: At the local level, it is essential that there is convergence and synergy among other large social and human development programmes such as the National Rural Employment Guarantee Act and the National Rural Health Mission. Such measures would make the programme for Agricultural Renewal inclusive, ensuring attention to the livelihood security of agricultural labourers and landless families. Priority may be given to the integrated implementation of all these programmes in the Farmers’ distress hotspots in every State. The 500,000 Members of the proposed Bharat Nirman Corps can become the grassroot voices for the Gram Swaraj and Jai Kisan Movements.

18. Knowledge Connectivity: NCF is grateful to the Government of India for accepting the recommendation made in its second report (August, 2005) that Knowledge Connectivity should become fundamental to physical connectivity under the Bharat
Nirman programme. We welcome the following statement in the revised Bharat Nirman document regarding Knowledge Connectivity:

“The Government is committed to expanding rural connectivity through a slew of measures so that rural users can access information of value and transact business. This will include connecting block headquarters with fiber optic network, using wireless technology to achieve last mile connectivity and operating information kiosks through a partnership of citizens, Panchayats, Civil Society Organisations, the Private sector and Government.”

19. The National Alliance for Mission 2007: Every Village a Knowledge Centre facilitated by NCF provides a platform for partnership for achieving the goal of knowledge connectivity under Bharat Nirman. NCF recommends that Government may review its policy towards Community Radio, since a combination of the Internet/ cell phone and community radio will help to take timely information to farmers even in the remotest parts of the country.

20. In 1995, the Supreme Court of India ruled, “air waves or frequencies are public property”. The principle is the same as for seawater enshrined in the immortal Dandi march of Mahatma Gandhi. A successful merger of tele-centre technologies and the radio will help to usher in an era of knowledge revolution in rural India. Efficient disaster management and mitigation will be greatly facilitated by such a step. We therefore recommend that Village Knowledge Centres (VKC) may be permitted to apply for a community radio license. The eligible organisations should also include Gram Sabhas, Cooperatives, ICT-Self Help Groups promoted by NABARD, NGOs and Educational Institutions.

21. As Community radio applicants generally represent rural, remote and deprived communities, with limited funds and access to Delhi, a single window clearance should be given for CR licenses. It is important to recognise that the applicant, being a small outfit in rural areas will not be able to access various departments in government for
clearance. NCF suggests, that the extension and provision of community radio licences to village knowledge centres is seen as a part of Bharat Nirman. In the light of the above, all clearances and documents, including the Wireless Operating License, should be granted within a period of three to four months from the date of receipt of the application. The Community Radio license should be valid for a period of five years from the date of operationalising the radio station, with the option to request an extension for another five years. No license fee should be levied on the CR license holder. The requirement of furnishing a bank guarantee at the time of applying should ideally be done away with, or should be a token amount of Rs 5,000. A community radio station may be permitted to cover an area of minimum of 10 kilometres radius, for which a minimum transmitter power of 100 watts is required. However, in case of hilly, isolated and sparsely populated terrain, a more powerful transmitter or a wider coverage area may be required to reach the target community. In such cases, the transmitter power may be fixed according to topographic and demographic requirements. Broadcasting using transmitters up to half a watt should be de-licensed. The number of frequencies to be allotted for community radio should ideally be fixed at three within a particular coverage area for optimisation.

22. In an era of globalisation and bottom-up approaches to development, Community Radio can act an important medium in strengthening grassroots and mainstream linkages; act as a true people’s medium and contribute towards creating a vibrant, aware and informed community, the hallmark of a true democracy. As one of the signatories to the process of the World Summit on Information Society, India is committed to ensure a political atmosphere that enables the creation of a “people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge.” Extending to the citizens of India, a right over airwaves would be an essential measure in both these regards.

23. A Community Radio Station attached to VKCs may be permitted to cover an area of approximately 10 kilometers radius. In the case of hilly areas as well as fishing zones in oceans, a wider coverage will be needed. Broadcasting using transmitters up to half a
watt should be delicensed. The Community Radio license should follow the programme and commercial codes of the All India Radio. A forward-looking Community Radio Policy which will be in keeping with the spirit of the Right to Information Act is the need of the hour. Knowledge and skill empowerment of farm families is essential for achieving the goals of the Year of Agricultural Renewal.

24. To sum up, we should not remain silent spectators to a steady agricultural decay. Both human security and national sovereignty are at stake. Overall economic growth rates have little meaning if we do not look after the economic health and survival of over 60% of our population. The Year of Agricultural Renewal programme, if implemented with speed and dedication, can help to launch the country on the path of an ever-green revolution in agriculture characterized by continuous improvements in productivity and profitability without associated social or ecological harm. Improving small farm productivity, as a single step, will make the largest contribution to the eradication of hunger and poverty. This, together with the generation of market driven non-farm livelihood opportunities through the proposed ICAR-CSIR 60,000 Lab to Land demonstrations in post-harvest technology and agro-processing will help the country to realize the full benefits of Bharat Nirman.
CHAPTER II

STRENGTHENING AGRICULTURAL RESEARCH:
TOWARDS SCIENCE-LED EVERGREEN REVOLUTION

2.1.0 Introduction

“However efficient the organization which is built up for agricultural demonstration and extension, unless that organization is based on the solid foundations provided by research, it is merely a house built on sand”

(Royal Commission on Agriculture, 1925)

2.1.2 Science and technology are the engines of agricultural growth and development. This was amply demonstrated in the Green Revolution process in India triggered by the development and widespread adoption of high yielding varieties (HYVs) of rice and wheat and ushered in by the synergistic congruence of technological, political and socio-economic forces in 1968. Green Revolution technologies played a major role in increasing food supplies, in lowering and stabilizing food prices, in increasing farm incomes and in generating additional income and employment in the non-farm economy. Even poor producers were able to internalize their production and employment benefits to improve their incomes and food security. Poverty levels in rural areas declined and the country moved from food deficit to food surplus in two decades, thanks to high growth in total factor productivity.

2.1.3 Early projections expected these trends to continue though indications were there in the mid-1990s that a deceleration of the rate of technical change could erode these gains significantly. With respect to the vanguard crops - rice and wheat, and leading regions - northwestern India, there is indeed a deceleration. Wide yield gaps continue for all crops at various levels. New challenges have also emerged even as the traditional concern of sustained food security permits no room for complacency. Poverty and hunger, despite significant improvement are still at unacceptable levels as India is home
to nearly one-fourth of the World’s hungry and poor. It is becoming obvious that past paradigms and institutions will not serve either the cause of growth or of poverty alleviation. No wonder, India is off track in achieving the UN Millennium Development Goals, particularly in the areas of hunger and poverty reduction.

2.1.4 Today, Green Revolution has waned and India’s agricultural growth rate in recent years has slipped below the population growth rate. This has implications for economic growth, food security, equity and rural welfare. The mid-term review of the 10th Plan had also revealed that the progress is way off the track in meeting all the targets set for the Plan period and beyond. This trend must be reversed to help achieve the desired agricultural growth rate of about 4 percent per annum. This requires a multi-pronged strategy, developed around technology flow. We have analysed the nation’s agricultural research and technology development system with a view to suggest as to how the R&D sector should be strengthened and reoriented to play the pivotal role in creating a science-based and knowledge-led evergreen revolution. We are convinced that science and technology will assume even greater role than in the past, but ‘more of the same’ will not serve the cause. Contemporary challenges and opportunities would demand a reorientation of agricultural R&D institutions, strategies, and a new paradigm to steer these.

2.2.0 The State and Trend of Food, Agriculture and Food Security

2.2.1 During the past over 40 years (between 1962-63 and 2003-04), spanning the Green Revolution era, foodgrains production increased from about 83 million tonnes to about 200 million tonnes, primarily due to increase in cereal production, particularly rice and wheat, from 70 million tonnes to nearly 187 million tonnes (Table 1). Oilseeds, sugarcane and cotton productions had also increased by 2 to 3 times. But, the production of pulses remained more or less stagnant, around 12 million tonnes, although in recent years there is some acceleration. As regards livestock production, from 1970 onwards, the growth has been phenomenal, multiplying from 23 million tonnes in the triennium ending (TE) 1972-73 to 88 million tonnes in the TE 2003-04. Today, with an annual
production of nearly 100 million tonnes, India is the largest milk producer in the world. Fish and eggs productions had also multiplied 5 to 6 times.

**Table 1: Production Trend in Indian Agriculture**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Foodgrains</td>
<td>Million tonnes</td>
<td>81.6</td>
<td>103.5</td>
<td>130.8</td>
<td>174.8</td>
<td>199.7</td>
</tr>
<tr>
<td>Cereals</td>
<td>Million tonnes</td>
<td>69.6</td>
<td>92.6</td>
<td>119.5</td>
<td>161.7</td>
<td>186.5</td>
</tr>
<tr>
<td>Pulses</td>
<td>Million tonnes</td>
<td>12.0</td>
<td>10.9</td>
<td>11.3</td>
<td>13.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>Million tonnes</td>
<td>7.2</td>
<td>8.6</td>
<td>10.5</td>
<td>19.1</td>
<td>20.3</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>Million tonnes</td>
<td>101.9</td>
<td>121.6</td>
<td>176.7</td>
<td>241.0</td>
<td>293.5</td>
</tr>
<tr>
<td>Cotton</td>
<td>Million bales</td>
<td>5.3</td>
<td>5.8</td>
<td>7.5</td>
<td>10.3</td>
<td>10.8</td>
</tr>
<tr>
<td>Potato</td>
<td>Million tonnes</td>
<td>2.9</td>
<td>4.7</td>
<td>9.9</td>
<td>15.6</td>
<td>24.2</td>
</tr>
<tr>
<td>Milk</td>
<td>Million tonnes</td>
<td>20.2</td>
<td>23.0</td>
<td>34.0</td>
<td>55.8</td>
<td>87.7</td>
</tr>
<tr>
<td>Eggs</td>
<td>billion nos</td>
<td>3.2</td>
<td>6.6</td>
<td>10.8</td>
<td>21.7</td>
<td>40.8</td>
</tr>
<tr>
<td>Fish</td>
<td>Lakh tonnes</td>
<td>12.2</td>
<td>18.3</td>
<td>24.1</td>
<td>41.2</td>
<td>61.8</td>
</tr>
</tbody>
</table>

*Source: Agricultural Statistics at a Glance 2004*

2.2.2 **The quantum jumps in the productions were realised through quantum jumps in yield.** For instance, cereals yield increased from 750 kg/ha in TE 1962-63 to 1915 kg/ha in TE 2003-04 (Table 2). It is heartening to note that about 70 to 75 per cent of the production increases in most of the commodities were through increases in yield per hectare. It may be further noted that while the Green Revolution had occurred essentially in wheat and rice, its spill-over effect was visible in other commodities and production systems.

**Table 2: Productivity (kg/ha) Trend for Major Commodity Groups**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Foodgrains</td>
<td>698</td>
<td>848</td>
<td>1030</td>
<td>1406</td>
<td>1671</td>
</tr>
<tr>
<td>Cereals</td>
<td>750</td>
<td>924</td>
<td>1150</td>
<td>1599</td>
<td>1915</td>
</tr>
<tr>
<td>Pulses</td>
<td>499</td>
<td>500</td>
<td>492</td>
<td>562</td>
<td>598</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>493</td>
<td>520</td>
<td>580</td>
<td>761</td>
<td>904</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>42961</td>
<td>48902</td>
<td>56251</td>
<td>65129</td>
<td>66477</td>
</tr>
<tr>
<td>Cotton</td>
<td>686</td>
<td>756</td>
<td>944</td>
<td>1367</td>
<td>1330</td>
</tr>
<tr>
<td>Potato</td>
<td>7362</td>
<td>9520</td>
<td>13247</td>
<td>15507</td>
<td>18574</td>
</tr>
</tbody>
</table>

*Source: Agricultural Statistics at a Glance 2004*
2.2.3 However, as seen in Figures 1 and 2, production of cereals, oilseeds, sugarcane and cotton from 1996 onwards has remained stagnant and at times even declined. Nonetheless, lately (during 2004-05), cotton production has shown remarkable progress and has increased to about 243 lakh bales in 2005 from about 138 lakh bales in 2003. During the same period, the cotton lint yield has increased from less than 300 kg/ha to over 500 kg/ha (partly attributed to the rapid adoption of Bt Hybrid cotton varieties). Fortunately, although slightly decelerated, livestock and fish productions continue to maintain steady growth (Figure 3).

**Figure 1. Cereals, Pulses and Oilseeds Production**

Source: Agricultural Statistics at a Glance 2004

**Figure 2. Sugarcane and Cotton Production**

Source: Agricultural Statistics at a Glance 2004
2.2.4 During the next 5 to 15 years (by the years 2010 and 2020), foodgrains production will need to be increased by about 45 and 90 million tonnes, respectively, from the current level (Table 3), requiring an annual growth rate of 1.96 percent, against 2.18 percent registered during 1995 to 2000. Human demand for high value food products, namely, fruits, vegetables, milk, meat, egg and fish, as evident from the past consumption trend (Table 4), and further propelled through income growth (GDP growing annually by 7 to 8 percent), is projected to increase by about three-fold towards the year 2020 at a high trend growth rate of about 4 to 5 percent (against a trend growth rate of about 1.96 percent for foodgrains) (Table 5).

### Table 3. Domestic Demand for Foodgrains by Commodities

<table>
<thead>
<tr>
<th>Foodgrains</th>
<th>Domestic demand (mt)</th>
<th>Demand growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>77.0</td>
<td>103.7</td>
</tr>
<tr>
<td>Wheat</td>
<td>61.7</td>
<td>84.2</td>
</tr>
<tr>
<td>Coarse grains</td>
<td>27.6</td>
<td>35.8</td>
</tr>
<tr>
<td>Pulses</td>
<td>14.2</td>
<td>23.0</td>
</tr>
<tr>
<td>Foodgrains</td>
<td>180.5</td>
<td>247.8</td>
</tr>
</tbody>
</table>

2.2.5 Given that nearly 600 million Indian people (about 60% of the total population are directly dependent on agriculture, comprising about 120 million farm families, the country, of necessity, aims to meet its food and agricultural demand almost entirely from its domestic production. Thus, the demand projections closely match the production targets (Table 6). As seen in Table 6, area under foodgrains in 2010 will be only 121 million ha against 124 million ha in TE 1994-95. Therefore, the projected additional production towards the years 2010 and 2020 must accrue entirely through yield increases of about 50 to 100 percent over the base year TE 1994-95 (Table 7).
**Table 6. Production Targets for the Years 2010 and 2020**

<table>
<thead>
<tr>
<th>Items</th>
<th>TE 1994/95</th>
<th>Area in years 2000 to 2010</th>
<th>Production Target (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mha)</td>
<td>(mha)</td>
<td>2010</td>
</tr>
<tr>
<td>Crops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>42.19</td>
<td>42.18</td>
<td>103.6</td>
</tr>
<tr>
<td>Wheat</td>
<td>25.13</td>
<td>26.24</td>
<td>85.8</td>
</tr>
<tr>
<td>Coarse grains</td>
<td>33.25</td>
<td>30.69</td>
<td>34.9</td>
</tr>
<tr>
<td>Total cereals</td>
<td>101.57</td>
<td>99.11</td>
<td>224.3</td>
</tr>
<tr>
<td>Pulses</td>
<td>22.59</td>
<td>21.69</td>
<td>21.4</td>
</tr>
<tr>
<td>Foodgrains</td>
<td>124.16</td>
<td>120.8</td>
<td>245.7</td>
</tr>
<tr>
<td>Fruits</td>
<td>3.2</td>
<td>3.2</td>
<td>56.3</td>
</tr>
<tr>
<td>Vegetables</td>
<td>5.1</td>
<td>5.28</td>
<td>112.7</td>
</tr>
<tr>
<td>Livestock and poultry products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>-</td>
<td>-</td>
<td>103.7</td>
</tr>
<tr>
<td>Meat &amp; eggs</td>
<td>-</td>
<td>-</td>
<td>5.4</td>
</tr>
<tr>
<td>Marine products</td>
<td>-</td>
<td>-</td>
<td>8.2</td>
</tr>
</tbody>
</table>


**Table 7. Target Yield (kg/ha) Levels to Meet the Future Demand**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield achieved in TE 1994/95</th>
<th>Required yield level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Rice</td>
<td>1851</td>
<td>2456</td>
</tr>
<tr>
<td>Wheat</td>
<td>2420</td>
<td>3270</td>
</tr>
<tr>
<td>Coarse grains</td>
<td>979</td>
<td>1137</td>
</tr>
<tr>
<td>Total cereals</td>
<td>1688</td>
<td>2263</td>
</tr>
<tr>
<td>Pulses</td>
<td>593</td>
<td>987</td>
</tr>
<tr>
<td>Foodgrains</td>
<td>1489</td>
<td>2034</td>
</tr>
<tr>
<td>Fruits</td>
<td>10281</td>
<td>17656</td>
</tr>
<tr>
<td>Vegetables</td>
<td>13921</td>
<td>21345</td>
</tr>
</tbody>
</table>


2.2.6 As seen in Figure 4, the average yield at the national level is required to be improved by 33 per cent for rice, 35 per cent for wheat, 16 per cent for coarse cereals, 66 per cent for pulses, 37 per cent for vegetables and 72 per cent for fruits by 2010 over the base year 1994-95. By 2020, the yield level over the base period yield is required to be improved by 56 per cent for rice, 62 per cent for wheat, 36 percent for coarse
cereals, and 116 per cent for pulses. The production of livestock and poultry products must be improved by 70-80 per cent by the year 2010 and 136-157 per cent by the year 2020. This level of yield improvement requires serious efforts on the part of the National Agricultural Research System (NARS). The emphasis for achieving the required increments in yield levels must be placed on regions where the current yield levels are low.

Figure 4. Required Improvement in the Productivity Over the Year 1994-95


2.2.7 Annual total agricultural production is a function of extent of cultivated area, yield per hectare and cropping intensity. The cropping intensity (currently around 130 percent) and yield per ha largely depend on water availability (irrigation intensity), plant nutrient application and availability (fertiliser consumption) and on extent of area coverage under quality seeds of modern varieties – the three pillars of the Green Revolution, of course, duly supported by appropriate policies and services. As seen in Table 8, net cropped area increased from 135 million ha in 1961 to 142 million ha in 1981 and since then has stagnated and even marginally decreased. Area under irrigation has more than doubled from about 25 million ha in 1961 to 55 million ha in 2001. Quantum jump had occurred in fertiliser consumption which increased from 0.34 million tonnes in 1961 to over 16 million tonnes in 2001 (in elemental terms, the nutrient
supply increased from less than 10 kg NPK per ha to over 90 kg NPK per ha). The coverage under High Yielding Varieties (HYVs) of rice and wheat ranges from about 60 percent to almost 100 percent, varying from State to State and region to region within States, the adoption being much higher under irrigated conditions as compared to that in rainfed and other non-congenial settings.

Table 8. Input use in Agriculture

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Cropped Area</td>
<td>Million ha</td>
<td>135.4</td>
<td>139.7</td>
<td>141.9</td>
<td>141.6</td>
<td>141.0</td>
</tr>
<tr>
<td>Irrigated Area</td>
<td>Million ha</td>
<td>24.9</td>
<td>31.6</td>
<td>40.5</td>
<td>49.9</td>
<td>54.7</td>
</tr>
<tr>
<td>Fertilizer Consumption</td>
<td>Thousand tonnes</td>
<td>338</td>
<td>2657</td>
<td>6064</td>
<td>12728</td>
<td>16094*</td>
</tr>
</tbody>
</table>

*Figures relate to 2002-03; Source: Agricultural Statistics at a Glance 2004

2.2.8 In recent years, however, the three pillars of the Green Revolution have weakened. The growth in fertiliser use has greatly decelerated. Non-availability of quality seed in adequate quantity, at desired time and at reasonable cost, is a major constraint. The irrigation growth has also decelerated and has often accentuated salinity and water logging problems. The use efficiency of all the three factors has thus greatly deteriorated. The rates of adoption of new technologies have also been far below its expected level (Table 9). These adverse trends of resource use and technology transfer are certainly responsible for the sluggishness of Indian Agriculture in recent years.

Table 9. Percentage Farmers Using Modern Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Kharif</th>
<th>Rabi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>75.7</td>
<td>54.2</td>
</tr>
<tr>
<td>Improved Seed</td>
<td>46.3</td>
<td>34.3</td>
</tr>
<tr>
<td>Pesticides</td>
<td>46.4</td>
<td>30.8</td>
</tr>
<tr>
<td>Veterinary Service</td>
<td>30.3</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Source: Chand, Ramesh, 2005. WTO and Indian Agriculture: Issues and Experience

2.2.9 Table 10 gives the composition of agricultural economy of different States as well as of the country as a whole. The contribution of crops sub-sector to the agricultural economy has decreased from 76% in 1981 to 66% in 2002 whereas the
contribution of livestock sub-sector has increased from 18% to 25% and that of fisheries from 1.9% to 4.4%. Considerable differences amongst the States regarding magnitudes of contributions of the various sub-sectors have emerged over the years. As regards crops, in several States, such as Madhya Pradesh (where the contribution of crops has increased from 70% to 75%), Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and Assam, the contribution was over 70%. The livestock sub-sector contributed over 30% to the agricultural economy in Rajasthan, Punjab and Haryana and between 25% to 30% in the States of Andhra Pradesh and Himachal Pradesh. The fisheries sub-sector had relatively high importance in the States of Goa, Andhra Pradesh, Assam, Gujarat, Orissa and West Bengal. These trends must be internalised while allocating resources and setting priorities for research and technology development programmes in different States and regions.

Table 10. Composition of agricultural economy in India (%)

<table>
<thead>
<tr>
<th>States</th>
<th>Crop sector</th>
<th>Livestock sector</th>
<th>Forestry</th>
<th>Fishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>82.2</td>
<td>79.8</td>
<td>62.7</td>
<td>14.2</td>
</tr>
<tr>
<td>Assam</td>
<td>79.4</td>
<td>79.3</td>
<td>73.6</td>
<td>12.8</td>
</tr>
<tr>
<td>Bihar</td>
<td>73.2</td>
<td>63.8</td>
<td>68.8</td>
<td>21.3</td>
</tr>
<tr>
<td>Goa</td>
<td>64.6</td>
<td>69.4</td>
<td>69.0</td>
<td>14.0</td>
</tr>
<tr>
<td>Gujarat</td>
<td>81.5</td>
<td>73.7</td>
<td>63.9</td>
<td>13.7</td>
</tr>
<tr>
<td>Haryana</td>
<td>69.4</td>
<td>70.6</td>
<td>66.8</td>
<td>30.0</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>58.6</td>
<td>59.2</td>
<td>58.4</td>
<td>21.1</td>
</tr>
<tr>
<td>Karnataka</td>
<td>80.7</td>
<td>81.7</td>
<td>72.5</td>
<td>15.2</td>
</tr>
<tr>
<td>Kerala</td>
<td>75.1</td>
<td>72.8</td>
<td>62.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>70.3</td>
<td>72.5</td>
<td>75.2</td>
<td>18.3</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>73.9</td>
<td>71.3</td>
<td>71.8</td>
<td>18.3</td>
</tr>
<tr>
<td>Orissa</td>
<td>84.6</td>
<td>86.7</td>
<td>75.0</td>
<td>6.2</td>
</tr>
<tr>
<td>Punjab</td>
<td>73.2</td>
<td>72.6</td>
<td>68.1</td>
<td>25.6</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>72.6</td>
<td>70.6</td>
<td>64.4</td>
<td>26.2</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>79.2</td>
<td>76.2</td>
<td>72.7</td>
<td>18.2</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>78.9</td>
<td>75.8</td>
<td>73.1</td>
<td>18.3</td>
</tr>
<tr>
<td>West Bengal</td>
<td>72.7</td>
<td>67.1</td>
<td>67.3</td>
<td>16.7</td>
</tr>
<tr>
<td>All India</td>
<td>76.2</td>
<td>73.7</td>
<td>66.1</td>
<td>18.3</td>
</tr>
</tbody>
</table>

Source: National Account Statistics
2.2.10 FAO estimates reveal that the number of undernourished people in India increased from 216 million in 1990-92 to 221 million in 2000-02, although the number had decreased to 203 million in 1995-96 (Figure 5). During the same period, in China, the number of undernourished decreased from 194 million in 1990-92 to 146 million in 1995-96 and to 142 million in 2000-02. **Micronutrient and vitamin A deficiencies posed greatest health problem in India.** As seen in Figure 6, in the year 2000, 57 percent of the pre-school children in India suffered from vitamin A deficiency against 41 percent in Sub-Saharan Africa and 16 percent in China. **This slow or even negative progress (in terms of absolute number of undernourished) in India’s food security, to a large extent, was related to the slow growth in already low income of farming households**, increasing from Rs 9,049 during 1969/70-1973/74 to Rs 11,223 during the year 1999/00-2003/04. **The income disparity between agricultural workers and non-agricultural workers doubled from 1:3 during 1979-84 to 1:6 during 1999-2004 (Figure 7).**

![Figure 5. Number of People Undernourished](source: FAO 2005)
Figure 6. Vitamin A Deficiency in Preschool Children

Source: Micronutrient Initiative and UNICEF 2005

Figure 7. Per Worker Income in Agriculture and Non Agriculture

Source: Chand Ramesh, 2005. WTO and Indian Agriculture: Issues and Experience

2.2.11 Despite a deceleration in rate of growth of human population in recent years, India’s projected total population in 2010 will be 1.19 billion, comprising 815 million rural people (68 percent of the total population). The agricultural population will
account for about fifty percent of the total population and 71 percent of the rural population. Poverty projection for 2006-07 suggests that of the 220 million of the people below poverty line, 171 million will be rural people, of which nearly 122 million will be farmers or their family members. **In other words, while poverty will continue to be essentially a rural phenomenon, the majority of the poor people will be from the farming community.** This is not difficult to understand as one sees the declining trend of the contribution of agricultural GDP to the total GDP. As seen in Table 11, during the past eight years, the post reforms era - 1995/96 to 2003/04, the agricultural GDP grew only by 1.86 percent per annum whereas during 1980/81 to 1994/95 it grew by 3.33 percent. The corresponding figures for the non-agricultural GDP were 6.95 and 6.56 percent, respectively. Further disaggregation shows that within agriculture the crops GDP had grown only by 1.18 percent whereas the livestock GDP grew by 3.7 percent.

**Table 11. Growth Rate in GDP agri. and Non agri. in Different Periods, %/year**

<table>
<thead>
<tr>
<th>Period</th>
<th>Total</th>
<th>Non-agri.</th>
<th>Agri.</th>
<th>Fishery</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Pre green revolution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950/51 to 1964/65</td>
<td>3.95</td>
<td>5.59</td>
<td>2.66</td>
<td>4.79</td>
</tr>
<tr>
<td>II Green revolution period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965/66 to 1979/80</td>
<td>3.62</td>
<td>4.4</td>
<td>2.76</td>
<td>3.47</td>
</tr>
<tr>
<td>III Wider technology dissemination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980/81 to 1994/95</td>
<td>5.37</td>
<td>6.56</td>
<td>3.33</td>
<td>6.29</td>
</tr>
<tr>
<td>IV Post reforms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995/96 to 2003/04</td>
<td>5.69</td>
<td>6.95</td>
<td>1.86</td>
<td>4.17</td>
</tr>
</tbody>
</table>

*Source: Chand, Ramesh, 2005. WTO and Indian Agriculture: Issues and Experience*

2.2.12 There must be a paradigm shift from the concept of macro-level food security at the National level (i.e., the per capita availability of food) to nutrition security at the level of each individual child, woman and man. Nutrition Security is best defined as "physical, economic, social and environmental access to balanced diet and clean drinking water”. **The major cause of household and individual level food insecurity in our country is the lack of the minimum purchasing power essential for economic access to balanced diet. The famine of jobs/ livelihood opportunities leads to the famine of food at the household level, thus emphasizing the need for ensuring**
that our development strategies lead to job-led and not jobless economic growth. Farmers are also consumers and hence 70% of the consumers in India are also those who earn their livelihood in farming. Therefore, under our conditions enhancing agricultural productivity per units of land, water and labour is the speediest way of ending poverty-induced chronic undernutrition. Another problem of the Indian agricultural economy is that of the intensity (Table 12). It may be emphasized that the smaller the farm, the greater is the need for marketable surplus, so that the family has adequate cash income. With the increasing fragmentation of land and continuing decrease in average size of farm holdings, part time off-farm employment of marginal and sub marginal farmers would become a necessity for livelihood security. In this context, the newly enunciated National Rural Employment Guarantee Scheme, the Food for Work Programme and the National Food Guarantee Programme (proposed by NCF) could be extremely effective in enhancing livelihood security of the farmers and of other rural poor, particularly through strengthening skilled employment.

2.2.13 The intensity of small farms (<2 ha) in the country will further increase, reaching 83 percent in 2010/2011 (from 63 percent in 1960/61). About 45 percent of the total cultivated area will be operated by smallholders and the rest 55 percent will be operated by medium-and large holders, which together would constitute 17 percent of the total farming households (Table 12).

Table 12. Percentage Share of Operational Holding by Size Groups

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Number of operational holding (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;2)</td>
<td>63</td>
<td>70</td>
<td>74</td>
<td>78</td>
<td>81</td>
<td>83</td>
</tr>
<tr>
<td>Medium (2-4)</td>
<td>19</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Large (&gt;4 ha)</td>
<td>18</td>
<td>15</td>
<td>12</td>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>B. Area of operational holding (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;2)</td>
<td>19</td>
<td>21</td>
<td>26</td>
<td>32</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Medium (2-4)</td>
<td>20</td>
<td>19</td>
<td>21</td>
<td>23</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Large (&gt;4)</td>
<td>61</td>
<td>61</td>
<td>53</td>
<td>44</td>
<td>36</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: Jha, Dayanatha, Presidential Address, 60th Annual Conference of Indian Society of Agricultural Economics
2.2.14 Agricultural Research must be refocused in a manner that science not only helps to enhance productivity, but also income through farming system diversification and value addition. Value-added employment involves a paradigm shift from unskilled to skilled work and from routine on-farm to value-added off-farm livelihoods. Over a third of the rural population is assetless, i.e., they do not possess land or livestock or fish pond. Concurrent attention to skilled on-farm and non-farm employment is essential for alleviating poverty and chronic undernutrition. Unfortunately, agricultural research institutions are yet to work in an integrated manner to achieve the triple goals of ‘more food, more income and more jobs”, all in an environmentally sustainable and socially equitable manner.

2.2.15 Our planning process over the past decades in the agricultural sector has been focused on increasing foodgrains production. All strategies have been addressed to the crop sector and rightly so, because focus was providing the foodgrains. But incidental to such planning process, the livestock sector got neglected and in its wake the landless and the marginal farmers, who constitute 58% of the rural population, never received due attention. Incidentally, this resource poor population sustains itself through 481 million livestock and 410 million poultry which serve as the most critical components of our rural production system.

2.3.0 Changing Contours of Indian Agriculture

2.3.1 Opening up of the economy and integration in global market implies dismantling of protective restrictions intended to safeguard national interests, and enhancing our competitiveness. Food self-sufficiency, maintaining low food prices, raising agricultural exports, and investments for upgrading production potential in a cost-effective and sustainable mode were overriding concerns. These generated a stream of protective and incentive instruments (all bunched in AMS) which need adjustments under the liberalized regime and imply massive restructuring of the price structure. Agriculture is responding to these forces as well as to changing IPR regimes.
2.3.2 The most profound shift pertains to **rapid privatization** in all domains - production, consumption, investment, technology, etc. and concomitant decline in State control. Alternative instruments and approaches are evolving to transform agriculture and a very important part of this ‘learning’ phase is a redefinition of the role of the State. Public goods, welfare imperatives, other regulatory needs, and other areas of market failure will continue to need government intervention. **A matter of concern globally is shrinking investment in international public goods.**

2.3.3 Policies and instruments which served well in yesteryears have either been overstretched or are untenable in the current scenario. There is consensus that the unfolding challenges of Indian agriculture can only be addressed through science and technology, and that a different R&D paradigm - a **national innovation system** integrating all facets of rural life and stakeholders would be necessary. **While Centrality of the efficiency mantra is essential for meeting the growth objectives, sustainability issues would also become critical.**

2.3.4 The agrarian structure is in a flux. There is inexorable downward pressure on farm size and increasing concentration in the lowest size-groups. Increasing migration and occupational restructuring are consequent responses discernible in the countryside particularly in hill and mountain and arid drylands. It is now realized that **smallholder farming must become viable and efficient.** This focus also underscores the importance of **employment and labour intensity of agriculture.**

2.3.5 Agricultural growth in recent years has thrown new sectors and regions into prominence. Livestock, fisheries, horticulture, specialty enterprises (spices, aromatic, organic) and value-added products illustrate this trend. **Market-driven diversification** in a global perspective has become the new paradigm driving future agricultural growth.

2.3.6 Rising capital intensity, particularly in the high-growth sectors of agriculture, has set in motion a new set of forces. Movement of industrial and foreign capital and entrepreneurial resources to agriculture, biased technical change, continuing infirmities in market and other infrastructure, varying knowledge- intensity of the sector
and other factors are ingredients of the evolving scenario which need to be monitored and regulated appropriately. **There is a real threat that left to the market, poor and small farmers will lag further behind.** The soaring imports of vegetable oils and pulses and depressing the domestic production of these commodities is a case in point. **Declining growth in public investments and eroding institutional infrastructure are other disturbing features of the current trend.**

2.3.7 World agriculture, particularly trade, places high premium on **quality.** **Public health and food safety concerns are central themes of global regulatory negotiations.** Indian agriculture has to respond to these. Equally important are sustainability of natural resources (particularly water) and other environmental externalities including global warming and climate change. These could cripple our productive capacity sooner than later. Market failure is widespread in these sectors and difficult regulatory measures confront us.

2.3.8 **The agricultural knowledge sector** will play a pivotal role in exploiting the new opportunities and containing the likely threats. A new philosophy, approach and strategy will be required even as we try to enthuse vigour and vitality in the existing R&D institutions.

2.4.0 **Overview of Agricultural R&D Infrastructure**

2.4.1 Agricultural R&D owes its origin, growth, and sustainability to public support as more than 85 percent of aggregate R&D funding comes from public exchequer. With more than 20,000 scientists and Rs. 30601 million expenditure, it is one of the largest systems in the world.

2.4.2 The public system has large and complex network of Central and State research/education institutions/universities, zonal research stations and co-ordinated research programmes (Table 13). The ‘D’ component has been with the States, under the control of State departments of agriculture. Its isolation has not been successful and there has been a **decline in the extension system across the board.** Consequently, the Centrally supported frontline extension system has grown covering frontline
demonstrations, KVKs (496 and by the year 2007 the Government aims to establish at least one KVK in each 527 district). Current thinking, however, appears to favour NGOs involvement.

Table 13: Institutions in ICAR and SAU’s in India, 2004 - 05

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central</strong></td>
<td></td>
</tr>
<tr>
<td>National institutes (Deemed Universities)</td>
<td>4</td>
</tr>
<tr>
<td>Other Institutes</td>
<td>43</td>
</tr>
<tr>
<td>National Bureaus</td>
<td>5</td>
</tr>
<tr>
<td>Project Directorates</td>
<td>12</td>
</tr>
<tr>
<td>National Research Centres</td>
<td>31</td>
</tr>
<tr>
<td>All Coordinated Research Projects</td>
<td>91</td>
</tr>
<tr>
<td>Central Agricultural University</td>
<td>1</td>
</tr>
<tr>
<td>Krishi Vigyan Kendras</td>
<td>496</td>
</tr>
<tr>
<td>Zonal Research Stations</td>
<td>8</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
</tr>
<tr>
<td>State Agricultural Universities*</td>
<td>40</td>
</tr>
</tbody>
</table>

* Include Horticulture and Veterinary Universities; Source: ICAR Annual Report, 2004-05

2.4.3 The institutional edifice of the State R&E system continues to grow. The number of SAUs has grown from a mere handful in early seventies to 40 now. Unfortunately, funding levels have not kept pace with this and operational as well as scientific resources have degenerated. These trends fly against persistent advice to reorient resources and focus toward local R&D institutions.

2.4.4 Perhaps the most significant trend has been the growing involvement of private sector. This is welcome. However, its exclusive preoccupation with profits restricts its area of interest. The whole subsistence farming sector, the substantial body of new knowledge in public goods domain, poor and fragile eco-systems are examples. Public-private synergy is evolving as a new R&D ideology.

2.5.0 Investment in Agricultural R&D

2.5.1 Current R&D spending is estimated at about Rs. 31 billion annually. It is backed by more than 20 thousand scientists in the research/education sector alone.
Private sector participation has risen rapidly over the last decade and it now accounts for about 14 percent of funding (Table 14). The uptrend in public R&E funding has been consistent, except in more recent years when it has flattened. Operational support however has not kept pace with overall trends. The problem has been serious in the State system whose share in the total R&E expenditure has consistently declined over the past four decades (Table 15).

Table 14. Growth of Private Research in Asia

<table>
<thead>
<tr>
<th>Country</th>
<th>Expenditure (Million 1995 US$)</th>
<th>Annual growth rate (%)</th>
<th>Private as % of total, 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1985</td>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>26</td>
<td>56</td>
<td>7.7</td>
</tr>
<tr>
<td>China</td>
<td>0</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>3</td>
<td>6</td>
<td>6.9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>14</td>
<td>17</td>
<td>1.9</td>
</tr>
<tr>
<td>Philippines</td>
<td>6</td>
<td>11</td>
<td>6.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>11</td>
<td>17</td>
<td>4.4</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2</td>
<td>6</td>
<td>11.0</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>128</td>
<td>7.2</td>
</tr>
</tbody>
</table>


Table 15: Public Investment in Agricultural Research and Education: at 1999 prices

<table>
<thead>
<tr>
<th>Year (TE)</th>
<th>Total R&amp;E expenditure (Rs. Million)</th>
<th>Share of States, %</th>
<th>Expenditure as percent of Agric. GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>6073 (8.6)</td>
<td>69.2</td>
<td>0.32 (4.7)</td>
</tr>
<tr>
<td>1981</td>
<td>8007(1.9)*</td>
<td>52.5</td>
<td>0.40 (1.3)*</td>
</tr>
<tr>
<td>1991</td>
<td>13528(5.2)</td>
<td>56.6</td>
<td>0.45 (1.7)</td>
</tr>
<tr>
<td>2000</td>
<td>20773 (4.0)</td>
<td>50.5</td>
<td>0.50(0.6)*</td>
</tr>
<tr>
<td>CAGR</td>
<td>4.4</td>
<td>-</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Figures in parentheses are growth rates for the preceding decade. *Growth rates are not statistically significant; Source: Jha and Pal 2003(IFPRI), Agricultural Research & Technology Status, Impact and Contemporary Issues

2.5.2 The edifice is large in nominal terms. In relation to the size of the agricultural sector, however, investment intensity is low. At 0.34 percent of agricultural GDP (Figure 8), research intensity is only half of the overall average for all developing
countries (0.6 percent) (Table 16). There is considerable inter-State variability in intensity of State funding (ranging from 0.08 in U.P. to 1.4 in H.P.) (Table 17). With the exception of a few States, commitment to R&E is not strong and in some States (UP, WB) the situation has deteriorated (Figure 9).

Figure 8. Trends in Government Funding to Agricultural Research and Education in India

![Graph showing trends in government funding to agricultural research and education in India.]

Source: Pal, Suresh (2005), NCAP, New Delhi

Table 16. Public Agricultural Research Expenditure in India Relative to Other Regions 2000

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Total spending (Million international dollars)</th>
<th>Intensity (% of AgGDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>1,858</td>
<td>0.34</td>
</tr>
<tr>
<td>China</td>
<td>3,150</td>
<td>0.40</td>
</tr>
<tr>
<td>Brazil</td>
<td>1,020</td>
<td>1.81</td>
</tr>
<tr>
<td>Japan</td>
<td>1,658</td>
<td>3.62</td>
</tr>
<tr>
<td>USA</td>
<td>3,828</td>
<td>2.65</td>
</tr>
<tr>
<td>All Developing Countries</td>
<td>12,819</td>
<td>0.53</td>
</tr>
<tr>
<td>All Developed Countries</td>
<td>10,191</td>
<td>2.36</td>
</tr>
</tbody>
</table>

Table 17. Growth and Intensity of Agricultural R&E Funding by State Governments

<table>
<thead>
<tr>
<th>States</th>
<th>Annual compound growth rate (%)</th>
<th>Funding as share of AgGDP (%)</th>
<th>Funding per scientist, Rs Million</th>
<th>Share in funding by all States (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>6.47</td>
<td>5.48</td>
<td>0.16</td>
<td>0.24</td>
</tr>
<tr>
<td>Assam</td>
<td>5.51</td>
<td>4.08</td>
<td>0.28</td>
<td>0.39</td>
</tr>
<tr>
<td>Bihar*</td>
<td>8.55</td>
<td>4.25</td>
<td>0.13</td>
<td>0.23</td>
</tr>
<tr>
<td>Gujarat</td>
<td>9.71</td>
<td>6.4</td>
<td>0.19</td>
<td>0.54</td>
</tr>
<tr>
<td>Haryana</td>
<td>5.16</td>
<td>6.68</td>
<td>0.28</td>
<td>0.42</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>12.76</td>
<td></td>
<td>0.62</td>
<td>1.37</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>10.97</td>
<td>12.19</td>
<td></td>
<td>0.92</td>
</tr>
<tr>
<td>Karnataka</td>
<td>7.54</td>
<td>6.27</td>
<td>0.19</td>
<td>0.42</td>
</tr>
<tr>
<td>Kerala</td>
<td>5.23</td>
<td>2.79</td>
<td>0.31</td>
<td>0.52</td>
</tr>
<tr>
<td>Madhya Pradesh*</td>
<td>13.29</td>
<td>8.8</td>
<td>0.07</td>
<td>0.21</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>7.06</td>
<td>6.26</td>
<td>0.39</td>
<td>0.59</td>
</tr>
<tr>
<td>Orissa</td>
<td>6.50</td>
<td>2.17</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>Punjab</td>
<td>10.28</td>
<td>5.12</td>
<td>0.24</td>
<td>0.31</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>10.95</td>
<td>5.22</td>
<td>0.12</td>
<td>0.24</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>13.00</td>
<td>5.59</td>
<td>0.21</td>
<td>0.51</td>
</tr>
<tr>
<td>Uttar Pradesh*</td>
<td>5.74</td>
<td>-6.56</td>
<td>0.13</td>
<td>0.08</td>
</tr>
<tr>
<td>West Bengal</td>
<td>2.34</td>
<td>7.45</td>
<td>0.17</td>
<td>0.12</td>
</tr>
<tr>
<td>All States</td>
<td>8.23</td>
<td>5.64</td>
<td>0.19</td>
<td>0.28</td>
</tr>
</tbody>
</table>

* For undivided State, Source: Pardey & Beintema, 2006, Science for Agriculture: Growing Global Divide, IFPRI

Figure 9. Per Capita State Domestic Product and Research & Education Intensity (2001-04)

Source: Pal, Suresh, 2005. NCAP, New Delhi
2.5.3 Dependence of State R&E on the Centre has grown. For outreach programmes also, Central support has become more important. It has been argued that this has crowded out support for hardcore R&E. The conceptual dichotomy between basic/applied research/development and institutions (Central/local) has to be translated in a clear funding policy.

2.5.4 Priority accorded to agricultural R&D is revealed by the fact that this large network was built mainly from domestic resources. There has been a slowdown over the last decade or so and this is reflected in restraints on recruitment of scientists. This has been attributed to the overall policy thrust on downsizing public bureaucracy. Current assessments argue for a need-based approach on this so that priority sector investments remain on track in real sense.

2.5.5 Yet, very modest external assistance has played a useful role in R&D capacity development. In the wake of the evolving IPR regime, global technology markets are tightening. This reinforces the thrust on domestic capacity building and external assistance has a key role to play in this regard. Public good research requires adequate support from public funds.

2.5.6 R&D needs are growing exponentially and substantially enhanced domestic funding is essential to address these. There are pronouncements at the highest level endorsing this. On the other hand, there is also the view that we do not need more of the same. Until the contours of a national policy on public R&D are redefined and clearly enunciated, managers of public finances will remain apathetic.

2.6.0 Scientific Manpower Resources

2.6.1 Scientific manpower is the most critical resource for R&D. There are no official estimates but a recent study shows that there are about 22,000 scientists in the NARS (Table 18); public sector institutions account for more than 95 percent of them. Public extension system is much larger, and taken together, professional manpower in public agricultural R&D appears impressive.
Table 18. Scientific Manpower in ICAR/SAU System

<table>
<thead>
<tr>
<th>Particulars</th>
<th>All ICAR institutes</th>
<th>All SAUs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period: 1992</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of scientists</td>
<td>4,092</td>
<td>17,678</td>
</tr>
<tr>
<td>Full-time researchers</td>
<td>2,999</td>
<td>8,132</td>
</tr>
<tr>
<td>Scientists with Ph.D. degree (%)</td>
<td>68.8</td>
<td>62.6</td>
</tr>
<tr>
<td><strong>Period: 2001/02</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of scientists</td>
<td>4,539</td>
<td>13,633</td>
</tr>
<tr>
<td>Full-time researchers</td>
<td>3,069</td>
<td>5,810</td>
</tr>
<tr>
<td>Scientists with Ph.D. degree (%)</td>
<td>75.7</td>
<td>69.6</td>
</tr>
<tr>
<td>Average of scientist (years)</td>
<td>43.8</td>
<td>45.7</td>
</tr>
<tr>
<td>Percent of scientists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant professor</td>
<td>43.3</td>
<td>45.4</td>
</tr>
<tr>
<td>Associate professor</td>
<td>39.3</td>
<td>34.9</td>
</tr>
<tr>
<td>Professor and above</td>
<td>17.4</td>
<td>19.7</td>
</tr>
</tbody>
</table>


2.6.2 Skill level of scientists in the research and education system is comparable to the best. More than two-third of them hold Ph.D. degrees. The extension system, on the other hand, faces the problem of low proficiency and this has remained a matter of concern from the very beginning. In addition to efforts to upgrade the skill level through intensive training, this has also forced entry of better trained research and non-government personnel in extension system. A highly motivated and trained public extension system is essential to raise the knowledge intensity of Indian agriculture. Dismantled and ad hoc responses are inefficient.

2.6.3 The average age of scientists is growing and this has long-term implications for scientific productivity. This has happened due to divergence between attrition and replacement rates in recent past. Restrictions on recruitments in public sector has affected human resources adversely both by discouraging creation of new positions and by bureaucratic hurdles on filling vacancies.
2.6.4 More than three-fourth of the scientific manpower resources are in States which account for half of the national R&E expenditure. With nearly uniform salary patterns, this reveals structural weakness—support per scientist is significantly lower in the State system (Rs. 0.84 Million against Rs. 1.72 Million). As attention shifts back to strengthening local R&D institutions, this dichotomy will need to be addressed. There cannot be a ‘second rate’ psyche segregating scientists. Institutional dispersion of scientists reveals another constraint. Several ICAR and SAU units are below the critical size. This implies that we create hard infrastructure but often fail to back these up with adequate human resources (humanwares).

2.6.5 Matching human and other resources has not received adequate attention. Finally, there are two serious issues which need reiterating. These relate to decline in scientific manpower in the State system and stagnation in the Central system. This has happened during the phase when the research agenda expanded and diversified. This had consequences like loss of critical mass in research units and programmes. Second, lower support per scientist in the State system does not auger well for the future, particularly since these scientists are expected to play a larger role in research outreach functions.

2.7.0 Institutional Base for Agricultural R&D

2.7.1 Institutional linkages and research coordination are unique strength of the public R&D structure. Private R&D achieves excellence by concentrating high quality resources. This is beyond the reach of public systems, but synergies and complementarities offer similar opportunities. This requires careful planning, an area which has not been given much attention. Consequently, these institutions try to emulate the private sector research institute/laboratory model. This is not tenable logically besides nurturing waste and duplication. Redesigning national R&D must begin from this premise. This requires ‘out of the box’ thinking.

2.7.2 Without professionalizing and modernizing the public extension system, the tripod of research, education and extension cannot be completed. The most important source of synergy breaks down. This has been recognized since long but the resource
implications have kept reforms at bay. The segmented (Centre-State, research/education-extension) and departmental models tried in the past have not been successful. The unique nature of agriculture makes agricultural R&D different from other sectors and makes extension vital. The context is different and other providers are emerging. **A new ball game has been set up and our response has remained outdated.**

2.7.3 **The Green Revolution model of R&D organization is proving inadequate** in the current context for several reasons. An alternative national innovation system paradigm has been proposed which places the farmer (rather than commodity/resource or region) at the Centre and then weaves in the farming system, technology, markets, and other stakeholders. In fact, elements of this concept are emerging in market-led transformation occurring in the countryside but public institutions, including R&D, remain rigidly tied to the past. This approach calls for massive changes in existing institutions.

2.7.4 Clear enunciation of the roles of the Centre, States, local bodies, Panchayati Raj Institutions, private sector, and NGOs in a client-Centred R&D structure is a critical task. Public resources are getting scarcer and its deployment has to focus on efficiency. **Critical scientific and resource mass and modern management must back the human resources. A very strong policy and planning capacity has to be created.**

2.7.5 The emerging IPR regime will have profound implications for public R&D systems. The changing incentive climate will drive resources away from public to private goods and from long-term to short term gains. Both of these detract from the basic rationale of public investment in R&D.

2.7.6 The Central point is that powerful forces have been unleashed by the free trade movement. In countries which have pursued the path of protection for long and have developed institutions accordingly, this change calls for new rules of the game and new institutional arrangements. We have not even begun thinking about how these will affect the existing R&D edifice. **Time is not on our side,** particularly keeping in mind that several of the bilateral and regional trade agreements that our country has signed will
be in force within three to five years. **Post-Hong Kong breathing time space on most global agreements is hardly 10 years.**

### 2.8.0 Research Resource Allocation

2.8.1 R&D became a critical element of agricultural development strategy since the fifties and it has been reasonably well supported. The Green Revolution created a favourable environment and provided a model strategy. As the foodgrains demand-supply balance became manageable, the same strategy was adopted to tackle new and emerging research issues like regional disparities, resource conservation and sustainability, high-growth and high-value commodities, frontier technology sectors, WTO-related research issues and so on. Such initiatives absorbed additional resources which were liberally provided for nearly three decades. There was not much concern regarding resource allocation in this expansion phase; additional resources to implement new schemes (plan) and on-going programmes (non-plan) was the critical issue which became the main monitoring indicator as well.

2.8.2 Public resources gradually became stringent and research priorities, relevance, research productivity and other efficiency-related issues came to occupy centrestage in the nineties. Research resource allocation is the main theme in this debate which strives to create a ‘new look’ national innovation system. The following issues of macro dimensions deserve priority attention and redressal:

- As mentioned earlier, new (**plan**) and on-going (**non-plan**) dichotomy has long been the only resource allocation calculus invoked every five years. Non-plan activities have claimed more and more resources over time and the flexibility to shift resources to new areas has gone down in recent years. This has been the impact of dwindling resources on the one hand and rigidities in non-plan expenditures on the other. **The share of research in total agricultural development expenditure has also gone down.**
• A related consequence has been **decline in operational cost per scientist**. This has hit the State system more and their capacity has been seriously undermined. Functional allocation of research funds emerged as a major issue in the nineties.

• Public R&D embraces research, education and extension. In the last 50 years, the relative emphasis has changed. In the initial post-independence years, the strategy emphasized extension. The assumption was that there was adequate slack in the knowledge system which could be exploited. Over the next three decades, focus shifted to research and capacity building covering research programmes, institutions and human resource development. There has been a noticeable shift in emphasis in recent years and outreach has again come to prominence.

• Research domain includes upstream (basic/strategic) and downstream (applied, on-farm) components and since the reorganization of research in the sixties there has been a division of labour between Central and State institutions along these lines. It has been shown earlier that the Central component has grown faster in terms of investments. It has also moved in downstream areas significantly. It is now realized that **critical weaknesses lie in the State component and this must be addressed, especially keeping in mind that agriculture is a State subject.**

• There are other macro policy issues which have a bearing on allocation of public resources for research. Growth in private research capacity, possible impact of research complementarity and spill-in, use of domestic and external resources, are examples which have all been invoked in research resource allocation debates. The problem all along has been that **the NARS has never articulated a Research Policy Statement**. Not surprisingly, very little analytical attention has been paid to resource allocation questions.

2.8.3 **Current resource allocation profile reveals that there is greater emphasis on R&D activities.** The integrated approach adopted by the public system implies that resources are allocated to research, education/training, and extension. **Table 19 shows** that while almost everyone participates in research, more than 70 percent are involved in teaching/training and extension. Overall, 48 percent of all public R&E resources are
allocated to research, 19 and 33 percent are allocated to teaching and extension, respectively (Figure 10). Despite heavy back-up of support staff, nearly 11 percent of scientific resources are allocated to administrative chores. This amounts to more than a thousand full-time scientists - a waste no system can afford. As expected, Central research resources focus relatively more on research, but research resources allocated to administration is also higher. With little education responsibilities, the private system is able to dedicate more resources (60 percent) to research.

Table 19: Activity Profile of Agricultural Scientists (Percent).

<table>
<thead>
<tr>
<th>Institution</th>
<th>Research</th>
<th>Teaching</th>
<th>Extension</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR</td>
<td>97.2</td>
<td>48.3</td>
<td>57.8</td>
<td>68.8</td>
</tr>
<tr>
<td>Deemed Univ.</td>
<td>99</td>
<td>89</td>
<td>56.7</td>
<td>66.9</td>
</tr>
<tr>
<td>Other Inst.</td>
<td>94.8</td>
<td>36.6</td>
<td>58.1</td>
<td>69.3</td>
</tr>
<tr>
<td>SAU</td>
<td>91.8</td>
<td>79.6</td>
<td>76.6</td>
<td>56.7</td>
</tr>
<tr>
<td>Other public</td>
<td>78.6</td>
<td>64.3</td>
<td>78.4</td>
<td>62.3</td>
</tr>
<tr>
<td>Total public</td>
<td>87.3</td>
<td>67.7</td>
<td>69.6</td>
<td>57.4</td>
</tr>
</tbody>
</table>

Source: Jha, Dayanatha and S. K. Pandey (2005), Research Resource Allocation, NCAP, New Delhi

Figure 10. Percent Distribution of R&D Expenditure, 1999-2001

2.8.4 As regards commoditywise allocation, Figure 11 shows that a major share of agricultural research is crop focused. Foodgrains and horticultural crops, the mainstay of the national food system, account for about 40 percent. The other major groups - livestock and fisheries receive (together about 22 percent) less attention than their importance in agricultural GDP. Food security still remains a strategic concern and claims very high priority. Figures for the Central research sector (ICAR) indicate a more growth-focused allocation with 25 percent resources going to livestock and fish, whereas SAUs allocate only about 19 percent to this sub-sector. The ICAR has a strategic forward-looking role and the allocation profile substantiates this. The table also shows that ground level institutions (SAUs) target their research resources more locally. The emerging private sector is still highly selective in its allocation. The broad pattern of allocation at different institutions is consistent; more rigorous analysis at programme/project level is needed for in-depth analysis of rationality.

Figure 11. Research Focus of Scientist

![Research Focus of Scientist](image)

Source: Jha, Dayanatha and S. K. Pandey (2005), Research Resource Allocation, NCAP, New Delhi

2.8.5 Regional resource allocation analysis revealed that six agro-climatic zones — Trans-Gangetic, Central Plateau and Hills, Western Plateau and Hills, Southern
Plateau and Hills, East-coast Plains and Hills, and West-coast Plains and Hills accounted for more than 58 percent of all research resources. **Lower Gangetic Plains, Eastern Plateau and Hills, and Western Dry Region** were relatively under-emphasized (Figure 12). Strong State systems naturally contributed to regional capacity. ICAR followed a more balanced strategy and also factored in State capacity in its regional allocation. Congruence analysis indicated the need for higher marginal allocation to the zones neglected in the past.

**Figure 12. Percent Distribution of FTE Scientists by Ecoregions**

![Bar chart showing percent distribution of FTE scientists by ecoregions](chart.png)

*Source: Jha, Dayanatha and S. K. Pandey (2005), Research Resource Allocation*

2.8.6 Considering rationality, simple congruence analysis revealed that research resources were broadly allocated in accordance with relative economic importance of commodities. This is what one expects in a mature public system. Knowledgeable scientists and consultative processes lead to this. High congruity index values were obtained with respect to individual commodity groups as well. Condiment and spices was the only group which recorded low index value. Institution–wise assessment VOP and FTE ranking revealed that ICAR and SAUs had high correlations implying that research resources were well aligned, but for ‘other’ public institutions and private R&D, the two were not in accord.
2.8.7 A scoring approach incorporating efficiency, equity, sustainability, and trade/value addition showed the need for marginal adjustments between commodities. It suggested marginal increase in resources allocated for cereals, vegetables, commercial crops, livestock, and condiments/spices groups and withdrawal from pulses, tubers, oilseeds, fibres, plantation crops, and medicinal/aromatic groups. We note that such readjustment proposals are naive and should not be accepted at face value. Research resources allocation decisions are complex and these data and analyses only help in improving the information base for decision making.

2.9.0 Scientific Productivity and Research Impacts

2.9.1 Creation of new knowledge and its application to enhance social welfare are basic measures of effectiveness of a research system. Several indicators are used by analyst to assess this effectiveness. These indicators assess the performance in terms of development of intermediate research products, usable technologies, and their spread and impacts. For agricultural research, which is applied in nature, scientific publications and technologies are the two main outputs. These research outputs also adequately capture other research contributions like development of research methodologies and intermediate products, which either get published in scientific journals, or facilitate technology development.\(^1\) This section examines the trends in these main outputs of the ICAR-SAU system. Brief summary measures to quantify the socio-economic impacts are also discussed.

Research Publications

2.9.2 Research publications include journal articles, books and book chapters, monographs, research and teaching manuals, extension materials, etc. Since consistent time-series data are not available for all of these indicators, research articles indexed by three abstracting sources for agricultural and allied sciences are considered. These are the Science Citation Index (SCI), the CAB Abstracts (CABA), and the Indian Science Abstracts (ISA). Total number of research publications authored by the scientists working

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\(^1\) Patent is another indicator of research product, but this was not considered due to lack of information and emphasis in the system.
in ICAR institutes and SAUs were taken from these three sources. There is a drastic decline in the number of the SCI-indexed publications in 1990 over that in 1980. This decline is deeper for SAUs and it continued even in 2002. ICAR institutes however showed a moderate recovery in 2002. What is more worrisome is that even the institutes and universities with better publication record could not achieve the 1980 level in 2002 (Table 20). This clearly shows depletion of upstream or strategic research in the ICAR and SAU system.

Table 20. Trends in Annual Research Publications of ICAR-SAU System

<table>
<thead>
<tr>
<th></th>
<th>ICAR institutes</th>
<th>SAUs</th>
<th>Total (ICAR &amp; SAUs)</th>
<th>Articles per FTE&lt;sup&gt;b&lt;/sup&gt; scientist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top five&lt;sup&gt;a&lt;/sup&gt;</td>
<td>All institutes</td>
<td>Top five&lt;sup&gt;a&lt;/sup&gt;</td>
<td>All SAUs</td>
</tr>
<tr>
<td>Number of articles indexed in Science Citation Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>446</td>
<td>696</td>
<td>496</td>
<td>758</td>
</tr>
<tr>
<td>1990</td>
<td>123</td>
<td>205</td>
<td>205</td>
<td>292</td>
</tr>
<tr>
<td>2002</td>
<td>143</td>
<td>299</td>
<td>154</td>
<td>231</td>
</tr>
<tr>
<td>Number of articles indexed in CAB Abstracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>690</td>
<td>1,090</td>
<td>951</td>
<td>1,924</td>
</tr>
<tr>
<td>1990</td>
<td>902</td>
<td>1,645</td>
<td>1,664</td>
<td>4,413</td>
</tr>
<tr>
<td>1998</td>
<td>934</td>
<td>2,027</td>
<td>1,672</td>
<td>4,637</td>
</tr>
<tr>
<td>Number of articles indexed in Indian Science Abstracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>651</td>
<td>1,170</td>
<td>1,547</td>
<td>4,308</td>
</tr>
<tr>
<td>2002</td>
<td>432</td>
<td>1,250</td>
<td>1,145</td>
<td>4,786</td>
</tr>
</tbody>
</table>

<sup>a</sup> SCI data are triennium averages; <sup>b</sup> Full-time equivalent (e.g., a scientist spending 50% of his time on research was considered as 0.5 FTE). Source: Pal, Suresh, 2005, NCAP, New Delhi

2.9.3 A sharp decline in the SCI-indexed articles authored by the agricultural scientists echoes the broad trend observed for the Indian science. The total number of SCI-indexed research articles authored by Indian scientists in all fields of science decreased from 14,983 in 1980 to 10,103 in 1990, but rose back to 14,028 in 2002. However, part of the slow recovery of the articles of agricultural sciences during 1990s
could be attributed to a shift towards publication in Indian journals which increased in number over time. These Indian journals were also rated high by the national professional academies and assessment boards.

2.9.4 Trends in the total number of publications of agricultural science are quite encouraging. The number of CABA-indexed publications of the ICAR-SAU system increased from 3,014 in 1980 to 6,058 in 1990, which further rose moderately to 6,664 in 1998. A similar trend was also observed for the ISA-indexed publications. This increase in the number of publications during 1990s is important because the number of agricultural scientists has gone down during this period. The number of publications per scientist per year also increased from 0.48 in 1990 to 0.51 in 1998, registering an increase of about 6 percent (Table 20). This clearly shows an upward trend in scientific productivity of the ICAR-SAU system. However, there are some noteworthy patterns. Nearly 80 percent of the papers were published in the non-SCI journals with zero impact factor and only a small proportion of the papers were published in the journals with an impact factor greater than zero but less than two. About half of the SCI-indexed and more than 70 percent of the total publications were authored by the scientists working in SAUs, which is expected because of their scientific strength and dominance of student research. However, the tendency to publish in the low rating journals is a matter of concern. The average impact factor even for the ICAR articles was 1.1 in 2002, as against 1.6 for CSIR articles, underscoring the need for improving the quality of agricultural science publications in the country.

2.9.5 Given the international norm of two papers per scientist in a year, the current productivity level (0.5 paper) of agricultural research is too low in India. The question now arises how can it be increased? Scientific productivity is directly related with the availability of research resources, both manpower and financial. It is found that an institute with higher budget per scientist is likely to be more productive than a poorly funded institute. At the same time, it is also important how the available resources are used. The institutes with higher proportion of operational expenses in the

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2 Increase in the ISA-indexed articles is sharper due to widening of its coverage of publication sources.
3 The impact factor is the frequency with which an average article from a journal is cited in a particular year.
total expenditure and greater scientific interactions and institutional linkages are likely to have better publication record. In addition, age of an institute capturing institutional factors like history and culture of an organization has a positive impact on the publication efficiency. This is because of the fact that the accumulating stock of tacit knowledge and tradition of “good practices” help in efficient use of research resources and attracting best brains. On the other hand, a high proportion of top cadre scientists are associated with lower scientific productivity. These results have strong implications for the ICAR-SAU system which is dominated by the top cadre scientists. Also, the share of operational expenses in some of the institutions was less than 20%. Thus, balancing the cadre strength and factor-shares in research expenditure are essential for increasing scientific productivity of the system.

Technology–led Enhanced Productivity, Profitability and Sustainability

2.9.6 The number of usable technologies developed is another indicator of scientific productivity, for which time-series data are not readily available. Studies in this area, however, provide useful insights; for example, there is an upward trend in the number of varieties developed for rice - an important crop receiving greater research attention. During the 1970s, 127 rice varieties were released, which rose to 223 in the 1980s — almost doubling the breeding productivity. Part of this jump in the productivity could be attributed to increase in the number of rice breeders. The number of officially released varieties increased to 257 during the 1990s. Besides increase in the number of varieties bred, rice breeding also witnessed some qualitative changes over time. The proportion of varieties with fine quality (long slender) grain increased from 29% in 1970s to 36% in 1990s. Also, there is significant increase in the number of varieties developed for marginal production environments, as well as those tolerant to biotic stresses. This development has contributed to a substantial reduction in yield variability even in the rainfed areas of eastern India. Development of hybrid rice in partnership with the International Rice Research Institute and private seed companies have established yield advantage of 15-20%. Thus, maintaining high and stable yields with improved grain quality is a major contribution of Indian plant breeding programmes. Also, there was focus on breeding short duration rice varieties, which constituted about half of the total
varieties released during 1980s and 1990s. Fast expanding rice trade, especially of Basmati aromatic rices, is triggered by the modern Basmatis which are high yielding, disease and pest tolerant and as good or even better in aroma and quality when compared with traditional varieties.

2.9.7 Similar trends are also observed in breeding programmes for other crops. For example, in maize, the number of varieties (50) developed during 1980-1993 was higher than those developed (45) during 1960-1980. Also, there was a shift in breeding focus from varieties to hybrids during the 1980s. Recently, high protein maize hybrids are developed to meet the rising demand for food and feed. In the case of wheat, so far more than 200 varieties have been released for cultivation in India, and yield potential has been increasing by one percent per year due to the persistent improvement in plant type. Improvement in grain quality (for chapati making) and development of rust resistant varieties are the other significant contributions of the wheat breeding programmes. After the mid-nineties, an additional yield potential of about 0.7 tonne/ha has been established on farmers’ fields, which is likely to be enhanced further through exploitation of hybrid vigour in wheat breeding. The success of crop breeding programmes, coupled with the policy of open access to public material, has contributed rather significantly to the growth of private seed industry in the country.

Total Factor Productivity Growth and Rates of Return

2.9.8 Scientific contributions of the Indian agricultural research system are periodically reviewed by various expert committees and government bodies at different levels, and sustenance of the funding indicates that the Central and State governments are convinced of positive contributions of agricultural research. This is evident from a number of technological revolutions, often referred to as ‘rainbow revolutions,’ ushered in different sectors of Indian agriculture. Socio-economic impacts of these revolutions have been assessed quantitatively by a number of studies done by the national and international organizations. It is shown that investment in agricultural R&D is a ‘win-win’ option as it is the largest contributor to agricultural total factor productivity (TFP), which in turn reduces rural poverty significantly. Although there are
considerable variations, the average rate of return to investment in agricultural research was about 70 percent with a median value more than 50 percent. These rates are very much comparable to those obtained internationally, covering both developed and developing countries (Figure 13). Furthermore, the marginal internal rate of return to research investment in India ranged from 57 to 59 percent since the green revolution era. This is against 35 percent rate of return realized for private agricultural R&D, and 45 percent for public agricultural extension.4

![Figure 13. Median International Rate of Returns (%) to Research Investment in India](image)

Source: Pal, Suresh, 2005, NCAP, NewDelhi

2.9.9 Concerns are expressed in some circles regarding the trend in the growth of TFP, which in a way reflects on effectiveness of NARS. Table 21 provides a summary of important studies measuring TFP growth in Indian agriculture. The TFP growth was rather lower in the Eastern and West-Central India during 1977-87, but it picked up later, and most of the crops grown in these regions showed an appreciable growth in their

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4 The marginal internal rate of return to investment in irrigation ranged from 4 to 6 percent during the corresponding period.
TFPs. The growth in agricultural TFP is estimated to be 1.4 to 2.1 percent since 1980, which is equal to that observed for the crop sector during the green revolution period. However, deceleration in the TFP growth for crops is observed in the Indo-Gangetic Plains during the mid-1990s. This is certainly an undesirable trend, but it would be premature to entertain the deceleration hypothesis based on the data for few years. Moreover, there is no clear indication whether this deceleration is because of slow improvement in the technical efficiency—an important factor for growth in TFP, or technological regression. Thus, there is no clear evidence of decline in the socio-economic impact of public agricultural research in the country. In fact, deceleration in the agricultural growth since the mid-nineties underscores the need for acceleration of technology flow to farmers, requiring higher investment in research and extension.

Table 21. Trends in Agricultural Total Factor Productivity Growth

<table>
<thead>
<tr>
<th>Study and period</th>
<th>TFP growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virmani (2004), All India, agriculture</td>
<td></td>
</tr>
<tr>
<td>1980-81 to 1991-92</td>
<td>2.2</td>
</tr>
<tr>
<td>1992-93 to 2003-04</td>
<td>2.1</td>
</tr>
<tr>
<td>Coelli and Rao (2005), All India, agriculture</td>
<td></td>
</tr>
<tr>
<td>1980-2000</td>
<td>1.4</td>
</tr>
<tr>
<td>Kumar et al. (2004), Indo-Gangetic Plains</td>
<td></td>
</tr>
<tr>
<td>1981-90</td>
<td>2.02</td>
</tr>
<tr>
<td>1990-96</td>
<td>-0.02</td>
</tr>
<tr>
<td>Evenson and Rosegrant (1999), All India, crop sector</td>
<td></td>
</tr>
<tr>
<td>1656-65</td>
<td>1.10</td>
</tr>
<tr>
<td>1966-76</td>
<td>1.39</td>
</tr>
<tr>
<td>1977-87</td>
<td>1.05</td>
</tr>
<tr>
<td>1956-87</td>
<td>1.13</td>
</tr>
<tr>
<td>TFP growth by region,1977-87</td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>1.57</td>
</tr>
<tr>
<td>South</td>
<td>1.5</td>
</tr>
<tr>
<td>East</td>
<td>0.70</td>
</tr>
<tr>
<td>West-Central</td>
<td>0.39</td>
</tr>
</tbody>
</table>
Agricultural Diversification

2.9.10 In horticulture, forestry and medicinal and aromatic plants, rapid multiplication of disease-free planting material by tissue culture is contributing to rapid adoption of improved varieties and higher crop yields. Availability of improved varieties and hybrids and better crop and pest management techniques have enhanced vegetable yields significantly, and the country is now the second largest producer of vegetables in the world. In the case of livestock, cross breeding and nutrition and disease management research have increased milk and meat yields and reduced mortality rates. But, the success was confined to dairy, commercial poultry and fish sector only, and subsistence livestock sector suffered because of limited commercialization of technologies which are often capital intensive, causing a scale bias.

Sustainability of Production Systems

2.9.11 The Indian research programme has also focused its efforts on improving resource-use efficiency, conserving natural resources, particularly soil and water, and rehabilitating degraded soils. The management of degraded lands posed an important challenge. Land degradation in the form of soil erosion, salinity/alkalinity, and waterlogging are posing serious threats to sustainable agricultural development. Research efforts made by ICAR and IARCs like ICRISAT have continued to overcome these problems. Watershed programmes have shown several benefits in various target domains, documented in the form of higher incomes, crop diversification, increase in irrigated area and fodder availability, and soil and water conservation. Controlling soil erosion was found to benefit sustainable agricultural production in rainfed areas. Vertisol technology was developed to overcome the problem of rainfed area. The benefits of adopting Vertisol technology were documented as easy cultivation, effective pest management, higher production, less labour time and cost, higher income, increase in food and fodder security, lower cost of seed and nutrients, better soil and water conservation, prevention of soil erosion, and effective use of rain water.

2.9.12 Sustainability-enhancing impacts are, however, not as visible as the impacts in terms of increase in crop yields. There is substantial reduction in waste and
unculturable land and area subject to water and wind erosion, and large tracts of saline and alkaline lands are reclaimed and brought under cultivation. Soil & water conservation technologies have reduced water run-off by 15 to 42 percent, controlling soil loss by 2 to 12 tonnes per ha per year. In addition, the watershed programmes have increased cropping intensity, on an average by 41 percent and created more than one hundred mandays of employment per hectare in a year. It is expected that the resource-conservation technologies like watershed development would reduce the use of groundwater for irrigation by 5 to 30 percent in the rice-wheat system. The packages for integrated management of pests and plant nutrients, along with pest tolerant varieties are expected to reduce the use of pesticides to the extent of 50 percent. Although there are some success stories showing tangible impacts of these knowledge-intensive technologies, a number of factors limit their spread, especially to small farmers. These are mostly group-based interventions and the system is still struggling to address the question of appropriate methodology and institutional arrangement for their dissemination. **Lack of adequate information, services, inputs and credit further restrict exploitation of improved technology by small farmers.**

**Benefits to Small Holders**

2.9.13 Has agricultural research in India also benefited small holders and unfavourable production environments like dryland areas? **Since the green revolution technologies in long term were generally neutral to scale, the growth benefits were also shared by small producers, and the urban poor benefited through reduction in food prices.** The high-yielding varieties also spread rapidly to dry semi-arid regions of the Central and Peninsular India and covered more than 74 percent of area under sorghum and pearl millet, which is higher than that of paddy. Of late, there is rapid spread of modern varieties in the eastern India, contributing to most of the increase in the national foodgrain production during the 1990s. **There is a huge potential of untapped yield enhancement in Eastern India.** Several studies have shown that technological change has been pervasive even in the rainfed areas, and crops like coarse grains, pulses, oilseeds, fibres, and vegetables have registered a positive growth in the total factor productivity. However, the impact has been rather limited in a few States, viz. Bihar,
Madhya Pradesh, and Karnataka, partly because of incremental nature of technological advancements (unlike one-shot jump in irrigated areas), which are often eroded by erratic weather conditions. Barring these few limitations, the agricultural research system has been able to address the objective of sustainable agricultural development with social justice, and economic policy environment has helped in achieving this objective. Of course, international agricultural research community, mainly the CGIAR system, has been a useful ally in this endeavour and there have been many technology spillovers. But, these technology spillovers from the CGIAR system would not have been realized in the absence of the strong national system.

2.9.14 Agricultural research leading to the adoption of improved technology may reduce rural poverty in many ways. We must get away from the too simplistic internal rates of return based on adoption of high yielding varieties. **New approaches could include:**

- higher on-farm yields and productivity;
- higher net income of farmers;
- expansion of farm employment opportunities and higher wages;
- growth of non-farm activities;
- lower food prices;
- reduced vulnerability to crop and other risks; and
- empowerment of the poor and of their organizations.

2.9.15 The last item, empowerment, has gained increasing attention in recent years. Unless the poor have the power to participate in deciding which technology to use, they are unlikely to benefit from it. In other words, better farm technology will most benefit the farmers who are active partners in setting priorities of R&D. An analytical framework for approaching the above issues should cover the following:

- What is the probability that applied research will be successful, and hence, what is a desirable measure of successful research in an R&D continuum?
• How soon will the results be available for adoption, how widely applicable will the results be, and when will they be adopted by various groups and for how long?
• Once adopted, what is their contribution to productivity and incomes of different groups of people, especially smallholders?

2.10.0 Major Challenges

2.10.1 Significant progress was made in the past 40 years and must continue to be made in the coming years in raising food consumption levels, improving nutrition, and reducing poverty through agricultural transformation. The efforts, however, need to be redoubled to meet WFS target and MDG to halve the number of hungry people by 2015. India is way off track in achieving the MDG goals. Hunger cannot wait. Further, resource-poor farmers are under acute distress and are finding it difficult to liberate themselves from the complex traps of multi-layer debts, poverty, poor access to institutional support, high production risks, market failures and declining returns. Average productivity of our crops and farm animals is low and wide yield gaps exist for almost all crops and commodities. **Why science and technology have failed to alleviate, if not completely eliminate, the distresses?**

2.10.2 As the world is experiencing revolutions in biotechnology, information and communication technology, nanotechnology, space technology and business management systems, veritable divides, such as technology divide, gene-divide, digital divide, gender-divide, rich-poor divide, rural-urban divide are dangerously widening, and threatening peace. **While the country harnesses the uncommon potential of the uncommon opportunities, it is challenged with the daunting task of bridging and narrowing the various divides.** The Challenge before us is to build research and technology development capacities and partnerships which will contribute to and capture the impact of Gene Revolution and other scientific revolutions. How can the national and international systems be strengthened to rationally manage biosecurity and TBT and minimize the adverse impacts of TRIPS and other WTO agreements on the small-scale farmers and fisherfolks and the poor and convert these provisions into an opportunity?
Bridges must be build across science, society and humanity so as to effectively share the
global knowledge and technology pool for more equitable and inclusive development.

2.10.3 The agriculture led broad-based economic growth must take place
under the settings where the natural base of production resources, such as land,
water and biodiversity, has shrunk, the biotic and abiotic stresses have intensified
and there is widespread environmental and agro-ecological deterioration. The
degradation of breadbaskets, such as the fatigued rice-wheat lands, irresponsible fishing
and aquaculture and industrialization of livestock production, stubbornly high post-
harvest losses, and disconnects among production, processing and marketing are
constraining the sustained accelerated economic growth that is needed to reduce poverty
and enhance food security. Moreover, climatic change, variability and global warming
and their impact on agriculture and vice versa emerge as new threats and management of
these changes resulting in minimization of the damaging agricultural trends is a real
challenge.

2.10.4 The precise causes of the agrarian crisis and waning of the Green
Revolution process are many and varied, but there are five basic factors which are
central to the present crisis. These are: unfinished agenda in land reforms; quantity
and quality of water; technology fatigue; access, adequacy and timeliness of
institutional credit; and opportunities for assured and remunerative marketing.
The disconnect between science and public policy, the decline in quality of agricultural
produce as well as no connectivity with the clients of farm research and adverse
meteorological factors add to these problems. The worst affected are the majority of
small and marginal farmers, tenants and share croppers, landless agricultural labour and
tribal farmers, since their coping capacity is very limited. Women suffer more since they
have little access to institutional credit or organized extension support.

2.11.0 The Road Ahead: Meeting the Challenges

2.11.1 Science and technology will be pivotal to the country’s effort to meet the
challenges enumerated above and to help our farm and fisher families to enhance the
productivity, profitability, sustainability and equity. For this the Commission
recommends a three pronged approach: **Firstly, we must prioritise strategic research and technology development programmes**, including cutting-edge technologies, geared to meet the technological problems retarding and decelerating agriculture-led growth and development. **Secondly, we must realize that science and technologies should have a human face and cannot operate in a vacuum.** Therefore, it is absolutely necessary to formulate clear cut goals, policies, strategies and programmes and build partnerships for harnessing the (unlimited) power of science and synergizing technological and social revolutions. **Thirdly, the National Agricultural Research System, the technology assessment and transfer system, the knowledge system (skill development, re-tooling, indigenous knowledge, the humanware aspects, enabling mechanism (IPR, SPS) and services must be synergistically aligned, restructured and revitalized to dismantle the unholy alliance of hunger, poverty, unemployment, unsustainability and exclusion.** In this context, the following aspects must particularly be addressed.

- Evolve a **national innovation system**—align policy, incentives and institutions in this direction
- Balance the roles of the Centre, States, corporate and rural knowledge centres in provision of R&D services
- Use critical scientific and modern management tools essential for viability and efficiency of public R&D
- Align external assistance with the long-term capacity building — human resource development, particularly in frontier and strategic research
- Manage IPRs for technology transfer and resource generation by becoming dominant technology provider in the South

### 2.11. A. 0 Priority Research and Technology Development Areas

2.11. A.1 Science and technology must address (for crops, livestock, fisheries and forestry) the following four interrelated areas in order to attain higher productivity and sustainability and thereby help alleviate hunger and poverty:
• Enhancing yield ceilings, bridging yield gaps, protecting yield gains, minimizing post-harvest losses, augmenting value addition and improving productivity and promoting ecotechnologies rooted in the principles of ecology, economics, equity and employment;

• Exploiting the gene revolution (biotechnology), benefiting from information and communication technology revolution, space, nuclear and nanotechnologies and promoting knowledge-based farming systems, precision agriculture, intensification, diversification and value addition;

• Protecting and improving natural resources (land, water and biodiversity), addressing environmental concerns, and managing climate change and natural disasters; and

• Seeking congruence of productivity, profitability, sustainability and equity, addressing gender issues and problems of poor and the excluded, and managing liberalized trade in the globalised world by addressing issues related to global competitiveness in the context of the WTO AoA.

2.11. A.2 **In undertaking the above programmes, we must realise that basic (fundamental), strategic and applied researches constitute a continuum and are mutually reinforcing.** The Indian NARS has successfully been undertaking research in each of these categories. The modes of conducting researches have also evolved over the years. Lately, need for anticipatory and participatory researches have been felt to fill the gaps not covered by the usual modes of generating and transferring technologies. Given the persisting yield gaps and widening income inequity on one hand, and the fast changing global technological and socio-economic scenarios on the other hand, India needs to give high priority to strategic, participatory and anticipatory researches. Climate change, sea-level rise (the Tsunami 2004 is a cruel reminder to unforeseen destructions) and other such events call for national preparedness to meet these emergencies and new challenges by instituting and strengthening anticipatory researches. Strategic research, such as genomics and proteomics, which is geared to problem-solving, will particularly be helpful in removing the critical bottlenecks in technology. Participatory approaches of technology designing, verification and refinement will greatly ensure quick and
comprehensive adoption of technologies developed through inter-disciplinary and system-based programmes. The Commission suggests the following strategic and anticipatory research areas for priority action:

**Breaking Yield Ceilings, Bridging Yield Gaps, and Protecting Yield Gains**

2.11.A.3 It is encouraging that yields of major crops have continued to increase during the past 35 years; they are projected to increase towards 2030, albeit at a decelerating rate, but nonetheless implying a continued need for developing the technologies wherewith to achieve increased yields. For instance, rice, central to the nation’s food security must maintain annual yield growth of about 2 percent towards the year 2020 to meet the demand. As cropping intensity becomes increasingly important, the features of crop duration and high per day productivity become preferred attributes.

2.11. A.4 As regards breaking yield ceilings, conventional breeding and management practices continue to offer great prospects of developing new super ideotypes, hybrids, and new life forms characterized by greatly enhanced new levels of yield, productivity, and adaptability, such as the **Super New Plant Type, Super Hybrid, aerobic and NERICA rices and extra-long-spikes, and hybrid wheat cultivars**. These will be complemented by various genetically engineered products. Quality, consumer preferences, cost effectiveness, and environmental aspects of production, distribution, and consumption of these new types will need to be critically analyzed in order to assess efficiency and efficacy of their large scale popularization in the broader context of food security, poverty alleviation, sustainability, equity and biosecurity.

2.11. A.5 As regards bridging yield gaps, **50 to 100 percent transferable yield gaps are not uncommon**. There are several agro-ecological and socio-economic causes for the gap in bridging the exploitable yield gaps. With increasing emphasis on precision agriculture, there are greater chances for narrowing the yield gaps. The existing exploitable yield gaps should be seen as an opportunity for future growth that is consistent with agro-ecological, environmental, socio-economic, political and technological settings in the major production regimes. With newly-improved methodologies for systems analysis, and greater access to relevant data, reliable estimates
of potential yields in specific agro-ecological regimes are increasingly available. Such estimates will assist in estimating more reliably the gaps between actual and potential yields, and will assist also in charting strategies to bridge yield gaps.

2.11. A.6  As regards protecting the yield gains, under certain production regimes there are signs of decline in actual yields. A long term strategy and a site-specific and knowledge-intensive soil-fertility orientation are needed for the fertilizer-use technology transfer, adoption and monitoring by the extension advisory system and the farmers themselves. **Soil-test based fertilizer application**, particularly micro nutrients, real-time nitrogen management by leaf chlorophyll meter or leaf colour chart and soil nutrient budgeting, will be the elements of precision agriculture to sustain high yields and lessen the inputs-related deceleration of partial factor productivity. This approach calls for a paradigm shift in the technology transfer approach, based on intensive knowledge and higher capacity of extension agents of both public and private sectors. A **consortium approach** involving scientists, grassroot institutions, corporate sector, NGOs, financial institutions and farmers is urgently needed.

**Soils**

2.11. A.7  Imbalanced agricultural intensification, excessive and unsustainable exploitation and consumerism-related industrialization under demographic pressure have over-drained our soils which have increasingly become both hungry and thirsty. Micro-nutrient deficiencies are spreading fast. These have caused **widespread decline in total and partial factor productivity growth rates** while demand for enhanced, sustained and pollution-free agricultural production is ever intensifying. **Enhancing input use efficiency and competitiveness must be our priority agenda.**

2.11. A.8  Classically, soil has so far been seen as a medium of plant growth to meet basic needs of humans and its other functions of regulating biosphere integrity and sustaining biodiversity have received scant attention. “**Soils don’t only serve for agriculture and forestry, but also for filtering, buffering and transformation activities between the atmosphere and the groundwater, protecting the food chain and drinking water against pollution and biodiversity.** Regarding the latter, soil is
the most important gene reserve, containing more biota in species diversity and quantity than all other aboveground biomass on the globe” (Blum, 2002, 17th World Soil Science Congress). Conceptual frameworks of development indicators generally ignore these vital functions of soil and need a re-look.

2.11. A.9 Soil organic matter (SOM) is the mainstay of soil quality. While balanced fertilization may meet crop productivity and maintain SOM, it is an urgent imperative to improve the sequestration of carbon in all the soils by all available means including recycling of crop residues, green manuring, composting, reduced tillage etc. We must realize that the “grains belong to humans but the residues belong to the soil”. So carbon sequestration should be an urgent priority, irrespective of its effect on climate change. Enhanced use of bio-fertilizers, soil microbes, bio-pesticides and bio-control of weeds may be given high priority.

2.11. A.10 Establish a National Network of Advanced Soil Testing Laboratories capable of testing large volumes of soil samples for 16 macro and micronutrients – 1000 laboratories in all parts of the country, to begin with. At least 500 of these should be located in dry farming areas where there is scope for doubling average yields immediately through addressing the deficiencies of micro-nutrients and the overall nutrient imbalance and deficiency in the soil. Revitalize and retool existing soil testing laboratories.

2.11. A.11 Provide each farm family with a Soil Health Card containing information on physical, chemical and microbiological profile and health of the soils. A dedicated cadre of soil technicians/scientists for the National Movement on Soil Health Care with defined targets and resources (functioning equipment and trained human resources at the soil testing laboratories) should be created.

2.11. A.12 Agri-clinics, Input Distribution Centres, Small Farmer Estates, Cooperatives, Block and District Level Science and Technology Consortia and Panchayat Raj Institutions must integrate their efforts for ensuring soil health in conjunction with integrated watershed development systems and the Technology Missions. Farmers must
be trained to follow the recommended practices. Special extension programmes based on large scale **participatory demonstrations** should be organized. KVKs, both for soil testing and training, must play a pivotal role in this work.

2.11. A.13 Fertilizer companies should be encouraged to produce, demonstrate and market new fertilizer combinations and mixes to promote balanced fertilization in a cost-effective and environment-friendly manner. **The revitalized Land Use Boards should be highly proactive in matching soils with most appropriate cropping and farming systems.**

2.11. A.14 Productivity of wastelands may be restored especially with inputs of social capital for removing poverty by enhancing self-employment, income generation and livelihood opportunities for small/marginal farmers and landless communities. The National Rural Employment Guarantee Scheme may particularly prove helpful in this resolve.

2.11. A.15 People must be made aware and sensitised of the shrinking capacity of soils to absorb any more abuse. A **National Soil Charter** structured on the “World Soil Charter of FAO” and “UN Soils Convention” should be created to ensure soil health security.

**Water**

2.11. A.16 Water, the life blood of agriculture, is under severe threat. Allocation of water to agriculture is facing a losing battle with the industrial, domestic, power and other sectors. There is also a compulsion to intensify agriculture under the constraints of declining per capita land and water availability. **The lack of water availability on the one hand and inefficient use of available water on the other have limited our agricultural production much below its potential.** Besides, there is a gradual deterioration in the quality of water. The adverse impact of expected climate change on precipitation, temperature and sea level rise as a consequence of global warming is no longer a theoretical conjecture and will further aggravate the precarious situation faced by Indian agriculture. It is therefore imperative that any technology and policy for enhancing
agricultural productivity must take into account the need for evolving programmes for efficient water management.

2.11. A.17 During this first year (2005) of the **UN Decade of Water for Life**, while India, under the Bharat Nirman Programme, has committed to add 10 million hectares over the next few years to its 56 million hectares already under irrigation (the highest in any one country of the world), top priority must be given to conserving every drop of water and rendering “**water as everyone’s business**” to ensure most judicious and efficient use of this most precious resource. Hydrological balance, water security and water-use policy, water users’ associations, storing water everywhere, recharging million wells, reviving dying wisdom for water conservation and use, energy and water pricing, integrated watershed management and convergence and synergy among missions comprise major water conservation and use initiatives.

2.11. A.18 **Precision agriculture** is a key to efficient water management. The concept of traditional agriculture is to be modernized to allow administering inputs and undertake farming operations precisely. This will need mutual collaboration among the scientists, the field functionaries and the farmers.

2.11. A.19 The much talked about **river linking programme** for inter-basin water transfer has taken a small step forward through the **Ken-Betwa** link canal. The consequent impact on productivity and more importantly the water and soil environment are only guessed at present. A systematic evaluation may be initiated to learn lessons from this programme and prepare us for undertaking similar and bigger endeavours in future.

2.11. A.20 Despite having a vast water management research database, **field-worthy information on certain important issues is yet to be generated**. These are on water management with mulches, on tuber crops, on system of rice intensification, its efficiency vis-à-vis land levelling index and sustainable methods of rainwater conservation and use.

2.11.A.21 Under monsoon climate, temporal and spatial deficits and excesses of water are common even in irrigated regions, as the source of water for the reservoirs is the
rainfall. This calls for supplementing the deterministic research results by considering the stochastic behaviour of rainfall, and hence, the water availability for agriculture.

2.11. A.22 A travelling workshop of experts from India and from the Nile, Jordan and Imperial Valleys should be organized to formulate new strategies for water management along the Rajasthan canal and other such existing and planned command areas. Water related tensions in rural areas are increasing. Timely and anticipatory actions must be taken to alleviate the conflicts.

2.11. A.23 Both the anthropogenic and natural causes of occurrence of poor quality water are known and their piece-meal solutions are also known. Looking into vast areas under such problems and their adverse impact on agricultural production, an ‘Integrated Water Use and Management System’ is to be developed to address the problem in a sustainable and holistic manner.

2.11. A.24 Bio-drainage is suitable for partially salvaging non-remunerative wastelands that are saline, waterlogged and abandoned. With some ingenuous planning, some normal cropping may be done along with plantation for bio-drainage in marginal lands. This will require evaluation of the environmental impact of bio-drainage and developing plantation geometry for selected tree species that are most suitable vis-à-vis the land and water quality. Despite successful demonstration of conventional land drainage technology, Indian farmers have not adopted or maintained them on their own. Like irrigation development, drainage development should also be considered as a national objective and given adequate departmental support.

2.11. A.25 Pressurized irrigation technology should be user-friendly, suitable also for small to marginal landholders and compatible with the available energy scenario in the countryside. The general awareness about the design criteria for pressurized irrigation system and its layout suiting to diverse field and horticultural crops and quality assurance are lacking among the manufacturers, suppliers field functionaries and farmers. Necessary steps, perhaps through a number of training programmes, should thus be taken to remove the aberration to benefit the users.
2.11. A.26 Remote sensing, simulation models, artificial neural network, GIS, geostatistical analysis etc., have great potential in water resource assessment and on-farm water management, and thus need to be applied for development and sustainable management of water resources. Application of modern tools to monitor ground and other water resources in relation to cropping pattern is required to diversify crops so as to prevent injudicious use of water resources.

2.11. A.27 National Water Policy should emphasise Integrated Water Management encompassing water harvesting, conservation, rehabilitation of waterbodies and ground water recharge. Efficient utilization of water must be considered as the core of a watershed development and management programme and such programmes are to be developed according to the ago-climatic environment of a region. Marketing facility is essential before going for diversification in agriculture using the harvested rainwater and such facilities need to be created simultaneously with the watershed development programme.

2.11. A.28 Mindset of all those who are associated with watershed programmes needs to be changed to consider water programmes not as merely departmental activities but as saviours of the rainfed agriculture and all who are dependent on it. This may be attempted through awareness generation programmes. Participatory Irrigation Management (PIM) is essential in irrigated regions to ensure sustainability of water use with high efficiency. Technology transfer procedures must find place at local levels and a mandatory mechanism needs to be developed involving farmers, administrators and the research institutions.

2.11. A.29 A National Research Centre on Glacierology should be established for collection, storage and dissemination of information on status of seasonal/perennial snow and ice. The Centre should undertake research on understanding the interaction amongst biological processes, physical environment and the climate change and develop early, medium and long-term warning systems and advise on trends of water availability and overall hydrological situation in the medium and long-term.
**Biodiversity**

2.11. A.30 Biodiversity, comprising genetic resources, is the building block of functions and forms of living organisms and will always be needed to produce new genotypes to meet the ever changing needs of humankind. New sciences of biotechnology and bioinformatics, coupled with conventional sciences, should be judiciously used for developing efficient and effective methods of conservation, utilization and exchange of genetic resources. Due to economic and population pressures the resources are eroding fast. Moreover, their availability is getting increasingly restricted due to their propriety protection under several systems. The Cartagena protocol for conservation, biosafety and sharing of genetic resources provides largely accepted and harmonized current practices and standards, and should be accepted by all countries. Along with Plant Breeders Rights, Farmers' Rights should be honoured and implemented for equitable and fair sharing of genetic resources. In this context, the indigenous rights over genetic knowledge and women's sphere of plant knowledge should be recognised under any intellectual property rights regime. The PVPFR Authority should ensure strengthening of national biodiversity management capacity implementation of the Farmers’ Rights and execution of the TRIPS and SPS commitments.

**Livestock**

2.11. A.31 *Livestock, whose ownership is more egalitarian as compared to land, is emerging as a driving force in the growth of agricultural sector of India.* Contribution of livestock to Agricultural Gross Domestic Product (AgGDP) has increased from 14% in 1980-81 to 26% in 2000-02. Demand for livestock products is income elastic and sustained growth in per capita income of the population, rising urban population, change in food habit are going to fuel further growth of this sub-sector. More than equity and balance, the rural livestock provides sustainability to the total agricultural operations. In spite of poor infrastructure, low investments and low priority shown to this sub-sector, livestock has provided sustainability and stability to agricultural production. The greatest contribution from livestock in the current concept of global economy and the national agriculture resurgence is in terms of sustainability to the total rural development,
which the livestock only can provide, especially to the landless agricultural workers and marginal farmers.

2.11. A.32 But, research and technology development supports for the livestock subsector have been neglected. Besides low productivity, poor nutrition and fodder and feed availability, poor health and high incidence of diseases and highly disorganized breeding and germplasm conservation programmes have serious depressing effect on the industry. Bluetongue, Bird Flu and other highly contagious diseases must be contained and eradicated and not allowed to enter the country. Thanks to the NDDB that the dairy sector, due to production-processing-distribution linkage with an end-to-end approach, has rendered India as the foremost milk producing country in the world. Such an approach must be popularized widely.

2.11. A.33 For enhancing the role of livestock for livelihood security, the following actions are required:

- Set up a Livestock Feed Corporation of India to provide support to local level SHGs engaged in the production of fodder and feed and in organizing Fodder and Feed Banks. Strengthen applied research in different agro-ecological regions so that livestock owners can implement correct feeding regimes using locally available feedstuffs and roughages. Research on ‘rangeland management’ on private and govt.-owned wastelands and rangelands is needed to increase production and availability of grasses for small grazing ruminants such as sheep and goats. This research should aim to increase the productivity of these land resources using low input technology although initial establishment costs are likely to be comparatively high. There is need for research on economic feeding systems for increasing slaughter weights of lambs and kids.

- In the case of poultry production, Poultry Estates may be organized with the help from the National Egg Coordination Committee and the organized poultry industry to help SC/ST and other resource poor communities take to economically viable poultry farming. Poultry Credit Card (as also Dairy Credit Card) should be issued to promote entrepreneurships.
Quarantine arrangements may be strengthened to **avoid the outbreak of epidemics caused by invasive alien species.** Poultry farming should be regarded as an agricultural enterprise and should be given special attention from the point of view of biosecurity.

Promote institutions and establish mechanisms to ensure **quality consciousness in milk, meat, vaccine and other products of this sector.** Encourage research and innovation to enhance sector level efficiency in quality production, value addition, procurement, processing, storage and marketing of all livestock products, including those based on small ruminants.

The government should encourage systematic area specific animal disease control programmes on the basis of a co-ordinated national plan under the overall guidance of the National Advisory Committee. The government should also structure, under a **National Animal Production and Health Information System (NAPHIS)** in the Central Department of AH&D, a dynamic disease information reporting and feedback arrangement. Special attention should be paid to Bluetongue and Avian Flu.

A **national livestock breeding strategy** needs to be evolved to meet the requirements of milk, meat, egg and other livestock products and their distribution. Major thrust should be on genetic up-gradation of indigenous/native cattle and buffaloes using proven semen and high quality pedigreed bulls and by expanding artificial insemination network to provide services at the farmer's level.

Research needs to be done on appropriate breeding objectives for indigenous breeds and appropriate methodology for implementing breeding programmes. This should especially include formulation of selection indices and accurate genetic evaluation to ensure steady genetic progress.

**Conserving Genetic Heritage and Harnessing Unique Niches:** The national bureau of animal genetic resources should chronicle and digitise inventories of the livestock genetic resources and associated traditional knowledge, and launch gene literacy movements to sensitise all stakeholders. The Suratgarh Farm (Rajasthan)
and other such farms of the Government of India should be developed as an *ex situ* germplasm repository of livestock genetic resources.

**Climate Change, Risk Management, Disaster Mitigation and Environmental Protection**

2.11. A.34 We have just past the first anniversary of the tragic Tsunami which on December 26, 2004 swept countries bordering the Indian Ocean that claimed the lives of more than 280,000 people and displaced 1.5 million people from their homes. Fisheries and coastal agriculture were severely damaged. In India, 300,000 fishers were made jobless. Furthermore, productive lands have been lost due to massive erosion and salinity infusion.

2.11. A.35 The Indian Ocean tsunami is one in a series of recent powerful natural disasters affecting developed and developing countries – from unexpected occurrences like earthquakes, floods, and cyclones to less immediate and evolving hazards like droughts and environmental degradation. The October 2005 South Asia Earthquake affecting Pakistan and India has resulted thus far in about 75,000 human casualties, and about $330 million loss in livestock, crops and agricultural equipment as estimated by ADB/World Bank. The trend in the past two decades shows an increase in both the number of natural disasters and the number of people killed by them (Figure 14). In the past two years, the number of deaths from natural disasters has been far above the past decade’s average.

2.11. A.36 In India, natural disasters such as floods, droughts, earthquakes, landslides and cyclones are of frequent occurrence and cause colossal loss of human lives, damage to properties and loss of crops. While most of the disasters are natural, some are aggravated by man-made activities. Need to develop strategies for disaster mitigation by agriculturists was never felt greater than today. To feed the ever increasing population it is essential to counter the adverse impacts of disasters in order to save and enhance the agricultural production. While doing so, care must be taken to prevent over exploitation and degradation of resources, which are to be maintained for the future generation. Natural resource management plays a key role not only in improving the land and water
degradation during crop production but also in protecting the environmental quality. Concerns for environmental pollution, especially from soil inputs to increase production have led the scientists to focus on the processes and procedures which can maintain land sustainability, arrest the processes of land and water quality deterioration and accelerate the rate of restoration of any natural resource. Approaches based on physical, chemical, biological and socio-economic principles can be most effective in providing solutions for mitigating disaster adversities, conserving resource base along with least detrimental influence on environment.

![Figure 14. Lives Lost to and Number of Natural Disasters, 1990-25](image)

**Source:** EM-DAT 2005

2.11. A.37 Global warming and the resulting climate change are likely to have adverse impact on India’s water resources, agriculture, forests, industries, energy and transport, human health and coastal zones. **Rising temperatures are expected to result in the reduction of the country’s wheat and rice yields in the next two decades.** By affecting agriculture and forestry, global warming is likely to jeopardize livelihoods and food security by drying up river basins. The major impact of climate change is abnormal changes in weather patterns, which are already being felt. Erratic rainfall patterns are going to disrupt the management practices for crop production. Most countries in temperate and tropical Asia including India are experiencing occurrences of extreme weathers like droughts and floods. The global warming is threatening the melting of ice...
and glaciaces. This is going to cause rising of sea levels thereby exposing the low-lying coastal areas to severe environmental stresses.

2.11.A.38 About 30 per cent geographical area (32 m ha) in arid zone are prone to drought and famine. Rainfall deficit, delayed arrival of mansoon, early withdrawal, large gaps in between rainfall events in eastern India, Jharkhand, Chattisgarh, M.P. etc. are the main causes of agricultural droughts causing damage to crops and bringing miseries to farmers. On the other hand, the excess rainfall causing floods, damages the standing crops in fields, erodes the fertile soil from croplands and makes transportation of produce extremely difficult. Occurrences of earthquakes, cyclones, avalanche, landslides and tsunami create destruction in all forms whether houses, buildings, crops, properties or most importantly humans lives.

2.11.A.39 There is rapid advancement in the development of the modern tools like remote sensing (RS), geographic information system (GIS), global positioning system (GPS), simulation modeling and information technology. The combination of these technologies provide a cost effective means of acquiring high resolution real time data through RS, data management and analysis through GIS, georeferencing the ground truth data with GPS and utilization of data for specific purpose and management through simulation modelling. Thus, these can serve as very useful tools for precise assessment and sustainable development. The following areas deserve greater research attention:

- The isotopic ratio of Helium in ground water is a sensitive index for tectonic plate activity below earth’s crust. Regular mapping of isotopic Helium concentrations in groundwater around the known tectonic fault lines and well-demarcated earthquake prone areas, can provide early forewarning signals for timely remedial action on the part of local administration. Further investigations on these aspects are recommended.
- Development of various kinds of early warning systems is required.
- To combat desertification, more research should be focused on non-nucleating theory of raindrop formation, which may explain cloud formation more scientifically than nucleating theory.
The geophysical factors of an area, which are primarily responsible for desertification, need more attention and study than the climatic factors.

Ozone is the most important air pollutant in terms of damage to crop plants and also injurious to human health.

Studies should be initiated for monitoring of earth surface ozone levels in India.

The effects of changing/increasing levels of ozone on crop growth and yield should be studied.

Precision in climate change prediction must be higher for temporal and spatial scale resolution.

The bio-physical and socio-economic aspects should be linked with climate change for realistic estimates of agricultural impacts.

Bio-physical traits such as leaf membrane stability index, canopy temperature depression and spin lattice relaxation time may be explored to be used as selection criterion for adaptation to temperature stress in wheat.

There is need for providing accurate advanced information on weather and its possible implications on the standing crops to farmers.

Adequate precision is required in predicting the short term high temperature conditions or heat wave conditions which are likely to damage agricultural crops.

Thermal time concept may be a useful tool in forewarning mustard aphid a month in advance.

**Bilateral collaboration with selected institutes abroad, especially nanotechnology-based work in USA, will be extremely helpful in the above areas.**

**Greening the Grey Areas: Accent on Rainfed Drylands**

2.11.A.40 Rainfed and other less favoured areas have the highest concentration of poor and malnourished people; these highly risk prone areas are characterized by low agricultural productivity, high natural resource degradation, limited access to infrastructure and markets, and other socio-economic constraints. In the interests both of improving household food security and lessening socio-economic inequity, and also of
raising national agricultural production, research and technology development must give greater attention to soil health, water conservation, livestock for livelihood security, horticulture and agroforestry in the rainfed areas, while maintaining and further increasing the gains made in irrigated areas. Genetic improvement for tolerance to water stresses (both scarce and excessive), salinity, acidity and other abiotic stresses as well as to biotic stresses, water harvesting and enhanced water and fertilizer use efficiency, management of soil erosion, crop-livestock integrated farming systems, participatory research, contingency farming and agro forestry should be high priority research agendas in rainfed areas. Technology transfer systems, including input and institutional supports should emphasize precision and pace, hence the need for greater skill alertness and commitment.

2.11.A.41 Yield and productivity gaps are particularly large in rainfed areas. This is attributed mainly to large variability of soil features, negligible control on water, weak technology assessment, refinement and diffusion mechanisms and poor institutional supports. Nonetheless, there are several successful stories of bridging the gaps at various levels, which should be critically analysed for identifying the underlying drivers of change and their judicious scaling up and adoption for greening the grey areas. A recent IFPRI study had examined the prospects of replicating and sustaining sporadic and isolated instances of technology-triggered success stories of enhanced yields to achieve broad-based aggregate successful growth in rainfed agriculture and suggests that, “where there is participation and individual motivation, where incentives are aligned with improved means to respond to incentives, and where technology plays a pivotal role, success may follow”.

Managing the Gene Revolution

2.11.A.42 The global area planted with biotech (GMO) crops has steadily increased during the last nine years. Today, about 9 million farmers in 17 countries are growing such crops covering about 85 million ha. India, so far, grows only one biotech product, i.e., Bt Cotton, occupying nearly 0.5 million ha under legally-released Bt hybrid varieties and an additional about 0.5 million ha under “illegal” Bt hybrid varieties. A recent study
reveals that, on an average, 30 percent of the illegal seeds are non-Bt, only 27 percent are F₁, rest of 43 percent are only 10-75 percent positive for Bt, indicating F₂ and mixtures. Fake cartons of the legal seeds are increasing.

2.11. A.43 The parallel production of legal and illegal biotech varieties underscores the strengths as well as weaknesses of the technology. The strengths encompass higher resistance to bollworms (a serious cotton pest) – significantly reducing the number of pesticide spray and the amount of pesticides used, thus cutting down both cost and environmental pollution. Higher yield, superior quality and early maturity are other benefits of Bt cotton varieties. The weaknesses include greater chances of corruption of seed chain, high seed cost and greater chances of non-adherence to the biosafety measures, viz, non-growing of refugia. Bt detection kits are available and should be used judiciously and transparently to confirm truthfulness of the seed and to build up quality control and faith of the farmer in the technology and the seed chain. The research and regulatory and extension systems must be effectively aligned to ensure smooth and cost-effective flow of quality seed.

2.11. A.44 The Gene Revolution is primarily propelled by the private sector. This paradigm shift has important implications for the kind of research performed, types of technologies developed and the way the technologies are disseminated. It raises concerns that the small farmers may not benefit. As per our needs, prospects and capacity, India should develop dynamic policy on biotechnology which must map out ways to benefit all stakeholders, especially small farmers, and minimize negative effects, if any.

2.11. A.45 The potential of biotechnology should be approached with a balanced perspective by integrating it within the national research technology and development framework and using it as an adjunct to and not as a substitute for conventional technologies in solving problems identified through national priority setting mechanisms. Priority setting should also take into account national development policies, private sector interests, market possibilities, potential for adoption by farmers, public perceptions of safety, and consumers' views. Accordingly, various stakeholders, public sector, private
sector, industries, NGOs and wider segment of civil societies should be involved in the formulation and implementation of national biotechnology policies, strategies, plans and programmes.

2.11. A.46 A panel chaired by M.S. Swaminathan, June 2004, had prepared a National Biotechnology Policy document and suggested the establishment of an autonomous National Biotechnology Regulatory Authority to oversee and harmonise biotechnological developments in fields of Agriculture and Food, Environment and Medicine and Pharmaceutics. The Department of Biotechnology has also been preparing a document on national policy on biotechnology through a widespread consultative process. The National Commission on Farmers considered these two initiatives and widened the scope of the consultative process by organising a consultation with farmers and farmers’ organisations, September 2005. The consultation suggested that National Policy on Biotechnology must address the following issues: (i) value, usefulness and appropriateness of biotechnologies, (ii) risk and biosafety aspects and their management, (iii) equity and ethical dimensions, overall awareness and promotion of pro-poor features of biotechnologies, gene literacy, (iv) control of and access to biotechnologies, the role of public and private sectors, harmonization of various regulatory provisions, and (v) investment in research and other institutional supports and partnerships for transparent and balanced harnessing of biotechnologies. It had emphasised that Pro-poor features of biotechnology should be judiciously harnessed to attack directly the issues of food insecurity, malnutrition, and poverty.

2.11. A.47 The National Commission on Farmers’ Consultation had endorsed the establishment of the above mentioned Authority as also of a National Biosecurity Institute steered by an Advisory Committee comprising scientists, representatives of public and private sectors, industry, CSOs, NGOs and farmers. The consultation had recommended that the Authority should combine both regulatory and advisory responsibilities and coordinate and harmonise the various socio-economic and other development aspects, regulatory measures and bioethical and biosecurity norms towards harnessing biotechnologies for the good of the common man (Aam Aadmi).
Diversification

2.11. A.48 Science and technology development has been the main force in enlarging people’s choice both by expanding human capacities to harness technologies and by providing menu of products to meet fast-changing needs and demands of humankind. There are several excellent examples of science and technology led diversifications such as the rice-wheat system, conservation farming, aquaculture and horticultural revolution. Diversification will be successful only if it:

- Responds to market changes, trade liberalization, shifts in food habits and food baskets and to other socio-economic developments and agro-ecological settings;
- Increases employment/income-generation opportunities and judicious use of land, water, labour, biodiversity and other resources;
- Reduces the incidence and damage caused by pests and diseases and risk diffusion leading to higher and more stable production and income; and
- Promotes resource conservation through the adoption of integrated farming systems (incorporating integrated pest management and integrated plant nutrient management), thereby exploiting synergism and lessening the requirements for and reducing the pressure on increasingly scarce water, land, and other resources.

2.11. A.49 To realize the fore-listed possibilities, policy guidance and institutional supports must be in place to induce appropriate technology development. Technologies suitable for integrated crop-livestock farming, especially for small-holders, should have priority for development and diffusion. Moreover, the production systems, including organic agriculture, should be linked to effective markets to increase farm income and poverty reduction.

Value Addition and Prevention of Post Harvest Losses

2.11. A.50 Post harvest losses, on an average ranging from 10 to 30 percent depending on commodities, being high in horticulture, livestock and fisheries - all high value products, are colossal. For instance, in horticulture, serious mismatch between production and consumption continues although there is no reliable data
available to estimate the success achieved during the last 10 years in reducing post harvest losses. The estimates of monetary losses being incurred in the country keep rising at regular intervals, as evident from the four reports brought out during the past decade: 1993-94 = Rs 8,000 crore (Min. of Food Proc.); 1996-97 = Rs. 25,000 crore (Mckinsey Report); 1999-00 = Rs. 50,000 crore (Anon.) and 2004-05 = Rs. 85,000 crore (Direcotrate of Marketing, Maharashtra). The huge investments made not only by the Department of Agriculture and Cooperation, but also by the APEDA, NCDC, NAFED, Ministry of Food Processing etc. have thus not succeeded much in reducing the staggering post harvest losses. No authentic data are available on the reduction in losses, if any, achieved due to the infrastructure created, improved PHM technologies promoted and several policy initiatives taken for streamlining the systems involved. All investments and efforts made for improving PHM have ended at the storage level of bulk quantities of a few commodities, with no care taken at the retail level. Consequently, the fresh produce continues to be sold in open stalls, roadside kiosks, carts, footpaths etc. causing serious loss in quality of the produce besides adding to the PH losses.

2.11. A.51 Further, liberalization has brought focus on technology as a major factor in competitive marketing, which should be duly reflected in new agriculture and science and technology policies. As trade shifts from primary products towards processed and manufactured products, greater emphasis will be needed for agroprocessing and post-harvest technologies that convert primary products into quality products and value-added products. Horizontal and vertical diversification can together proceed to expand options for quality products that meet fast-changing demands of local and foreign markets. Trade - , biosafety - , gene - and legal-literacy should be ensured at all levels, from farmers to policy-makers. These moves will promote farmer-industry linkage, small and medium enterprises (SMEs), rural entrepreneurship, and off-farm rural employment. It will be necessary to create marketing infrastructures that pay increased attention to food safety (as by cold chains) and to minimize post-harvest losses - particularly large for horticultural, livestock, and fish products. Institutional innovations will have to be explored, e.g. Contract Farming, Nucleus-Estate linkage systems, Small Holders’ Estates and Futures Markets. The group dynamics will promote
decentralized mass production by masses and benefit from centralized services. Through ensuring backward-forward linkages under an end-to-end approach, the Small Holders’ Estates will synergise production-processing-marketing linkage.

2.11. A.52 Efforts are underway in different countries to identify specialty commodities, such as off-season varieties and production systems, new crops, and novel varieties and breeds to capture new opportunities. With the increasing demand for herbal medicines and botanicals, and for organically produced food, aquaculture and other products, several countries have developed specific production and distribution patterns. Public and private sector support in supplying quality seed, planting materials, processing, procurement and marketing to promote these initiatives is a condition sine qua non. Individual countries have developed or are developing policies, strategies and programmes on such diversifications. As several of these initiatives are innovative and diverse, there is good scope for sharing such experiences through information system networks as well as through Technical Cooperation among Developing Countries (TCDC) arrangements promoted by FAO and other UN agencies and international organisations.

Aligning R&D to Manage WTO AoA

2.11. A.53 The share of agricultural trade in total agricultural GDP of the country had increased to nearly 10 percent during the TE 2004 from 6.3 percent during the TE 1995. The WTO AoA provides both opportunities and threats to agricultural families and agro-based industries. It was hoped that the trade liberalization will help accelerate the agricultural export leading to high net trade and will be instrumental in improving efficiency in allocation of resources. As seen from Table 22, in the post-WTO era, both export and import have increased substantially. However, the increase in imports was relatively higher than that in export, thus bringing down the proportion of surplus to GDP from 3.2 percent in TE 1995 to 2.7 percent in TE 2004, although there was a hump in the initial post-WTO years. This trend has adversely affected our self-reliance in agriculture. The value of export required to financing imports increased from 32 percent in the pre-WTO era to 57 percent in the post-WTO era.
Table 22. Indicators of Performance of Agricultural Trade, Unit: Million $

<table>
<thead>
<tr>
<th>Period</th>
<th>Imports</th>
<th>Export</th>
<th>Trade surplus</th>
<th>Surplus/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992/93-94/95 (Before WTO)</td>
<td>1190</td>
<td>3725</td>
<td>2534</td>
<td>3.2</td>
</tr>
<tr>
<td>1995/96-97/98 (Initial Years)</td>
<td>1996</td>
<td>6530</td>
<td>4534</td>
<td>4.6</td>
</tr>
<tr>
<td>1998/99-00/01 (Post WTO)</td>
<td>3272</td>
<td>6060</td>
<td>2788</td>
<td>2.7</td>
</tr>
<tr>
<td>2001/02-03/04 (Post WTO)</td>
<td>4087</td>
<td>7141</td>
<td>3055</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Source: Chand, Ramesh, 2005. WTO and Indian Agriculture: Issues and Experience

2.11.A.54 Export of marine, livestock and horticultural products maintained the tempo of growth continuing from pre-WTO period whereas there was a setback to the exports of oilmeal and the earnings from traditional groups consisting of tea, coffee, spices, etc. declined sharply. Primarily caused by declining international prices, imports of several commodities increased substantially, at times hurting domestic production of major crops and the country was not able to safeguard interest of the farmer-producer. Vegetable oils accounted for more than three-fourths of the total increment of agricultural import in post-WTO era. Imports of pulses, spices, cotton, wood and wood products have also increased significantly (Table 23). Noticeable increases in imports of fruits and nuts had also occurred (mostly due to increase in cashewnut import which is mainly for reexport as processed cashew). Huge imports of vegetable oils and pulses have depressed domestic prices of these commodities and adversely impacted their domestic production and the producers. India should develop policy to regulate trade of such commodities to balance interests of both producers and consumers. Since farmers, who are both producers and consumers, comprise about 60 percent of our population, the exercise of balancing the import and export of strategic commodities must be undertaken keeping in mind overall income and savings and livelihood security of small farmers. On the other hand, the country must be able to take full advantage of the bright prospects of increasing exports of high value commodities such as fruits, vegetables, fish and livestock products.

2.11.A.55 Cost competitiveness and product quality issues are critical to compete in World market. Research and technology development should be geared and focused to increase the overall competitiveness of our major crops and commodities. This
calls for enhanced and sustained efficiency of inputs use, thus cutting cost of production, improving quality and reducing post-harvest losses so that the input-output ratio is maximized (without sacrificing the ecological and environmental security). International quality and safety standards for agriculture products are very high. Meeting of their standards involves substantial costs for building technical and physical capability. There is a need for pooling talents and resources available in both public and private sectors to build this capacity. Finally, public research system should shoulder the responsibility to protect small farmers from ill-effects of trade reform process.

Table 23. Import Dependence for Food (Import/Domestic consumption %)

<table>
<thead>
<tr>
<th>Item</th>
<th>1991-94</th>
<th>1995-98</th>
<th>1999-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable</td>
<td>0</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>Milk</td>
<td>0.1</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>Rice</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Cereal</td>
<td>0.4</td>
<td>0.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.8</td>
<td>1.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Fruits</td>
<td>0.4</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Sugar &amp; Sweeteners</td>
<td>2.3</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Pulses</td>
<td>4.5</td>
<td>6.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Veg. Oils</td>
<td>5.7</td>
<td>24.4</td>
<td>47.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0.89</strong></td>
<td><strong>2.02</strong></td>
<td><strong>3.76</strong></td>
</tr>
</tbody>
</table>

*Source: Chand, Ramesh, 2005. WTO and Indian Agriculture: Issues and Experience*

2.11. A.56 Along the production-processing-marketing chain, commodity-specific detailed action plan should be prepared with clearly defined goals. India’s preparedness in the field of SPS measures is highly inadequate. As a result of which, several of our consignments get regularly rejected. The situation is likely to get still worse in the coming years as the Codex Alimentarius Safety Standards get more and more stringent, let alone the fast shifting of the goal posts. Thus, the urgency of the launching of quality and food literacy movement in the villages and strengthening of SPS infrastructure can hardly be overemphasized. A **Food Safety Council of India, chaired by the Union Minister of Agriculture, with the Union Commerce Minister as co-Chairman, should be established.**
2.11. A.57 We must urgently augment and create survey, surveillance and quality literacy programmes. The SPS infrastructure should be brought at par with International Standards and awareness should be generated abroad on steps taken by India to maintain high standards regarding food safety and biosafety. Keeping in mind high prospects of enhancing livestock export from India, the food safety concerns for livestock products will particularly be important since livestock economy is the backbone of a large number of marginal farmers and landless agricultural labourers. But today large parts of livestock product international trade are restricted because of animal diseases and threat of Avian Flu looms large. **ICAR’s work on animal diseases and risk management assumes extremely high priority for addressing these concerns.**

### 2.11. B.0 Policy and Paradigm Shifts

"**Ahead of us lie dangerous times. There are serious problems that derive from the realities of the external world, climate change, loss of biological diversity, new and re-emerging diseases, and more. Many of these threats are not immediate, yet their nonlinear character is such that we need to be acting today**”

(Lord May of Oxford, 30 November 2005)

2.11. B.1 Future of our agriculture would depend upon the ability of farm families to raise agricultural productivity in perpetuity in an environmentally sustainable manner and enhance our global agricultural competitiveness though rapid progress in the areas of quality improvement cost reduction, diversification of farming systems and value addition to primary products. **Science is basic to sustainable intensification, diversification, value addition and quality improvement.** It is only science based and knowledge intensive agriculture that can help our farming families numbering over 115 million (25% of the global farm population) to enhance productivity without associated ecological harm. The Commission offers suggestions on methods of achieving a proper match between scientific research and the knowledge and technological requirements essential for launching an “ever-green revolution” or sustainable agriculture movement. Even at the outset, it must be stressed that an annual growth rate of 4% in agriculture will need a 8%
growth rate in horticulture, animal husbandry and fisheries, thus emphasizing the need for a farming system rather than a commodity centered approach to research.

2.11.B.2 National and international policy actions should ensure that science and technology must specifically address the needs and prospects of majority small and resource-poor farmers and help mainstream the gender concerns. Institutional, human capital and policy supports must capture the positive effects and minimize the negative effects of globalization and liberalization and of revolutions in biotechnology and information and communication technologies. A meaningful interaction between science and policy and between scientists and policy makers is needed to promote knowledge economies and to bring the much-needed congruence among productivity, sustainability, profitability and equity. Thus, it is not only biological and physical sciences, but also economics and social sciences, which must all interact dynamically to yield wholesome results.

2.11.B.3 Urbanization and globalization have fuelled dietary convergence and dietary adaptation. These present both an opportunity to reach lucrative new markets and a substantial risk of increased marginalization of smallholders and poor people leading to even deeper poverty. Smallholders must organize themselves in cooperatives or as Small Farmers’ Estates to enhance their economies of scale and competitiveness and should be supported both by the public and private sectors for training and skill development and start-up funds.

2.11.B.4 The need to accelerate agricultural production can hardly be overemphasized. However, quick fixes and short term economic gains, particularly those with heavy social and ecological costs, must be avoided. For instance, the conversion of vast paddy fields into saline aquaculture in Southeast Asian countries which saw a short lived boom but busted soon, caused serious land degradation. National policy priorities for preventing land degradation and managing degraded lands must be determined and judiciously implemented.
2.11.B.5 There are pressures for diverting water from agriculture to other sectors. IFPRI has warned that re-allocation of water from agriculture can have a dramatic impact on global food markets. Policy reforms are needed from now to avoid negative developments in years to come. These reforms may include the establishment of secure water rights to users, the decentralization and privatization of water management functions to appropriate levels, the participatory and community involvement in regulatory and pricing reforms and markets in tradable property rights, and in the introduction of appropriate water-saving technologies. **Community land and water care movements** should be launched to ensure commitment of the masses towards conservation and judicious use of water and other natural resources.

2.11.B.6 Likewise, major policy and management changes are needed to realize full potential of fisheries consistent with cultural and social concerns of all stakeholder groups. The dark side to the new fish boom should be discouraged. As regards livestock, the high environmental cost of intensified industrial livestock production and the environment friendly widespread mixed farming systems of majority small and landless farmers should be judiciously balanced through appropriate policy and technological interventions. **“Lack of policy action will not stop the Livestock Revolution, but it will ensure that the form it takes is less favourable for growth, poverty alleviation, and sustainability in developing countries”**.

2.11.B.7 Conservation of forests is closely linked with the status of agriculture and livelihood security of people living in and around forests. Small and poor farmers account for 60 percent of rain forest destruction, converting forestland to agricultural land to meet their food needs and to earn a living. **“In fact, when a farm household in the humid tropical forest margins slashes and burns as the initial step in an agricultural cycle, it starts clock ticking”**. Integration of social status, physical infrastructure and agricultural productivity of forest margin areas with the overall national economy will greatly reduce the pressure on forests and forestlands.

2.11.B.8 Policy towards minimising the erosion of the treasure of biodiversity should be a high priority. The FAO-led International Treaty and Global Plans of Actions on Plant Genetic Resources for Food provide the mechanism for rationally conserving and
utilizing genetic resources. Dynamic national research systems should be in place to address the research, development and sharing issues of germplasm. Biotechnology should increasingly be used for characterization, conservation and utilization of genetic resources. On the pattern of UNESCO's Human Genome and Human Rights, FAO should adopt a universal declaration on the "Plant Genome and Farmers' Rights" to provide a balance between the rights of conservers of biodiversity and the researchers, developers, and users of modern biotechnological products. There is an urgent need to develop guidelines and procedures for the realization of Farmers' Rights to sustain on-farm in-situ community based conservation of biodiversity and associated traditional knowledge. A fair, gender sensitive, transparent and implementable reward and recognition system should be created for this purpose.

2.11.B.9 Science can greatly promote inclusive development by addressing the needs and opportunities of poor, less-favoured areas, neglected and excluded communities. Even biotechnology can be geared towards this cause. As repeatedly emphasized by Nobel Laureate Amartya Sen, the lack of entitlement to basic resources is the main cause of hunger and poverty. Scientifically informed agrarian reforms to grant titles to land and water, and increased access to credit, knowledge and markets, will enhance productivity, sustainability (through better land and water care) and income, thereby resulting in appreciable reductions in hunger and poverty. Engendering these changes and technologies and socioeconomic safety nets designed for small-scale and marginal farmers are essential for supporting rural livelihoods, and this aspect should be explicitly highlighted in national policies.

2.11.B.10 The existence of an enabling environment to judiciously exploit scientific and technological developments is as important, if not more, as the technology itself. Policy provisions must humanize technologies, and should emphasize: (i) enhancing capabilities for sustainable livelihood, and providing for new livelihood opportunities for the poor, (ii) improving the productivity, profitability and sustainability of communities' assets, and establishing effective linkages between community mobilization and the government and other service providers, (iii) ensuring the congruence and synergism among environmental, economic and social (gender and other equities) securities, and
empowering communities, especially the vulnerable ones, to harness new and
appropriate technologies and enabling them to blend traditional local technologies with
morden technologies.

2.11.B.11 Science and technology development must continue to spearhead the
productivity-enhancement process. Sustained intensification through increased yield
per unit land area, water, labour, and capital is the only recourse for achieving the
production targets. In retrospect, the Green Revolution had its own strengths and
weaknesses. The unprecedented production and yield increases and improvements in
food supply and rural economy notwithstanding, it had the following shortcomings:

- Maximization of yield potential of only three cereal crops (rice, wheat and maize),
  albeit most important from the view point of food security, and that too only
  under irrigated or assured rainfall conditions, thus bypassing the vast rainfed and
  non-congenial areas and a large number of other important crops.
- In the initial years, it was suited generally to resource-rich farmers who could
  afford inputs, hence resource-poor farmers with little input capacity could not buy
  into the revolution, atleast in the early stages, thus enhancing inequality.
- It largely ignored the environmental costs.

2.11. B.12 The above shortcomings must be avoided as we launch the Second Green
Revolution as recently emphasised by our Hon’ble Prime Minister, Dr. Manmohan
Singh. In this context, the researchers must ask themselves the following questions in
deciding their research and technology development priorities:

- Will the technology lead to higher productivity across all farms, water regimes
  (rainfed drylands), soil types and regions, not just well-endowed ones?
- How will the technology affect the seasonal and annual stability of production,
  especially the highly risk prone rainfed areas suffering from high instability?
- How will the technology affect the energy balance, eco-system and the
  sustainability of farming?
- Who will be the winners and losers from the technology – and how will it affect
  the majority small and marginal farmers, the poor and deprived ones?
2.11.B.13 Paradigm shifts will be needed to address the above and other related questions. The first paradigm shift relates to a shift in research approach from a single commodity based and monodisciplinary to a farming system based and multidisciplinary. The second shift demands a change from a top-down (training and visit system) extension approach to a participatory (effective research-extension-farmer-market interface) approach of technology assessment, refinement and transfer. The third shift seeks the integration of molecular biology, bio-technology and bio-information with conventional as well as traditional technologies (ecotechnology) for speedy, more precise and wholesome gains. The fourth shift seeks greater congruence between productivity sustainability and equity and creation of enabling mechanisms and inclusiveness for generation and adoption of new technologies. Cost-effectiveness of production, quality and safety in food and other products, and GMO biosafety and biosecurity, will assume high significance in the globalised and liberalized world. These paradigm shifts should be comprehensively internalized in national policies on agriculture and agricultural research and technology development.

Women in Science and Science for Women: Technological Empowerment of Women – Humanising Science and Technology

2.11. B.14 Countries with lower achievement in the Human Development Index and Gender Development Index have a larger percentage of their economically active population (both male and female) employed in the agriculture industry. Second, these same countries have a higher proportion of economically active women involved in agricultural activities relative to men. The disparities are likely to increase as rural to urban migration continues to change the composition of rural areas putting even greater responsibilities for the growth of the agricultural sector on women than they already have. In aggregate, women in rural areas in the poorer countries will be impacted most heavily as the feminization of agriculture intensifies further. Agricultural technologies specifically designed to improve the efficiency and productivity of the female labour force will thus greatly improve overall agricultural productivity.

2.11. B.15 There is lack of analytical understanding of the gender inequality. Social research must provide disaggregated information on rural woman that can feed into
policy formulation, and that can help articulate the strategic gender aspect of demographic transition. There is a lack of organized empirical evidence and of key information on the negative impact of the gender bias - as of unpaid work of rural women within the family, child labour, inadequate nutrition for mothers and children, inequitable access to credit and support services and to health and education facilities. This gap contributes to the continuing inability to influence those agricultural policies, programmes, and policy makers that affect rural women. Science must help gender mainstreaming to fully realize this huge human capital wherewith to combat hunger and poverty.

2.11. B.16 The National Commission on Farmers, in cooperation with the National Academy of Agricultural Sciences and the M.S. Swaminathan Research Foundation, organized a brainstorming session on the role of Women in Science and Science for Women, November 2005, to review the progress since the Fourth Women’s Conference held in Beijing in 1995. Recognizing the increasing feminization of agriculture and further realizing that agriculture in the years ahead will be essentially science-led and knowledge-based, the meeting appreciated that

(i) a people-centric sustainable development should ensure women’s equal access to economic resources, land, credit, science and technology, vocational training, information communication and markets,

(ii) S&T have to be developed, disseminated and harnessed in a gender sensitive manner with equal participation of women not only in S&T development but also by women who are the end users, and in strengthening the health, nutrition and livelihood security of women, and

(iii) there is a greater need for self sensitization, confidence building and psychological management.

In order to ensure the above, the Commission strongly recommends to strengthen the following areas:
2.11. B.17 **Women in Science**

- Promote the full participation of women in all S&T activities and ensure their full and equal participation, by taking into account the multiple burden on their time and creating suitable support systems to reduce this strain.

- Enhance the retention of girls in the leaky pipeline especially at the tertiary level and the mid-career women by bringing in flexibility in procedures and personnel policies to meet their special needs.

- Assess and draw up appropriate schemes to enhance their professional participation and increase the number of fellowships, opportunities for participation in conferences/workshops and increase their representation and participation in decision making and Professional Bodies as well as institute many recognitions and reward systems for their meritorious works.

- Prepare an electronic directory of women scientists and technical personnel as a reckoner for facilitating and enhancing their participation in scientific meetings and decision-making committees.

- Promote entrepreneurship among interested women by drawing up innovative schemes which help in the incubation and scaling up of innovative ideas which address the specific needs of women and establish special venture capital fund for enabling women entrepreneurs to take to a career of self-employment in converting new technologies into market-driven products.

**Science and Technology for Women**

*Skill Empowerment*

2.11. B.18 Skill empowerment of women is fundamental for harnessing science and technology for livelihood security. In this context, the following actions are needed:

- Identify appropriate technologies for multiple livelihoods, enhance incomes and improve the way of life of poor and vulnerable women.
• Draw up well coordinated programmes to reach the rural women through well networked models for technology transfer, demonstration, dissemination and adoption.

• Establish training and mentoring centres for the rural women at households, SHGs, Farm women and Farm labourers. Capacity building centres on the model of KVKs should be established soon.

• Establish rural technology parks which will also help in adoption of appropriate technologies, to address local problems like reduction in drudgery and occupational hazards, appropriate tools, identify income generating activities – provide a platform to assess the real needs and feed to S&T institutions as agenda for research.

• Identify and promote micro enterprises based on assured and remunerative markets, low transaction cost and economic viability, preferably in horticulture, including medicinal and aromatic plants; village level agro-processing and value addition centres, organic farming, etc.

• Increase easy access to credit and markets to enhance multiple sustainable livelihoods; develop micro-credit programmes into ‘Livelihood Finance’ systems which involve provision of credit together with appropriate services in the areas of technology, training and trade.

• Induce financial institutions to address issues like flexibility, sensitivity of the needs and status of the poor women so that they have an easy access to credit.

• Promote ICT based information service like e-governance, e-agriculture, e-education, e-medicine, e-commerce etc. through the Mission 2007 Every Village a Knowledge Centre which should have provision for appropriate contacts and follow up programmes to help those seeking special assistance.

**Generic Catalytic Interventions**

2.11. B.19 The following steps and activities will further enhance the cause of science-led improved livelihood security of women:
• Engender the curriculum at the school level and technical education (Medicine/Engineering/Agriculture) level for gender sensitivity among future scientists and development personnel and strengthen S&T education and communication skills among community development workers.

• Engender all technology mission mode programmes and conduct periodic gender audit, the experience will help in preparing guidelines for the inclusion of women in other technology-based or technology-rich programme areas, especially the National Horticulture Mission, Bharat Nirman Programme, Capacity Building & Monitoring Centres for SHGs and revitalization of KVKs.

• Generate disaggregated gendered data on the impact of S & T on the livelihoods of rural women.

• Harmonize all activities and schemes coming under different Ministries/Departments so that women benefit optimally, ensure adequate resource allocation for women under various programmes and implement equal wages for equal work.

• Establish a **Network of Women Scientists and Institutions** interested in engendering the development through S&T based interventions to develop an end to end approach for the various agro-climatic zones. Such a national level action and policy research network should carry out longitudinal studies of women’s roles in agriculture and rural livelihoods in the various agro-ecological regions of the country.

• Give greater focus to extension services in all areas of technology and build a strong cadre of extension workers, who may be given frequent exposure for sharing these ideas with the members in the group.

• S & T applications should foster job-led economic growth and not jobless growth. The opportunities for rural women to earn their daily livelihood through mini-enterprises and vending methods of marketing should be safeguarded by introducing engendered employment impact analysis.
**Filling Critical Gaps to Enable Unreached Women to Benefit from Science and Technology**

2.11. B.20 The critical gaps in taking the benefits of S&T to the unreached women should be filled in the areas of health, food and nutritional security, agriculture and entitlement. As regards health and nutrition, strategies should be enhanced to address anemia and hidden hunger caused by micronutrient deficiencies, particularly iron, iodine, zinc, vitamin A and B-complex vitamins and to promote conservation and revitalization of the traditional landraces and ethnic foods inclusive of wild edible foods to diversify the food basket. In Agriculture, the role of women should be promoted in the conservation-cultivation-consumption-commerce chain. Women’s access to production, input and credit resources), and to Common Property Resources should be enhanced. Appropriate technologies and support services should be provided to enhance their use in a participatory and productive manner. Their capacity should be enhanced in water use/management and augmentation and in harnessing renewable energy like biomass, biogas, solar and wind. The various Acts, especially the BD, PVP&FR should be engendered and a literacy drive should be launched to understand them.

**Participatory Research and Knowledge Management**

2.11. B.21 Often the situation under which the scientific information is generated is unlikely to be same from those operated by the farmers. The scientific information is to be reviewed in terms of specific needs, opportunities and constraints faced by farmers in different production systems. The typical contrasts in physical conditions under which the farmers operate in terms of topography, soils, plot size, hazards, the facilities of irrigation, size of management unit, farming systems, nature of production stability, production sustainability, and priority for production need to be considered. The Small Farm Production Systems have some typical characteristics which include strong interaction between land and household economy, interlink of on and off farm activity, highly diverse, complex and risk prone activities even within systems, predominance of household inputs, prevalence of traditional practices, multiple enterprises primarily for domestic needs, production systems highly susceptible to stress and perturbations, and dependence on family labour and further sharing. The assessment and refinement of
technology thus need to be site specific, holistic, farmer participatory, and technical solutions to existing problems should be inter-disciplinary, interactive, iterative and gender sensitive.

2.11.B.22 Essentially the assessment and refinement of technology needs discipline to programme mode, piecemeal to system approach, open ended to focused technological intervention, “take it or leave” to demand-led approach, integration of biophysical and socio-economic factors, institute to inter-institute mode of technology assessment and refinement, and overall a strong research-extension to research-extension-farmer-market linkage and overall proper appreciation of distinction between science and technology. Different types of farmers’ participation are used for conducting on-farm trials for different purposes. In a truly participatory and collaborative, even collegiatic manner, the farmers must actively participate in on-farm trial process and be involved in regular meetings designed to clarify the logic, their current practices and their demand for new technology. The farmers must participate directly in the planning and execution of trials and analysis of the results and the knowledge should flow both ways.

2.11.B.23 A farming system is unique and reasonably stable through dynamic arrangement of farm enterprises that a household manages in response to the physical, biological and socio-economic environments in accordance with the household’s goals, preferences and resources. These factors combine to influence both the output and production methods. The farming system is a part of a larger system and can be divided into subsystems. On the regional level there are the non-agricultural systems, the market and credit systems as well as the farm systems. Within the farm subsystems there are the crop, animal, soil, weed, insect and other subsystems. Thus, the farmer must occupy the centre stage in refining, adopting and adapting the technologies. The approach should involve selecting target areas and farmers, identifying problems and opportunities, designing and executing on-farm research, and evaluating and implementing the results.

2.11.B.24 While identifying the solutions from on-farm trial, it must be seen that the technology will function and its profitability, compatibility with the farming system, contribution to reducing risk, need for institutional support and ease of testing by farmers
The assessment of trials should be based on net income to the farmer assessed through economic analysis and ability to solve the problem diagnosed through. The results of promising pilot activities should be extrapolated for defined groups of farmers in specific defined areas (clientele). The Farm School approach should be adopted for grassroot level training and technology diffusion, for which the R&D system must provide the needed financial and technical support.

2.11.B.25 In a real community situation, seeking participation and ensuring the same on a regular basis is essential to develop useful technologies. To ensure genuine participation is a crucial art. There is a need for attitude change on parts of the stakeholders, particularly the researchers and extensionists. The public sector researchers need to be proactive in participation especially in more difficult conditions. The following steps will prove helpful:

- The institutions in which they work have to be committed to produce results of use to an identified set of clients.
- Performance criteria, the means of assessing work against these criteria and the types of reward and incentives provided must all be geared to success in delivering technologies to meet clients’ needs.
- Scientists will need specific training in participatory methods. Providing that due recognition is given to their potential shortcomings, training in PRA methods is a good first step. But the scientists must be given the resources for field work to pursue some of the research issues identified by PRA, and should go beyond mere diagnosis.

2.11.B.26 In the whole process of participatory research and technology development, researcher is most crucial person to ensure success. The local perception of research some times does not match with the participatory approaches. People also lack capacity to work together as there was no tradition of participation in India for a long time. This problem is still more pronounced when it comes to researcher and extensionists working together. This is an unfortunate legacy of the top-down research and extension. In the participatory mode, both the researchers and the extensionists need to develop positive
attitudes and empathy not only towards each other but also towards farmers. Since location specific research based on farmers’ needs will be more relevant to the farmers, the research stations of the SAUs and the KVKs need to be strengthened with better quality staff who are dedicated, trained in need identification and are able to formulate projects accordingly and should have freedom to initiate their own research studies based on local problems. MANAGE and NAARM should emphasise this approach in their training programmes. The ongoing programmes on researcher-extensionist-farmer linkage, such as National Demonstrations, KVKs, ATMAs, Lab-to-Land and Land-to-Lab Programme and Integrated Watershed Programme (to enhance productivity of every drop of water) and others should be sensitised to this requirement and their staff at all levels should be trained in adopting the participatory approach. Some of these programmes, such as Lab-to-Land, need to be revitalized and strengthened. The SAU’s Extension Departments should be reference centres, giving latest and credible information and advice.

2.11.B.27 Participatory (Farmer) breeding and knowledge sharing for development and diffusion of farmer-selected and scientist-assisted varieties combining proven adaptability to local agro-ecological, social and cultural milieu as well as possessing speciality traits (aroma, medicinal value and tolerance to local biotic and abiotic stresses) has emerged as an important strategy for harnessing treasures of our time-tested and ever-evolving indigenous knowledge and genetic resources. Several national and international programmes viz. the CGIAR Centres and the Indo-UK (DFID) programme have been promoting this approach. Some of these have been remarkably successful. For instance, the farmer participatory rice improvement programmes of the M.S. Swaminathan Research Foundation on Kalajeera (a high quality aromatic rice) in Orissa and Navara (a medicinal rice in Kerala) have tremendous potential of enhancing income and livelihood security of farmers in those areas. Such initiatives should be strengthened through additional research and technology dissemination efforts by mentoring and supporting dedicated SHGs and by linking the producers with markets and by creating and capturing niche markets.
2.11.B.28 Participatory Research, Demonstration and Training (RDT) Centres (see 2.11.D.11) should be farmer-centric and should concentrate on demonstrating how to increase the output and income of farmers with small holdings and artisanal fishermen. Precision farming, hi-tech horticulture, monsoon management and mixed farming will be important components of the training programmes. The proposed National Board for Strategic Research in Agriculture (see 2.11.D.10) can work out the modalities of establishing such Centres at locations where the work done will have a large extrapolation domain. Priority may be given to dry farming, where the work done at CRIDA and ICRISAT has shown that amelioration of micro-nutrient deficiencies in the soil can help to improve yield substantially. Also, we can initiate a revolution in pulses production by covering 100,000 ha under hybrid pigeon-pea (arhar) during 2005-06. The concerned State Governments could be requested to provide about 100 ha of land free of cost for establishing such RDT Centres. The Centres should be autonomous, and managed jointly by farm/ fisher families and scientists. Panchayati Raj Institutions should be associated with the design and management of RDT Centres. These Centres should be designed to serve as windows into the new world of agrarian prosperity that awaits rural India. They should have strong linkages with the relevant SAUs.

2.11.B.29 ICRISAT in partnership with CRIDA, National Remote Sensing Agency (NRSA), SAUs, Central and State Government Departments, NGOs and Farmers Associations/Organizations have developed and tested an innovative integrated watershed development model for enhancing the productivity of rainfed agriculture, minimizing land degradation and improving the livelihoods. The pilot model was developed and evaluated in Adarsha Watershed at Kothapally in Shankarpally Mandal in Ranga Reddy district of Andhra Pradesh. The main components of the participatory consortium approach for community watersheds are:

- Farmers collectively identify and prioritize the problems for possible technical interventions, participatory planning and implementation of watershed development involving all the stakeholders.
A consortium of research and development organizations including NGOs provides technical backstopping to community watershed programmes.

Increased individuals participation is ensured by providing tangible economic benefits through *in-situ* water conservation of rainwater which is translated into increased productivity and incomes through integrated genetic and natural resources management (IGNRM) approach. Holistic systems approach for watershed management for livelihood improvement was adopted in place of compartmental approach adopted earlier.

Knowledge flow is facilitated by linking successful on-station watersheds and on-farm watersheds for strategic research.

Islanding approach is used in which a strategic research watershed is established within the macro-watershed/district to serve as a site of learning.

Cost effective and environment-friendly soil, water, nutrient, crop and pest management practices are promoted for wider adoption to raise the carrying capacity of the system.

Empowerment of communities, individuals and the strengthening of the village institutions is achieved for sustainable development.

Continuous monitoring and participatory evaluation by researchers and elimination of contractors for implementing the works has increased transparencies, overall performance and sustainability of the programme.

2.11.B.30 This holistic innovative model has changed the paradigms for watershed management in India where watersheds are used as an entry point for improving the livelihoods and protecting the environment. Main success of the model depends on implementation of participatory approach by the community, empowerment of the stakeholders, building the available institutions and community-based organizations and most importantly technical backstopping by the consortium. **The pilot model, covering 200 villages, has been highly successful in enhancing productivity, profitability and sustainability. The Consortium should be encouraged to replicate and upscale the model.**
2.11.B.31 During the past 20 years, many extension systems like the Training and Visit system (T&V) of the World Bank have been tried and later pronounced as failure. Recently, another World Bank loan supported system, termed “Agricultural Technology Management Association” (ATMA) was introduced. ATMA takes into account the deficiencies of the T&V system and adopts a farming systems approach to extension. If implemented in a manner that regards farm families as partners and innovators and not just beneficiaries, ATMA will represent an improvement over the earlier approaches to extension. The mindset of extension personnel should change from patronage to genuine partnership (Lab to Land and Land to Lab).

2.11.B.32 Ecologically-sound agriculture is knowledge intensive. An area rather than a single farm approach is needed to spread eco-technologies like Integrated Pest Management, Integrated Nutrient Supply and Integrated Natural Resources (Soil, Water) Management. Panchayati Raj Institutions should be involved in the social engineering aspects of group endeavour in eco-agriculture as stipulated in the Constitution 73rd Amendment Act.

2.11.B.33 As earlier recommended by the Commission, the KVKs, should be developed into Krishi and Udyog Vigyan Kendras in order to give concurrent attention to on-farm and off-farm livelihoods. Establishment of 50,000 Farm Schools in the fields of farmer-achievers were suggested in order to spread their impact through farmer to farmer learning. The economic credibility and viability of the technologies adopted by outstanding farmers will be a major advantage in the lateral transfer of technical know-how. Thus, Farm Schools can serve as the grassroot learning centres and they can lead to a learning revolution in farming, particularly in areas such as horticulture, green house cultivation, efficient systems of water conservation and use, organic farming, cultivation of GM Crops, cultivation of tissue culture propagated banana, spices and other crops, medicinal plants, plantation crops, dairy and goat farming, crop-livestock–fish integrated production system, aquaculture etc.

2.11.B.34 The SAUs/ICAR Institute–KVK-Farm School system of technological and skill upgradation of farming needs continuous feed back and advice from farm men and
women. In order to provide a structured opportunity for sustained scientist–farmer dialogue, it is suggested that a National Council of Innovative Farmers (see 2.11.D.18) may be set up for providing on continuing basis guidance on the technology and public policy requirements for achieving productivity, quality and value-addition revolutions in the 115 million operational holdings in our country. This Council may be serviced by ICAR, with DDG (Extension) serving as the Convenor. Members of the Council of Innovative Farmers may be appointed by the President of ICAR in consultation with the National Commission on Farmers. A National S&T Alliance (Consortium) for Rural Livelihood Security, as suggested by the Commission, may be established to synergise inputs of various concerned Departments and Ministries at grassroot level.

**Fostering Strategic Partnerships towards an Innovative System**

2.11. B.35 The modern concept of an innovative system emphasizes a pluralistic system of research providers that recognizes the comparative advantages of different providers, and complementarity that can be achieved by forging close linkages between different actors. The leadership of ICAR has noted these requirements and has taken a number of initiatives to promote such linkages. However, effective implementation needs greater awareness down the line. In particular, the growing role of private research and the implications for public institutions are not widely appreciated. Where the private sector can efficiently provide near-market research services with scope for appropriation of benefits, the public sector should be prepared to withdraw and play a complementary role. Private research is stimulated by strategic research support from the public sector, and there are many areas where public-private linkages can enhance the effectiveness of both sectors. Enabling institutional mechanisms, especially IPR protection and capacity within the public sector to manage partnerships, can help develop and sustain these linkages.

2.11. B.36 The externally aided projects like NARP, AHRDP, NATP and proposed National Agricultural Innovation Project (NAIP) reflect government’s response to the changing needs in the national agriculture research system. There have been major paradigm shifts in the approach as well as in activities in these projects to address
concerns of system efficiency through O&M reforms, research infrastructure capacity building, human resource development, and programme efficiency through production system, mission mode, team of excellence and competitive and project-based modes of research funding involving different stakeholders including private sector. Policy, incentives and regulations should be aligned to foster innovations and entrepreneurship in agricultural science. In order to attract brilliant young scientists to agriculture, a Genius Award for young scientists should be established. The emphasis to address emerging market context through research on value chain in a consortium mode involving all the stakeholders is yet another move towards management of change. The concern on declining emphasis on basic and strategic research must be addressed through creation of national fund for basic and strategic research by ICAR as a separate plan programme. A significant component of the proposed NAIP should also strengthen basic and strategic research.

2.11. B.37 The proposed India – US knowledge initiative on agricultural research and education is a realization of the tremendous scope to complement the capabilities of the two countries being leaders in different fields of science and technology. The initiative is an effort towards addressing problems such as global warming, new pest-disease complexes, resource depletion and degradation, household nutritional security, slow growing farm profitability, and increased competition. Sharing of recent developments in cutting edge technologies, such as nanotechnology, should be high on the agenda. It is recommended that the NAIP should internalize these initiatives alongwith the proposed strengthening of scientific talent, technology acquisition and public-private partnership.

2.11. B.38 The IPR and other enabling regulatory measures should be harmonized nationally and internationally to reward the incentives as well as to protect the poor. The International Agricultural Research Centres (IARCs) of the CGIAR have long been interacting with the private sector, and mutually benefiting thereby. Some of the centres have formalized their collaborations through agreements. So far, the CGIAR system has been able to share its technologies and products as international public goods. The CGIAR policy must carve out a system which will allow a continuation of the free
flow of technologies to the poor, without jeopardizing their partnership with the private sector. Financial and other supports should be extended to the CGIAR system to enable it to pursue frontline research to generate highly competitive technologies and to leverage benefits from the spillover effects. Linkages should be established among IARCs to build complementary Centres of excellence and avoid duplication of efforts.

2.11. B.39 Private sector R&D institutions are growing in India, particularly in the areas of biotechnology and crop breeding. It is high time that we develop Codes of Conduct for public-private sector partnerships based on respect for each other’s obligations. Not-for profit R&D institutions also exist in the NGO sector which can also adopt the same Codes of Conduct as public-funded institutions in their partnerships with the private sector, where IPR, Breeders’ Rights and other forms of proprietary control over technologies and products of commercial significance are important. The Codes of Conduct should be developed through extensive consultation among all partners so that these could be used in the entire national scientific research system. The Commission recommends the following additional measures to further strengthen the partnership:

- Provide tax incentives, including tax holidays, so as to increase private sector’s contribution to R & D from 14% to 33%;
- Strengthen national capacities in regulatory matters, especially IPR, SPS and quarantine facilities to promote technology acquisition as well as trade;
- Encourage testing of new varieties bred by private sector and their other technological products in the public sector supported national technology testing programmes; and
- Undertake joint research activities with clearly defined responsibility, accountability and profit sharing.

2.11. B.40 Public private partnership in high value agriculture is a necessity and involvement of smallholders is crucial for achieving inclusive and equitable development. The role of the corporate system in the overall food chain is becoming important, highlighting the need for greater and effective linkages between public and private sectors in the changing food situation of the country. This linkage must be
addressed by the country’s innovation and research system. Indian supermarkets are increasingly retailing and distributing not only processed food but also fresh vegetables and fruits and other agricultural products and are playing an important role in the food chain. This has also put an increased pressure on food management and processing. In this transformed scenario, we must not forget the role of small and marginal farmers who are not only producers but also constitute the bulk of the poor consumers as customers. Small farmers thus must get a foothold in this changing food chain, but the major problem is their smallness causing higher unit transaction cost to participate in the system.

2.11.B.41 The rising consumer income, especially in the non-agricultural sector and urban areas and changing life-style, are creating bigger markets for high value agricultural products like fruits, vegetables, fish, eggs, milk and meat. The growing markets for these products present an opportunity for farmers to diversify their production out of foodgrains and raise their incomes. Annual growth rates of the order of about 4 to 6 percent in these commodities vis-a-vis 1 to 1.5 percent in case of cereals were registered during the last ten years and the trend is likely to continue in the years ahead. The enhanced production of the high-value products will push up processing and marketing of these products creating a lot of employment in rural areas.

2.11.B.42 In order to mainstream the small landholders into the high-value agricultural and supply chain, the strategic partnership between public and private sectors will be needed. Such an arrangement should be built to pool risk and resources to bring actors together to resolve market failures witnessed in developing countries. Supply chain plays important role in cooperation of the partners to specify high quality products to generate value and consumer demand. Such a win-win situation is particularly favourable for smallholders in terms of higher prices, knowledge, reduced losses and assured markets. However, smallholders are not able to make these demands due to market failures attributed to information asymmetries, organisational failure, high transaction cost and regulatory failures. The synergy of the public-private partnerships, especially involving the smallholder is bound to create mutual benefits and confidence
and can remedy market failures which cannot be undertaken separately by public and private sectors. If kept out of the chain, implications for smallholders are depicted in Figure 15.

**Figure 15. Implications of Exclusion of Small Holders from Market Chain on their Economic Activities**


2.11. B.43 The market failures can be remedied through: creation of research contribution to deliver high quality varieties, particularly suitable for processing, development of third party certification organization and public-private-partnership-led (PPP-led) initiative to create producers’ organisation to improve marketing and build linkages with processors, as suggested in earlier reports of the NCF in relation to the creation of Small Farmers Estates (SFEs) on the NDDB
model. The PPPs must be at the chain-level to intervene in all major bottlenecks, as targeting one may not benefit the whole supply chain. Bulk vending should be promoted to cut cost and also to mainstream small producers in market chain. Establishment of effectively functioning rural warehouses and transport connectivity and facilities, especially in hills and mountains and dryland arid zones, will be essential for linking the smallholder with the market chain. The PPPs must also induce positive effects for all stakeholders, processors, retailers, etc. to ensure a positive feedback and benefit to the whole supply chain. For keeping the system dynamically responsive to new situations with optimum output for all the partners, it may be prudent to ponder as to how to identify appropriate partners and modalities to scale-up PPPs and as to how can PPPs regulate market failures.

2.11. C.0 Funding of NARS and Strategic Financial Strengthening

2.11. C.1 The complexity of development challenges, the urgency of meeting the challenges and the unprecedented technological revolution (including ICT revolution) provide uncommon opportunities to the national agricultural science, research, education and technological development system to appropriately and synergistically strengthen and position itself to meet national goals as well as international commitments, particularly the Millennium Development Goals - especially halving the number of hungry and poor people by 2015.

2.11. C.2 As discussed earlier, investments in agricultural research, science and technology development are not only low (as compared to several developing and most developed countries) but also have been stagnating in the recent years. Some of the new emerging challenges and opportunities, such as climate change, nanotechnology, value addition to biomass, integrated and precision farming systems, participatory breeding and scientific organic farming, have barely been addressed. Knowing that the rate of return on investment in research in India has been high and the country is faced with complexer problems seeking technological solutions, the need for increasing investment in agricultural research can hardly be overemphasized. Not only the level of funds but also the efficacy of allotment of resources and the various mechanisms for
maximising the return on investment in agricultural research in terms of economic gains, social equity, environmental sustainability and ecological security need to be improved.

2.11. C.3 Our Prime Minister has repeatedly emphasized that agricultural revival and farmers’ well-being are the top priorities of the Government. The Common Minimum Programme of the UPA Government states, “The UPA Government will give the highest investment, credit and technological priority to the continued growth of agriculture, horticulture, aquaculture, floriculture, afforestation, dairying and agro-processing that will significantly add to the creation of new jobs. … will ensure that public investment in agricultural research and extension, rural infrastructure and irrigation is stepped up in a significant manner at the very earliest. … will ensure that adequate protection is provided to all farmers from imports, particularly when international prices fall sharply. … will follow policies and introduce programmes that strengthen India’s vast science and technology infrastructure.”

2.11. C.4 To a certain extent, the above declarations are being backed up by fund allocations and other supports in varying measures. One of the major recent initiatives is the Bharat Nirman - a time-bound business plan for action in rural infrastructure for the next four years. “Under Bharat Nirman, action is proposed in the areas of irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. We have set specific targets to be achieved under each of these goals so that there is accountability in the progress of this initiative (Prime Minister).

2.11. C.5 The Finance Minister in his Budget 2005-06 statement had observed “Agricultural Research has a vital role to play in the strategy for reviving and encouraging diversification. Our agricultural universities and research institutions have done good work in the past and now need to be strengthened and modernized. A Task Force headed by Dr. M.S. Swaminathan has recommended the creation of a National Fund for Strategic Agricultural Research. I am happy to announce an initial provision of Rs 50 Crore for operationalising this Fund.”

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2.11. C.6 It is most heartening that the Central Government has decided to establish a National Science Education and Research Foundation for frontline research in science and has approved Rs 1000 Crore for commencing two institutions, one in Kolkata and one in Pune. The National Commission on Farmers applauds this move and wishes to emphasise that similar strengthening of selected flagship agricultural research institutions and strategic research and technology development programmes is essential to meet the formidable challenges and to capture the uncommon opportunities in agriculture.

2.11. C.7 In line with the above, the Commission recommends a provision of Rs. 1,000 Crore as a one–time grant to NARS to bridge the critical gaps in scientific infrastructure in frontier areas of technology, so as to enable the Nation to enhance its agricultural competitiveness and to benefit from science-led agricultural transformation.

2.11. C.8 The suggested additional allocation will particularly strengthen the following areas: conservation of livestock heritage of the Nation by establishing field gene banks and undertaking systematic genetic improvement of local animal breeds, especially in rainfed drylands and geared to the needs of small and resource-poor farmers; strengthening of genomics, bioinformatics and other cutting edge biotechnologies; harnessing the gene power of microorganisms, including bioremediation; enhancing use efficiency of plant nutrients and water; and value addition, low-cost processing and biomass utilization.

2.11. C.9 The additional investments in infrastructure and human resource development and technology incubation and dissemination will mobilize science also for ensuring the success of Bharat Nirman, National Rural Employment Guarantee Bill, Tribal Land Rights Bill and other such initiatives of the Government. This will auger well also with the Prime Minister’s call to the scientists to bring about a Second Green Revolution which would have special focus on dryland agriculture and would address the needs of small and marginal farmers (PM’s Inaugural Speech, 93rd Session, Indian Science Congress, 2006).
2.11. C.10 Several recent committees and reviews have suggested revitalization of the NARS on the above lines. For instance, the Swaminathan Task Group as well as Mashelkar Committee have identified IARI, IVRI and other premier national institutes to be designated as Institutions of National Importance (see 2.11.D.10 and 2.11.D.22). The Commission recommends that such institutes should be given special funds and organizational and management supports to empower them to enrich the Indian agricultural knowledge system necessary for enhancing country’s competitiveness at the global level on one hand and to serve the majority small and marginal farmers, often inhabiting vast rainfed drylands and other poorly endowed non-congenial agro-climatic regions, on the other hand.

2.11. C.11 As mentioned earlier, India has one of the largest NARS, covering the entire spectrum of crop, livestock, fishery, forestry, natural resources and agro processing and agri-business, but there are gaps in several areas awaiting redressal or are not receiving focussed attention. Some of such areas, as listed below, require more intensive and inter-disciplinary attention.

- Climate change and its implications;
- Harnessing space technologies, ICT, nanotechnology and other frontier technologies for precision farming;
- Organic recycling and value addition to biomass, biofuels and bioenergy production;
- Crop livestock-fish integrated production systems;
- Pre-breeding and participatory breeding; and
- Scientific organic farming.

2.11. C.12 The Commission recommends setting up of new National Centres/Institutes in the above areas or mandate existing ones to address those areas specifically. Such institutions could be set up in existing ICAR institutes or SAUs but should be functionally and financially autonomous with their own Governing Boards. The National Institute for Space Applications and Precision Farming could be set up jointly by ISRO and ICAR in the land available to ISRO at Hyderabad. The National
Institute for WTO concerns in Agriculture could be set up jointly by ICAR, the Ministry of Commerce, APEDA and MPEDA. It should have wings for capacity building in IPR and SPS (sanitary and phytosanitary measures). The National Institute for Biofuels could be set up by ICAR and MNES. In Commission’s view, the institutions should be built around outstanding scientists and research leaders of proven capability in these fields. Such committed research leaders should be first identified and involved in the project design process.

2.11. C.13 Further, the 10th Plan Steering Committee for Agriculture, Chaired by Prof. M.S. Swaminathan, had identified National Challenge Programmes and priority areas to be led by Scientist-achievers in a time-bound manner, intended to harness the power of partnership among appropriate institutions and scientists. These will address issues related to climate change, WTO concerns, gender dimensions, productivity, profitability and sustainability of organic farming, dryland farming, pulses and oilseeds production systems, bio-fuels, energy plantations and biomass-based power generation, coastal farming systems, including sea water farming, medicinal plants and herbal biovalleys, abiotic stresses with particular reference to drought and salinity, new animal and fish feeds and new vaccines for establishing disease-free zones in livestock production. Adequate resources should be allocated to these challenge areas.

2.11. C.14 In addition, the need for additional support for prototype manufacture of new implements and their wide-spread testing, quality assurance and effective popularization, particularly for enhancing productivity and profitability of farmers, can hardly be overemphasized.

2.11. C.15 The Commission recommends that the ICAR should position itself to effectively utilise the available and the funds requested above. Unfortunately, some of the allocations are not being systematically and effectively used by the concerned organizations. For instance, the provisions under the National Fund for Strategic Agricultural Research (NFSAR) are yet to be operationalised. A National Board for Strategic Research in Agriculture (NBSRA) may be set up to coordinate and harness advances in Basic Sciences for agricultural progress. A couple of well-chosen
strategic research and technology development programmes (with high potential socio-economic and agro-ecological pay-off) should be launched by the ICAR without any further delay. Based on the preliminary outcomes, additional funds should be requested under the NFSAR. Obviously, prompt decision-making, project/programme formulation and effective governance are called for utilizing the resources for strengthening our research, especially strategic research.

2.11. C.16  **Besides intensity, sustainability of the funding is also important.** The current funding situation is not sustainable for a number of reasons. First, increased funding has not matched the continuing expansion of the number of R&E institutions, resulting in a steady increase in the share of salary and overhead expenditures at the expense of operating expenditures. In ICAR, the salary to operational expenses ratio has increased to 70:30 against a target of 60:40 and the situation is even more serious in the SAUs. New resource generation opportunities such as payments for services by farmers, growing high value crops (commercial livestock and fruit crops), income generation through commercialization of technology and services, and contract research with the private sector are emerging and should be tapped. This will require development of capacities in IPRs and business skills in public research organizations. However, resource generation will not fill the gap. **Public funding should be increased to 1% of AgGDP and priority should be given to Central and Eastern States.**

2.11. C.17  The share of competitive funding is still low and uncertain. Because competitive funding has the potential to enhance accountability, quality and efficiency of the system despite somewhat higher costs in terms of overheads and time of scientists, a **higher share of funds should be gradually shifted to competitive funding.** Of course, regular block grants must continue in order to maintain and upgrade research infrastructure and to strengthen basic and strategic research.

2.11. C.18  **The roles of Centre and States in supporting R&D should be balanced and harmonised.** The distinction between the roles of the Centre and the States in agricultural research has become blurred over time. In practice, SAUs should have primary responsibility for applied and adaptive research to meet local demands in their
respective States, and ICAR should take the lead in strategic research that is relevant to several States, and in those applied research areas where States will tend to under-invest due to spillovers. However, SAUs are generally starved of operating funds and now largely depend on ICAR. A shortage of funding in the SAUs has had adverse effects on human resources development, research infrastructure, and linkages with farmers. There is an urgent need to sensitize policy makers at the State level to the payoffs to investing in research. At the same time, the Central Government might develop a funding formula that supports the weaker States, but provides incentives to stronger States to increase their funding (e.g., matching grants). A key role of Central research is to generate spillovers to enhance efficiency in State research programmes. In some areas, especially crop breeding, spillovers are pervasive. The AICRPs provide a mechanism for facilitating such spillovers.

2.11. D. 0 Institutional Reforms and Revitalising the NARS

Addressing Multiple Research Objectives

2.11. D.1 The Indian NARS must find a balance among multiple objectives, ranging from traditional food security objectives, to emerging demands to serve a more market oriented economy, to meet the needs of more sophisticated consumers, and to preserve the environment. Striking a balance between these objectives has major implications for organization of research, prioritization of the research agenda, and management of intellectual property. Since there are increasing demands on the public sector to provide technologies with characteristics of ‘public good’ and that address market failures in addressing social and environmental concerns, public research investment in India needs to close the gap with the global average of one percent of agricultural GDP as mentioned earlier. Also, public research institutions must work closely with key stakeholders to define priorities that address multiple objectives, employing formal research prioritization approaches. This is extremely important when the system is large in size, objectives are conflicting and clients are poor in articulating their research needs.
Intellectual Property Rights and Public Research

2.11. D.2  **IPR regimes should be part of agricultural development pathways and consistent with our own priorities and capacities.** IPRs are important because they offer possible mechanisms for stimulating research, enabling access to technology, and promoting enterprise growth, all for the good of society. As such, they are merely one tool in a range of policies that may be applied in specific contexts to further agricultural development (e.g. for supporting public agricultural research, regulating seed production and marketing, providing an enabling environment for agribusiness development, and empowering smallholders). Because the incentives provided by any IPR regime usually interact with various other factors it is difficult to identify unambiguous conclusions regarding the possible contributions and concerns that IPR regimes might present for Indian Seed Industry. There are several priorities for monitoring. These include assessing the extent to which IPR regimes (and other policy changes) affect the structure and concentration of the domestic seed industry, and determine the options available to smallholders. This also includes analyzing if farmers have equitable access to an increasing diversity of crop varieties and if the structure of the commercial seed market provides confidence for participants while at the same time encouraging new entrants.

2.11. D.3  IPR regimes in plant breeding should provide incentives for diversifying and strengthening plant breeding and seed production. This implies that policymakers cannot consider IPR regimes in isolation from wider issues of national agricultural policy. The role of the public research system may be a subject of considerable debate in light of generally declining national budgets and the growth of the private sector. The system needs to distinguish between using IPRs in order to facilitate the use and delivery of their varieties, and seeing IPRs as a contributor to institute budgets through royalty income. This requires knowledge about the costs of obtaining and enforcing IPRs, and a realistic assessment of the public system’s capacity to compete with the private sector in producing commercially viable products (or in rewarding and maintaining staff for this task).

2.11.D.4  The strategies that the public system adopt for using IPRs will depend on answers to fundamental questions about the role of public sector agricultural research.
For instance, different approaches to relations with the private sector must be taken into account. In addition, the way that public system manages IPRs has a significant bearing on the extent to which germplasm resources are shared more widely. There are still serious challenges with respect to delivering useful varieties, particularly of non-hybrids and so-called ‘orphan crops’, to smallholders. The combination of limited and isolated markets with widespread seed saving means that even fairly strong IPR regimes are unlikely to elicit commercial interest in the near future. **We must find ways of combining (largely) public plant breeding, appropriate formal seed delivery (most likely private or cooperative), and support to local seed diffusion mechanisms, to serve the farmers dependent on these crops.** Public policies need to ensure that farmers are conversant with, and participate in debates regarding possible IPR regimes; that they are well-informed consumers who understand their rights in agricultural input markets; and that their interests and priorities are reflected in the work of public agricultural research.

**Efficiency of Public Research**

2.11. D.5 The public sector in general in India suffers from centralization and bureaucratization that imposes high transaction costs at all levels. Despite having a certain level of autonomy, the research system is no exception. Although ICAR recognizes these problems and has initiated a number of organizational and management (O&M) reforms, there are still important gaps as well as problems in their implementation. **First, institutional rigidities imposed by commodity and disciplinary boundaries restrict the flow of information between hierarchies and organizations in a large system such as India’s.** The decision to review the functioning of the AICRPs—originally established to forge interdisciplinary and inter-institutional research—was an important step toward addressing these rigidities. But much remains to be done to decentralize and devolve power before transaction costs can be reduced to acceptable levels for efficient research management.

2.11. D.6 Second, there is a growing problem in the quality of scientific human resources owing to inbreeding in the system, especially in the SAU system, and
weakening of global scientific linkages. In the 1960s and 1970s, a significant proportion of scientists were educated abroad and Indian scientists were generally well integrated with regional and international networks. This situation has deteriorated significantly with scientists often working in the same institution in which they receive their PhD, and with professional isolation of many scientists. This trend must be arrested through assessment of human resource needs and use of foreign grants and loans for human resources development, and to support participation in international scientific networks and other initiatives. Advances in information and communication technologies also have much potential to foster such linkages and improve access to international literature and scientific data bases.

2.11. D.7 Third, research institutions require much improved accountability through institutionalization of objective and transparent evaluation mechanisms for planning, monitoring and impact assessment of research. Proliferation of research programmes has meant that many programmes serving small States and agro-ecological zones are inefficient. Much of the inefficiency is due to research programmes serving small ecologically- and politically-defined markets, so that even if they are productive in terms of technologies produced, they are only used in a small area. Resource allocation needs to be linked to research planning based on ‘bottom up’ approaches involving relevant stakeholders and feedback from monitoring and impact assessment. Implementation of such processes has been attempted several times, albeit with varying degrees of success. A prerequisite for its effectiveness is to link planning, monitoring and evaluation with funding decision and with performance evaluation at various levels—the system, institute, project and scientist.

2.11.D.8 Finally, although successive review panels of ICAR have raised these various concerns and proposed recommended changes, past attempts at reform have failed due to the lack of financial flexibility and autonomy of ICAR. A package of reforms aimed at enhancing autonomy, improving decentralization and devolution of power, and improved financial management through project-based budgeting is required. Both ICAR and SAUs should commit themselves to such reforms. Support of high level
policy makers at both the Central government and State government levels is needed to implement this far reaching reform agenda.

Revamping and Refocusing the NARS

2.11. D.9 The centrality of adequate financial resources for science-led growth notwithstanding, the allocation, deployment, outlay-outcome accountability as measured by accepted indicators is equally important, if not more. A Task Group, chaired by Prof. M. S. Swaminathan, Chairman of the National Commission on Farmers, on Revamping and Refocusing of National Agricultural Research, set up by the Planning Commission at the instance of the Prime Minister of India, submitted its Report to the Planning Commission in February, 2005. The Report has made recommendations for transforming the Indian NARS to meet current ecological, economic, technological and social challenges and to equip more than 115 million farm families to face the challenges in the areas of markets and climate. It has suggested ways of bringing about paradigm shift from unskilled to skilled work and from routine on-farm to value-added off-farm livelihoods. The recommendations of the Task Group are summarised below.

2.11. D.10 Strengthening strategic, applied and anticipatory research: Establish a National Board for Strategic Research in Agriculture to bring about convergence and synergy among the numerous ongoing efforts to enhance our agricultural efficiency and competitiveness and to enhance employment and livelihood opportunities in rural India and to help fill gaps in critical areas where the core competence of the country is inadequate. Declare the national institutions like IARI, IVRI, etc., as Institutes of National Importance by an Act of Parliament to provide them autonomy to become Global Centres of Excellence in research, education and capacity building and to function like the Indian Institutes of Technology. A National Council for Global Leadership in Agricultural Sciences and Education may be set up for providing overall guidance to these Centres.

2.11.D.11 In order to improve the productivity of specific ecosystems in an economically and environmentally sustainable manner, a National Participatory Research, Demonstration and Training Centre to bring together, in an integrated
manner, the available scientific institutes in relation to research, such as arid, semi arid, coastal, hill and mountain eco- systems, should be established. These should be designed on the line of the polyclinics of CSIR. A **North Eastern Cadre in the Agricultural Research of ICAR**, with an initial cadre strength of 300, to create a critical mass of women and men scientists, trained from the region as well as from the rest of India, should be created.

2.11.D.12 **A National Regulatory Policy and Structure** which can help to assess risks and benefits of agricultural biotechnology in an objective and transparent manner, based both on science and technology which is of paramount need to safeguard the environment and human health, should be developed. IPR issues alongwith SPS issues based on the principle of social inclusion, must be given due attention. Selected **National Challenge Programmes** in areas such as the impact of WTO agreement, potential change in climate, dryland farming, etc., should be initiated. Initiatives and efforts are needed in areas of value addition, non-farm employment and empowerment of Panchayati Raj Institutions to discharge the responsibilities. **Public-private partnership** should be strengthened and **Code of Conduct** to foster ethical and symbiotic partnerships between public-private structures is needed. A **National Patents Bank for Rural and Agricultural Prosperity** to enhance new technologies on the part of underprivileged sections of the rural societies should be set up.

2.11. D.13 **Professionalisation of R&D Management in Agriculture:** The ICAR headquarters should be rather a more compact technical body engaged in interdisciplinary synergistic development, implementation, monitoring and evaluation of research strategies and programmes. The research and administrative wings of the Council should be unified. About 10% of the budget of ICAR institutes should be reserved for human resource development and capacity-building through life-long opportunities for re-tooling and re-training.

2.11. D.14 The National Academy of Agricultural Research Management (NAARM) at Hyderabad should train in ICAR and SAU scientists in professional R&D management and sensitise the various functionaries in major national and international issues and
agreements such as WTO, global climate change, etc. NAARM should host a National Virtual University for Science in Agriculture to reach out the Panchayati Raj institutions and other unreached. A Creativity Index to measure the spirit of invention and innovation amongst scientists should be developed and the recruitment system should be rendered fully transparent, merit-based and assertive.

2.11. D.15 The ICAR should dynamically adopt a thorough self-introspection, participatory self-assessment and self-correcting process. In its urgently called for integration and consolidation exercise, the system may operate on a project-mode basis on the lines of The Log Frame Options used in the CGIAR which has built-in mechanisms for effective monitoring, evaluation and implementation accountability.

2.11. D.16 The fund management system of the ICAR should be improved with the help of modern technologies. Block and competitive grants and project funds should be developed with defined links between authority and accountability at every level. There should be no artificial distinction between Plan and Non-Plan funds at the Institute level. All research proposals undertaken should have sharp focus with well-defined and verifiable indicators.

2.11. D.17 Integrating Research, Extension and Development: Agricultural extension should be holistic and inclusive. Credit and knowledge flow should be synchronised in time and space. Farm Schools, Kisan Credit Cards, Agri Clinics, Agri Business Centres, etc. should be established and strengthened. An area-based rather than a single farm-based approach is needed to spread eco-farm practices particularly through the active involvement of Panchayati Raj Institutions.

2.11. D.18 All technical positions in agriculture, both at the Centre and States, should be manned by technical persons with a proven track record in agricultural transformation. A National Council of Innovative Farmers may be set up to provide a structured opportunity for sustained scientist-farmer dialogue. A National and local-level Science and Technology Alliance for Rural Livelihood Security may be formed for providing technical support for Food and Work for Employment Guarantee Programmes with
emphasis on developing skilled workforce, enhanced factor productivity, and livelihood security specially of the socio-economically-deprived people. A National Institute for the Technological Empowerment of Women and Members of Panchayats may be established. Partnership and strategic bilateral and multilateral cooperation in the research and development, especially with CGIAR system, should be strengthened.

2.11. D.19 The Swaminathan Task Group was asked to review the functioning and priorities of the NARS as a whole. Concurrently, the Hon’ble Minister of Agriculture had appointed a Committee on Reorganization of ICAR under the Chairmanship of Dr R. A. Mashelkar, Director General, CSIR to suggest the organizational and procedural changes in the ICAR with the aim to improving the research outputs of ICAR institutions and their further commercialization. The Committee submitted its report to the Hon’ble Minister in July, 2005. The Committee had the benefit of discussions with Dr. Swaminathan and Dr. V. L. Chopra (Member Planning Commission and Convener of the Swaminathan Task Group), and concentrated mostly on organizational restructuring and did not venture deep into policy and associated institutional aspects. The highlights of the recommendations of the Committee are summarised below.

2.11. D.20 The ICAR should seek to invoke its autonomous status in its true sense to enable and empower its Governing Body with greater powers in decision-making in matters of finance and human resources. Several changes were suggested in composition of the various Committees of the Council, it was suggested to have the Prime Minister of India as the President of the ICAR Society.

2.11.D.21 Several suggestions have been made for abolishing multiple layers of command and controls existing between the Institutes’ Directors and the Director General, including abolition of the existing positions of DDGs and ADGs and regrouping the activities under a few Headquarters Directors and Heads of Departments.

2.11. D.22 Institutes like IARI, IVRI, NDRI and CIFE should be granted greater autonomy while remaining an integral part of the Council. Staff Research Councils should be renamed as “Institute Research Committee”, which should play a leading role
in priority setting, monitoring and evaluation. ICAR should develop a scheme on the lines of “CSIR Jewels” scheme to provide suitable incentives to meritorious scientists as well as to encourage institutes to evolve a competitive grant system and generate income from external sources.

2.11. D.23 Existing promotion policy of scientists, which is on the pattern of Career Advancement Scheme of UGC, may be done away with. ICAR may revert back to a suitably designed promotion policy as per ARS rules, providing desired mobility of scientists between ICAR, SAU, Private Sector and International Organizations. A system for quick hire of scientists on the lines of the CSIR system may be evolved. The scientific posts should be kept out of the purview of the existing instructions under which only 1/3\textsuperscript{rd} vacancies arising in a year can be filled. The Committee strongly supports further strengthening of the National Professors and National Fellows scheme.

2.11. D.24 ICAR should develop procedures and in-house capacity for pricing of ICAR’s intellectual properties, its licensing and associated ownership rights, leading to establishment of business and market entities by ICAR institutes. The Council should take initiative for linkages with industry and private sector and have a continuing mechanism for ICAR–Industry Interface to develop Scientist–Entrepreneur Scheme. The ICAR may consider the feasibility of establishing core shared facilities with appropriate industry partners and other stakeholders.

2.11. D.25 The recommendations of the Swaminathan Task Group and of the Mashelkar Committee are generally complementary and topical. These should be critically examined and, those accepted, should be implemented by the Government without further delay.
CHAPTER III

TOWARDS AN INDIAN SINGLE MARKET

3.1.0 Introduction

3.1.1 The Tenth Five-Year Plan document has observed that the major problems faced by the trading community in internal trade are the diversity of controls exercised by multiple authorities at different levels, restrictions of inter-State and inter-district movement of goods, lack of uniformity in standards laid down by different authorities and agencies and in taxes. Pricing strategies get affected by differential tax rates and become localised. All this has led to breaking up the vast India Market into a large number of smaller regional markets. The paperwork involved in complying with the various controls, regulations and licenses, the costs involved in terms of time and resources and the inevitable corruption and malpractices that this leads to have served as a big drag on the efficiency of trading operations in the country.

3.1.2 Trade is an important sector of the economy. The share of internal trade in the Indian economy in 2001-02 [advance estimates] stood at around 13.4% of the G.D.P and employed about 36 million people, a majority of whom were self-employed, engaged in the retail and wholesale trade. It is the most important sector in the tertiary/service sector with a share that is twice the share of ‘finance and insurance’.

3.1.3 The European Community has overtime managed to bring about a Common Market for all products i.e., a market with no internal customs charges or quantitative restrictions and then a Single Market, where there are no fiscal charges at borders nor any technical barriers to trade. With a view to benefit from the international experiences, a study was undertaken by the FAO at the request of the National Commission on Farmers, through the Government of India, Ministry of Agriculture. The FAO studied the European Union Market integration experience and looked into the legislative, political and economic measures taken during the process. The European experience is documented in this study not as much to establish any direct applicability but to understand the political processes and the economic measures that led to the adoption of a common and eventually a single market in that
region. This chapter has drawn on the above report. Extracts of the above draft report from the Chapter ‘Common Market in The Federal Structure and Options for Considerations’ are annexed at Appendix–I. Since there are no internal customs duties but quantitative restrictions or prohibitions could be applied to restrict or prevent the goods from moving out of the State and movement from one State to another State could be checked at the borders and fiscal charges be applied, India could at present be considered, in European Union [EU] terminology, a Common Market. Several steps however, would have to be taken in removing the quantitative/fiscal/administrative barriers to reach what, in European Union terminology can be called a ‘Single Market’.

3.1.4 The FAO report states that one of the major impacts of removing the inter-State barriers would be the realisation of better prices by the Indian farmers as supply chain between the producer and the consumer would be reasonably streamlined. This would also benefit the consumers. The cost of agricultural products in the urban areas has a reflection of hidden costs/taxes involved in the inter-State transport. Reducing the transaction cost would help in reduction of the ultimate price paid by the consumer to some extent and improve competitiveness of Indian Agriculture.

**Box-1**

**Liberlising Trade**

“As restrictions on domestic trade are relaxed, prices stabilize across States and there are welfare gains to producers, consumers and wholesale traders at the national level. In a liberalized trade regime for both domestic and foreign trade, States make new trading partners domestically and may even prefer to trade abroad than domestically to make the best of price difference. The gains illustrated to accrue from liberalizing domestic and foreign trade are derived from small policy changes that reduce/ eliminate movement restrictions and also from reduced transportation cost.”

*Source: Jha and Srinivasan*

3.1.5 The Hon’ble Prime Minister of India, Dr. Manmohan Singh observed as under:¹

“An important commitment of our Government is to integrate the domestic market for all goods and services. The time has come for us to consider the entire country as a common or single market for agricultural products. We have to systematically remove internal controls and restrictions. We should enable direct marketing between farmers and NGOs, Cooperatives and Private Companies.”

¹ Agriculture Summit, 2005 [9th April 2005]
3.1.6 The internal barriers to trade come in the way of a large unified Single Indian Market. This deprives in great measure the advantages of trade, which leads to economies of scale and increasing returns in production. The need to remove the barriers to trade is unquestioned; the real issue however is as to how to go about in the federal system.

**Box - 2**

**The Federal Structure**

Although agriculture is a State subject, a number of major policy decisions impacting the sector are taken by the Central Government. This includes the budgetary allocations under the Five Year Plan and several Central Government programmes and policies including laying down of Minimum Support Price for selected agriculture products and input subsidies. However, State Governments retain the right to impose fiscal levies on agriculture products, which constitute a considerable source of income for them. They also have the power to fix the prices of certain major inputs like electricity and water, which are provided through public utilities. States also have considerable flexibility in providing support services to agriculture like extension services, research and development, although there are several central government programmes in these areas which are available throughout the country. Agricultural marketing is a State subject and most States have taken steps to organize and regulate the wholesale markets in agricultural products through the State enacted Agriculture Produce Marketing Committee [APMC] Acts.

Indian Constitution guarantees to every citizen freedom of trade, business or profession, but the State Legislatures are empowered to impose such a reasonable restriction on the freedom of trade, commerce and intercourse with or within the State as may be required in public interest. This implies that absolute ban on import or export of goods or quantitative restriction on movement cannot be imposed by any State Government in India. However, in practice this freedom guaranteed by the Constitution has been somewhat restricted by several regulatory and fiscal measures imposed by different State Governments. Unfortunately, whilst in Europe, custom duties or fiscal changes which have equivalent effect, are specifically banned by legislation adopted under Treaty of Rome, these restrictions cannot be done away by a legislative or administrative order of the Central Government. The States have to be persuaded or induced to remove these restrictions in order to derive the benefits of an Indian Common Market.

*FAO Report [December 2005]: Towards an Indian Common Market*

3.2.0 The Marketing Issues

3.2.1 The various issues connected with marketing of agricultural produce in India and the needed reforms for the sector have been discussed in detail in the Second Report of the National Commission on Farmers [Serving Farmers and Saving Farming- Crisis to Confidence]. The small size of operation of the farmers and the system of selling ungraded produce means that the farmer starts with a serious handicap. Further, the regulated marketing system as it operates virtually does not offer the farmers virtually any choices/options, the market charges have become high and certain cess [like education cess, infrastructure cess etc.] have been added to, the
farmers complain about lack of transparency in weighing and also in auctions and
generally about lack of infrastructure and poor treatment given to them at the market
yards, the distance from villages to regulated markets in most of the States is quite
large and with small marketable surplus and poor infrastructure, many of the small
farmers find it difficult/uneconomic to take their produce to the market yard.
Inadequate storage facilities in the rural areas and non-availability of pledge finance
leads to distress sale where spot payment means a discount of 15-20% on the price.
Some of the other weaknesses of the marketing system for agricultural produce are
listed below:

- Thin spread of regulated markets in many States and lack of development of
  the periodic village markets, which are the first contact for the farmers.
- Inadequate infrastructural facilities at the regulated markets.
- Large variations in market fee/ other charges in the different markets across
  the States.
- Variations in the entry tax/octoroi/ sales tax etc.
- Inefficient working arrangement.
- Lack of grading at the farm gate.

3.2.2 Besides the above, the complex tax structure, multiplicity of State-level
taxes, the permit system of the transport vehicles, the harassment to which the
transport operators [the truck drivers etc.] are subjected to at various checkposts and
random checking for various purposes leads to delays and increase in costs. All these
and the various Acts like the Essential Commodities Act, 1955, and the plethora of
control orders issued under it, the Prevention of Food Adulteration Act, 1954, Fruits
Products Order, 1955, Standard of Weights and Measures [Packed Commodities]
Rules, 1977, Export [Quality Control and Inspection] Act, 1963, etc make internal
trade difficult and markets fragmented. The various barriers to internal trade,
excessive paper work, various check points which the transport vehicles have to cross
causing inordinate delays and payment of bribes etc. add to the transaction cost
leading to increased price to the consumer and a lower share to the producer in the
consumer price.
3.3.0 **Barriers to Internal Trade–Problems, Causes and Suggestions**

The barriers faced in the inter-State movement of goods is summarized in the diagram below:

**Diagram:** The Regulatory Regime for Inter-State Movement of Agricultural Goods

```
Regulatory Regime: Agricultural Goods

Commodity Specific <-> Location Specific

Restriction on Flow of Commodities
- Essential
- Hazardous
- Adulterated
- Licensed
- Forest
- Endangered Species
- Others

Fiscal Related
- Customs
- Excise
- Sales Tax
- Octroi
- Entry Tax
- Toll

Restriction on Flow in Locations
- National Borders
- State Borders
- District Borders
- Municipal Limits
- Law and Order
- Bridges
- Others

Enforcement Agencies are different and the truck may be detained under any criteria
```

*Source: Debroy and Kaushik [2001]*

3.3.1. The causes leading to the above problems could be grouped under the following broad heads:

- [a] Restrictions imposed by the Essential Commodities Act [ECA] 1955/Prevention of Food Adulteration Act, 1954 etc.
- [b] Fiscal issues
- [c] Transport related
- [d] Agriculture trade related
3.3.1.0 Essential Commodities Act, 1955 and other Acts/Orders

3.3.1.1 The Essential Commodities Act [ECA] is a Central legislation to control the storage, movement and trade in a large number of commodities including food grains, edible oils, pulses and sugar. The Act was enacted with the objective of maintaining and increasing the supplies of any commodity declared as essential by the Central Government and securing equitable distribution and availability at fair prices. The Act provides the framework for rules, regulations, orders, regulating or prohibiting the production, supply and distribution, trade and commerce of the specified commodities to achieve the objective of the Act. The Act provides instruments like license, permit, price control, storage, transport, distribution, acquisition, prohibition on sale, compulsory sale [levy] to the Central/ State Governments, maintenance of records and supply of information, on which orders could be passed by the Government to achieve the objectives of the Act.

3.3.1.2 Using the powers under ECA 1955, the various Ministries/Departments have issued control orders for regulating production, sale and prices of different items. Similarly, utilizing the powers delegated by the Central Government under the Act ibid, the State Governments/UTs have issued a large number of control orders covering items such as paddy/rice, edible oils etc. As per data available with the Ministry of Consumer Affairs [2005], the number of control orders issued by various State Governments/Union Territories under food and non-food items was 182 and 55 respectively. It is understood that 41 of these were rescinded and 10 amended. The ECA 1955, and the Control Orders were relevant and issued in situation of demand exceeding the supply. The demand-supply balance and the economic environment have changed in recent years but the restrictions and controls are continuing and coming in the way of efficient functioning of the marketing system. Many of the provisions under these control orders are now outdated and have to a certain extent adversely affected the potential of private sector initiatives and consequently agricultural development in the country. Removing controls on the movement and stocking of agricultural commodities across the country could result in incentives for the private sector and cooperative sector to invest in modern storage and bulk handling facilities for a range of commodities. Private investment in these facilities is likely to increase market efficiency, reduce post harvest losses and reduce government deficits. In any case, the powers of the
Government to restrict the movement of goods out of their territory granted under the ECA, 1955, are incompatible with the principle of a single market.

**Box - 3**

<table>
<thead>
<tr>
<th>Central Order</th>
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<tbody>
<tr>
<td>Despite the superficial absence of direct utilization of Control Orders, their mere presence creates uncertainty and thereby distortions. It further keeps certain powers with the food inspectors often liable to be misused.</td>
</tr>
</tbody>
</table>

*FAO Report [December 2005]: Towards an Indian Common Market*

**Suggestions**

3.3.1.3 Realizing the changing situation, the Government of India has already revised the lists of essential commodities from time to time. The number of essential commodities has come down from a high of 70 in 1989 to 15, at present. The need is to delete the remaining items also. It would be better if the ECA, 1955, was put under suspended animation for the present and revived by Government notification if any emergency situation develops, for a limited time for a specific commodity in a specified area. After watching for a few years and being satisfied that under the changed environment it is possible to tackle even emergency situations with market operations, it may be possible to scrap the Act all together. Scrapping the ECA, 1955, or placing it under suspended animation would also make various control orders issued under it redundant. However, to ensure that the States do not issue fresh control orders, the Central Government may consider the feasibility of making Central legislation to ban imposition of any restriction in the movement, stocking etc. of agricultural commodities.

3.3.1.4 Similarly the Prevention of Food Adulteration Act [PFA] 1954, Food Processing Order, Weights and Measures Act have become somewhat outdated and are misused by junior officers/inspectors etc. to cause considerable harassment to various units/establishments. It is expected that the new proposed *Food Safety and Standards Bill [2005]* could solve a major proportion of the current problems. The Bill would cover entire India and will supersede all State laws on food and food processing once it becomes a law ratified by the Parliament. The Bill clearly defines the food items and in line with the global concerns on food standards, incorporates the provisions of complete traceability on the label of the produce. However, interestingly the stress on the treaceability up to the farm-level for agriculture and horticulture is
less as compared to the processed foodstuff. In addition, the Bill proposes the creation of an apex organization, Food Regulatory Authority of India [FRAI], which would be the supreme authority for standard setting and enforcement in the food sector as against the present position where different Ministries are involved in administering different Acts/Control Orders concerning food and food processing. Furthermore, the proposed Bill, once enacted, would repeal all the concerned control orders issued by various departments, and create a streamlined framework. The specific enactments which would be repealed are listed in the Second Schedule of the proposed Bill and are as under:


Box – 4

The Prevention of Food Adulteration Act, 1954

The Act dates back to 1954 and is extremely restrictive in the category of permitted additives, which do not reflect technological options which are now available and widely used internationally. Although changes are possible, the procedure for making changes is extremely complicated and the authorities concerned have shown little flexibility in these matters. The Act is also rigidly administered in the sense that any deviation from what is prescribed, even in the matter of descriptive content of labels, is treated as an offence equivalent to adulteration, which can invite criminal prosecution. There have been instances where smudged labels have been treated as mislabeling and made a basis for criminal prosecution. In one case a label indicated the weight in “Kg.” Whereas the prescribed form under the rule was “Kg” and the mere addition of a dot at the end of “Kg” was regarded as a material deviation from the prescribed rules! Such provisions deter organise sector companies from expanding in this area while the unorganised sector, which is not policed at all, largely unaffected. We would recommend repeal of The Prevention of Food Adulteration Act.

Report on Task Force on Employment Opportunities, Government of India, Planning Commission

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3.3.2.0 Fiscal Issues

3.3.2.1 Fiscal reforms are important in facilitating the growth of efficient trade. There exist various forms of charges/taxes on the traded commodities in India. There are considerable variations in the market charges and taxation rates across States. Sales tax is the major component of State collection, followed by State Excise and Motor Vehicles and Passengers and Goods Tax. There are differing tax rates applicable depending on the size of the vehicle. The Central Sales Tax increases the price of the goods in the consuming State in comparison to the producing State. The Entry tax by State Governments impedes the movement of goods across the State borders. Non-uniformity of laws and procedures related to taxes add to the problems of the traders.

3.3.2.2 Octroi is used as a tax levied on the products entering the territory of a city or Municipal Corporation. Whenever the agricultural products enter the area of another mandi jurisdiction, it can technically be stopped and detained for checking payment of market fee at the point of purchase any time. This acts as a major harassing force on the movement of primary commodities and inhibits free movement of goods within a State.

3.3.2.3 The multipoint sales tax system as prevailing in India has cascading affect on prices. Further, as already stated, the rates of tax are not uniform in different States and also inhibit trade on account of extensive checking of documents etc at the border check points. In November 1999, the Government of India appointed an Empowered Committee of State Finance Ministers to suggest sale tax reforms. Following the appointment of this Committee, it was decided to introduce uniform floor rates of sales tax on most of the items important for inter-State trade. However, a review of the revised sales tax rates announced by the States showed that there was no uniformity in the revised rates or categorisation of products. In some States, ‘essential commodities’ were clubbed with the ‘prohibited’ items categories for rate purposes and the highest rate of 20% was levied on items of mass consumption along with liquor and narcotics. It appeared that the decision to implement a minimum floor rate was used as an excuse to increase the sales tax rates without rationalisation of the tax structure. The above Committee also recommended the introduction of the
Value Added Tax [VAT] in place of the sales tax. The VAT has been introduced in some of the States from April 1, 2005.

3.3.2.4 The Value added tax [VAT] is a multi-point tax imposed on ‘value addition’ at each stage, which is calculated as the difference between the purchase price and the sale price allowing for the ‘set off’ on the tax paid earlier. The invoice of the inputs purchased earlier provides the claim for credit, which could be deducted from the tax liability on the sale price. Under VAT, the rate of tax is applicable at each stage. The general rate of VAT on different items as proposed by the Empowered Committee was 12.5%. 46 items have been identified as exempt items’. Gold, silver, precious and semi precious stones are to be taxed at 1% and agriculture, industrial inputs and certain essential items [a total of 270 items are to be taxed at 4%. Rate flexibility is provided for 10 local items [out of Empowered Committee’s list]. Further, petrol, diesel, aviation turbine fuel, liquor and lottery tickets are out of the VAT provisions. The Central Sales Tax is proposed to be phased out in 3 years from the second year onwards.

Box - 5

<table>
<thead>
<tr>
<th>Value Added Tax [VAT]</th>
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<tbody>
<tr>
<td>Since the current tax statutes are cluttered with ad-hoc and outdated rules and procedures, the ideal solution is to gradually move to uniform nation-wide Value Added Tax [VAT] is universally accepted as the most efficient form of indirect taxation. As each input going into the final product is taxed only once, this tax avoids cascading and multiple incidences and is easy to implement and monitor. A unified system of taxing domestic trade in the form of a national VAT levied and administered by the Union Government would, in one stroke, bring about harmonization and help in removing the tax on inter-State trade.</td>
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</table>

3.3.2.5 The introduction of the Value Added Tax initially raised several issues/problems to industry and trade. Some of these issues were the treatment relating to the pipeline stocks/documents, the long time taken by the States in release of VAT statutes and rules etc and the communication gap between the State Government and the taxpayers. All these led to uncertainly and confusion for the industry, trade and the public. The above issues were however, transitional in nature and the trade/industry and others are expected to get used to the change. It is also expected that this experience would be useful for other States when they introduce VAT. However, the continuation of the Central Sales Tax for few more years and the
impact of rate flexibility for 10 items in each State would continue to impact the possibilities of developing a Common Market.

3.3.2.6 The complex tax structure and multiplicity of State-level taxes distort the process of trade. Inter-State and Centre-State harmonisation of tax law and administrative procedures could facilitate the simplification of the tax system.

Suggestions

3.3.2.7 All possible efforts are required to introduce VAT at the earliest. Till, a comprehensive national VAT is introduced, all States should switch over to State VAT. The inconsistency in commodity classification also needs to be addressed to ensure uniformity in rates. For inter-State sales, there should be zero rate in the originating State and the destination VAT should be applied at the point of final sale. The State VAT with a harmonised rate structure should eventually replace sales taxes and other taxes like turnover tax, octroi and entry tax etc. The introduction of entry tax to compensate possible loss due to implementation of State VAT should not be encouraged. This would come in the way of a unified Common Market. The State VAT may, in due course be replaced by National VAT, once there is an agreement between the Centre and the States regarding sharing of the tax.

3.3.2.8 The octroi or any other local tax introduced by any State needs to be abolished. If however, for revenue reasons the octroi etc. cannot be abolished in all cases, at least the primary agriculture produce should be exempted from their coverage.

3.3.2.9 Another approach could be the abolition of all indirect taxes on agricultural products as a policy that would not only resolve the problem of border taxes but would also be more socially equitable. A tax on agricultural products decreases the price received by farmers and increases the price paid by consumers. As farm incomes lag behind average Indian incomes and the poorest sectors of non-farm society spend the highest proportion of the income on food, indirect taxes applied to food products are doubly regressive. Furthermore, removing internal indirect taxes on agricultural products would tend to make Indian agricultural products more competitive on export markets.
3.3.2.10 A possible measure for compensating the States for loss of revenue could be to increase the devolution of funds from the Centre to the States most affected by incomes foregone. Another suggestion particularly relevant for compensating the loss of revenue could be the increase in VAT rate on processed and semi-processed products by say 0.5% all over the country.

3.3.2.11 The FAO study has also suggested, raising the tax say on petrol, by 0.5% to generate additional incomes to compensate loss of revenue by abolition of octroi, Central Sales Tax etc. The above report has observed that the end result would benefit the financial position of the States, rather than hurting their interest, and Haryana could be mentioned as an example in this regard. The State has long discontinued the taxes and the movement restrictions on the primary commodities and has been one of the biggest beneficiaries of the new tax regime, as the tax collection rate in the State has increased appreciably.

3.3.2.12 An important step could be to change the administration of taxes so that no border checks etc. are needed. Most of the physical barriers on primary agricultural commodities at the State borders are on account of collection of sales/purchase tax or APMC cess or Octroi. Furthermore, the verification of purchase tax returns etc is another function of these posts. The introduction of uniform rates on VAT in all States and network connectivity between authorities where information regarding movement of goods from one VAT jurisdiction to another could be exchanged online may help to do away with the need of having physical barriers. It is understood that the European Union [EU] has dispensed with all border formalities without having reached the stage of full harmonization of indirect taxation. The minimum rates of such taxes have been decided at EU level, but member countries are free to set higher rates. However, to avoid trade distortion, the products for sale in another member country are sent across the border free of tax and tax is then applied for sale at the rate applicable in the member country for sale. Compensating the State Governments for loss of revenues due to removal of fiscal related barriers to trade would be a complicated issue in our federal system. This would require considerable work on the basis of data/projections etc. for a comprehensive review. It may be better if the Finance Commission addresses this issue so that the Single Market becomes a win – win situation for all.
3.3.3.0 **Transport related**

3.3.3.1 Commercial vehicles moving across borders face a multiplicity of checks from different authorities relating to road tax, license fee, payment of excise/VAT, Essential Commodities Act, forest conservation, pollution control, security etc. The transport vehicles are required to obtain ‘fitness certificate’ and pay road tax on an annual basis. These vehicles are allowed to ply only within the State covered in their ‘permit’. For movement beyond the State, the transport vehicle owner has to apply for ‘National Permit’ covering at least four States. The permit holder is required to pay the road tax and permit fee for all the states concerned. The rate of road tax in different States is different.

3.3.3.2 Further, the variation in the collection procedures across entry points even within a State is another issue. Sometimes the goods carrying trucks from the bordering districts of the neighboring States even prefer to travel by a longer route so as to avoid the additional expenditure at that particular entry-point, and have to incur increased fuel cost and undergo longer travel time in that process.

3.3.3.3 As stated earlier, there are other taxes like entry tax, octoroi, toll tax etc. In each of these cases the appropriate authority at the checkpoints reserves the right to stop and detain the vehicles, which significantly adds to the cost of transportation. The interruption of the trucks/transport vehicle could be on various grounds, and it is quite possible for a particular vehicle to face detentions on each of them, increasing the transaction cost substantially. The direct impact of these measures, coupled with the general inefficiencies in the infrastructural scenario creates a major uncertainty and hurts internal trade especially in perishable products.

**Box- 6**

<table>
<thead>
<tr>
<th>Road Transport- Problems</th>
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<tbody>
<tr>
<td>The laws affecting the trucking industry like Motor Vehicles Act, the Motor Transport Workers Act, the Carriage of Goods Act, etc is another major problem. Smooth flow of goods carriage is hampered to a great extent by frequent stoppage of vehicles for a variety of reasons. For example, vehicle detention can be due to trucking operations or goods carried in the truck, or both. Trucking operations cover a wide range of areas, like inter or intra-State permits, road tax, load checks, local police check post, etc. But the more serious and time-consuming detention is on account of goods carried in the truck. Vehicles are frequently detained for checking essential documents, like sales tax, payment of market fee, octoroi, entry permits, etc. Besides, there are numerous other reasons under different legal provisions that can detain a vehicle, like check on the movement of essential commodities, food adulteration and hazardous chemicals etc. These checks are generally conducted by respective agencies at separate points, resulting in more than one detention. There exist flying squads or surprise checking teams other than normal checkpoints, which are empowered to stop and check the vehicle at any point within their jurisdictional limits and detain the vehicle for any violation.</td>
</tr>
</tbody>
</table>

*FAO Report [December 2005]: Towards an Indian Common Market*
3.3.3.4 The FAO report states that the cost of importing grains from Thailand to the bordering States is cheaper than transporting the same from another State of the country. Even the cost of importing from the US ports to India [select ports] is cheaper than the road transport of grains from Punjab to Andhra Pradesh. It establishes the abnormally high transport cost one has to incur in the country.

**Box - 7**

**High Transport Cost**

The extent to which the inter-State barriers inflate cost further becomes obvious from the Table below. It is observed from the table that the cost of importing grains from Thailand to the bordering States is cheaper than transporting the same from another State of the country. Even the cost of importing from the US ports to India [select ports] is cheaper than the road transport of grains from Punjab to Andhra Pradesh. While the analysis is exploratory in nature, it clearly establishes the abnormally high transport cost one has to incur in the country.

**Domestic Transport Cost of Grains with Oceanic Freight Charges [Rs./Tn]**

<table>
<thead>
<tr>
<th>Mode [Year]</th>
<th>From</th>
<th>To</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck</td>
<td>Punjab</td>
<td>Mumbai</td>
<td>1915</td>
</tr>
<tr>
<td>Mid - 2000</td>
<td>Punjab</td>
<td>Andhra Pradesh</td>
<td>2610</td>
</tr>
<tr>
<td></td>
<td>Punjab</td>
<td>Tamil Nadu</td>
<td>2750</td>
</tr>
<tr>
<td></td>
<td>Punjab</td>
<td>Kerala</td>
<td>2865</td>
</tr>
<tr>
<td></td>
<td>Punjab</td>
<td>West Bengal</td>
<td>2470</td>
</tr>
<tr>
<td></td>
<td>Delhi</td>
<td>Mumbai</td>
<td>1210</td>
</tr>
<tr>
<td></td>
<td>Delhi</td>
<td>Andhra Pradesh</td>
<td>2278</td>
</tr>
<tr>
<td></td>
<td>Delhi</td>
<td>West Bengal</td>
<td>1611</td>
</tr>
<tr>
<td>Ship</td>
<td>Europe</td>
<td>India</td>
<td>1365</td>
</tr>
<tr>
<td>2000</td>
<td>US Ports</td>
<td>India</td>
<td>1886</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td>India</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>Bangkok</td>
<td>India</td>
<td>534</td>
</tr>
</tbody>
</table>

*Ramesh Chand [2002]*

3.3.3.5 Inspite of the high cost of road transport [in absence of any suitable alternatives], about 65% of the goods haulage is by roads. The road length in India increased by over six times between 1951 and 1996-97, but the status of road connectivity is rather poor. Another issue is the cartelised nature of the road transport industry. New entrants in the business are not much welcomed. It is reported that there is no undercutting among the top 100 truck owners leaving virtually no room for competitive price negotiations. Medium and large truck operators [above six trucks] account for nearly 87% of the business. Most of the truck operators are running their business as ‘family concerns’.
Suggestions

3.3.3.6 In order to ensure that reforms in removing the barriers lead to gains to the farmers, and are not largely appropriated by transport operators, the Government may closely look at the road transport operations and take suitable measures to curb cartelisation and make room for easy entry of farmers/farmers’ groups and other individuals in this sector.

3.3.3.7 The removal of the inter-State barriers would facilitate the internal trade on one hand, while indirectly facilitating the foreign trade on the other. This would lead to welfare gains to all parties concerned including the farmers, processing and exporting firms as well as the final consumers.

3.3.3.8 To simplify the arrangements, it may be suggested that a uniform amount may be charged for the National Permit and the permit holder may be allowed to ply the vehicle anywhere in the country. Similarly, the system of annual fitness certification and road charges may be replaced by a lifetime charge assuming around ten-years life for a transport vehicle. For plying the vehicle beyond the above limit, the vehicle may be subjected to an annual fitness certification and payment of fee etc.

3.3.3.9 But for revenue consideration, the concept of ‘National Permit’ has no other value. The government could also consider doing away with it all together.

3.3.3.10 All checks [other than those for security reasons] may be given up or at least integrated under one window. Use of computers may be encouraged to minimise the detention time at various checkpoints. This may also increase the revenue collections.

3.3.4.0 Agriculture Trade

Agriculture Produce Marketing Committee [APMC] Act

3.3.4.1 The wholesaling of agricultural produce is governed by the Agricultural Produce Marketing Acts of various State governments. Once a commodity is notified, the APMC Act makes its transaction mandatory in the regulated market. Various Government Committees noted that this monopoly, introduced with the objective of benefiting farmers, is actually harming them. Although market committees may legally
be considered as a corporation [or Local Authority], they function virtually as a
department of the State government. The market fees charged on value of produce sold
[known as the Mandi tax] do not reflect the actual operation and maintenance cost of
the wholesale market but seen as another tax on agricultural commodities. Apart from
the mandi tax [usually two percent in most of the States], there are several other charges
applied on the products entering the regulated market yard. The major charges among
this category are usually rural development cess [2 percent], infrastructure cess [2
percent], education cess [0.5 per cent] etc. While the actual utilization of the collected
funds for these purposes is somewhat questionable, it is the farmer who has to indirectly
bear the entire burden, as the trader takes account of these transaction charges while
making the bidding. The State governments usually find these mechanisms a major
source of extra budgetary income, outside the purview of audit. Hence, very often, they
tend to be used as discretionary funds by the political masters. The APMCs have also
generally failed to provide adequate infrastructure at the mandis. The focus of the
APMCs has been on regulation and not development of markets for the local products,
introducing grading and encouraging local processing etc. The APMC have also not
played any significant role in bringing better market information to the farmers.

3.3.4.2 Direct marketing could enable the farmers to sell their produce to the
processors or bulk buyers at lower transaction costs and maybe at better prices than
what they get from intermediaries or from the wholesale markets. However, the
APMC Act in most of the States does not allow direct buying by processing
industries, exporters or wholesalers. Although this requirement has been waived on a
case-by-case basis in some States under pressure from the industry, the market fee
still has to be paid even though the produce may not enter the APMC yard.

3.3.4.3 Multiple collections of mandi taxes is another problem, as Market
Committees insist on collection of market fee again when the product comes from
another Market Committee jurisdiction. If a product comes from outside the State,
then the seller has to pay the market fee again, even if he has paid it in the State of
origin. This procedure of double taxation needs to be removed.

3.3.4.4 The monopoly of APMCs has meant that the private sector including
cooperatives have not been able to contribute in establishing and developing mandis.
The provision of the APMC Acts in different States requires modification to create a
lawful role for the private sector in the marketing development. The inter-Ministerial Task Force on Agriculture Marketing Reforms, which gave its report in 2002, has observed as under: “High investment and entrepreneurial skills are required for creation and management of agriculture marketing infrastructure. The situation of control by the State has to be eased to facilitate greater participation of the private sector, particularly to engender massive investments required for the development of marketing infrastructure and other supporting services. Investment requirements for the development of marketing, storage, cold storage infrastructure in the country during the Five Year Plan period has been estimated to the order of Rs.12,230 crore”.

Suggestions

Amendment of APMC Act

3.3.4.5 The regulatory marketing system introduced after independence was necessary at that stage to ensure transparency in trade in agricultural commodities and to ensure fair price to the farmer. But the working of the marketing committees has been questioned at times on various grounds including lack of transparency in operations. Farmers often express that the regulated markets are not friendly to them and the traders/petty officials exploit them. In order to improve the transparency in the operation of the APMCs, it should be made obligatory for them to publish the daily arrivals, maximum and minimum prices and the balance of stock available. Availability of this information on the Internet for all APMCs on a day-to-day basis could be the first step to develop an all India market. The monopoly of the APMCs in establishing and managing agriculture produce markets has meant that the private sector including cooperatives have not been able to contribute towards developing and building up marketing infrastructure in the country.

Box – 8

Amendment of APMC Act

The operation in APMC creates monopolies of the State Marketing Board/Market Committees in regulation the wholesale market by not allowing direct marketing, often leading to cartelization of a few brokers or arthiyas and non-transparency in price setting to the disadvantage of the farmers. The monopolistic operation of the market committee also acts as a disincentive to private sector in setting up processing units for value addition, as they do not have direct linkage with the farmers, which would otherwise help them in getting raw materials of assured quality and quantity. The policy framework should give farmers the liberty to freely market their produce anywhere including direct marketing to processors or other buyers without paying any market fees. However, in case they want the facilities of the market yard, they have to pay a service charge, which should be sufficient to cover the operation costs of the market committee.

FAO Report [December 2005]: Towards an Indian Common Market
3.3.4.6 The need for amendment of the APMC Act has already been discussed in the National Commission on Farmers second Report ‘Crises to Confidence’ released in August 2005. It may be repeated that the Ministry of Agriculture, Government of India have already formulated a Model Act on Agricultural Marketing incorporating the necessary reforms and circulated it among the States for suitable amendments in their respective APMC, Acts. The model Act basically follows the framework of the existing APMC Act with some modification and additions to facilitate direct marketing, entry of private sector including cooperatives in developing markets and contract farming etc. As per the Model Act, the waiving of market fees would only apply to specified produce sold under contract farming; direct sale would still be subject to market fee; direct buying from a farmer’s premises would require a license from the State Government etc. It appears that the Model Act would require a relook if all barriers to internal trade were to be removed.

3.3.4.7 With the increasing quantum of market arrivals, the need is to promote alternative and mega markets especially near the big cities and metropolitan towns outside the purview of the APMC Act.

3.3.4.8 If however, the taxation on primary products is discontinued, the APMC Act and marketing committee checkposts at the State borders would become redundant. The Government needs to abolish market fee on primary agricultural commodities altogether and levying of charges for various services like loading, unloading, weighing etc. in the APMC yard and replace it, by one consolidated service charge for use of the market infrastructure. This would bring in greater efficiency. In case the government finds the removal of market tax not possible immediately, it may be phased out over a period of two to three years, but the additional taxes like ‘Rural Development cess’, Infrastructure cess, and ‘Education cess’ have to be discontinued at the earliest. Furthermore, allowing private players including cooperatives to establish private mandis will be a major step in providing an alternative to the farmers and could lead to higher return to the farmers. The private players in most of the cases are selling processed agricultural products to the final consumers and therefore prefer to have assured supply of primary products. The coming up of pre production sale agreements loosely referred to as ‘contract farming’ is a significant development for Indian agriculture as it is expected
to enhance the level of investment in primary sector and boost productivity. Amendment/suitable restructuring of APMC Act would facilitate this trend further.

3.4.0 **Supporting Measures**

3.4.1 A host of supporting measures would be needed to ensure that the benefits of the Indian Common Market reach the farmers and the consumers [farmers and their families in India also form a very large percentage of the total population] and are not appropriated largely by the traders/truckers etc. Some of the supporting measures are discussed in the following paragraphs.

3.4.1.0 **Standardization and Harmonization of the Quality Standards**

3.4.1.1 The technical standards prevailing across the States are quite divergent and confusing at times. The prevailing scenario is in a way responsible for the current level of lower internal trade. In addition, the regional confinement due to diversity of standards often does not allow the players to enjoy the economies of scale. Furthermore, in coming years organized retail trade is going to be important in the country, and therefore there is need to ensure harmonization of the various prevailing standards across Indian States. Given the wide difference in the use of standards as well as selection of units prevailing in the country, the harmonization need to be introduced at every stage [e.g. – grading, packaging] to facilitate quick transaction. *Apple* is a fair example in this regard, where the level of standardization in the country is quite comprehensive, explaining the intensity of inter-State trade in it all over the country.
Box - 9

Horticulture

Horticulture products being high value have chance of increasing farmers’ income and generally improving the nutrition contents of the food basket. The Government of India have launched the National Horticulture Mission [NHM] to double horticulture production to 300 million ton by the end of 2011 from the level of 152 million ton in 2000. To get the optimum benefits from the NHM, it would be essential to ensure that the farmer gets a fair return in the form of increased income by increased productivity, reduction in post harvest losses, generation of value addition and shortening the supply chain in the marketing system. A national ‘common or single’ market would require countrywide cold chains and improvement in processing and transportation facilities. The barriers to internal trade, particularly in the transport sector due to poor/inadequate road connectivity, slow movement of goods, and delays at check posts etc. need to be removed specially for the perishable commodities. There is also a need to harmonise various laws/regulations for the food-processing sector to encourage increased private sector investment and improved quality of products. The Task Force on Employment Opportunities, Government of India, Planning Commission had stated that there were six Ministries in the Government of India [the Ministry of Agriculture, Rural Development, Health and Family welfare, Food Processing Industries, Commerce and Civil Supplies, Consumer Affairs and Public Distribution], which were administering various Acts/control orders concerning food processing. The large number of Acts/Control Orders, their interpretation etc. and the fact that different ministries handle these, make the compliance extremely difficult. Direct marketing by the producers to the consumers and development of specialized markets for fruits near the bigger towns/cities could help in improving farmer’s share in the ultimate price paid by the consumers.

3.4.2.0 Policy Support in Creation of Farmer Communities

3.4.2.1 While the removal of fiscal and procedural barriers would facilitate the movement of primary products with greater ease, there is a need to analyze its consequences on the return to the farmers. While the streamlined movement, absence of taxes and presence of private sector is likely to enhance the return to them, the major proportion of the lower transaction cost could however, still be appropriated by other players [traders, private players etc.]. Furthermore, the dominance of the truck union over road-route makes the possibility of large gain by individual farmers unrealistic. It seems prudent that the government should encourage the formation of producer enterprises in various forms all over the country so that a section of the farmers can themselves reap the benefit of the lowered transaction cost by sending the products to various parts of the country. The need is to give the power of scale to the small farmers both in production and post harvest operations to enhance their incomes. In the first report of the National Commission on Farmers ‘Serving Farmers and Saving Farming’ need for organisation of small farmers horticulture, cotton, poultry, aquaculture and other ‘Estates’ to facilitate delivery of inputs and confer power of scale to the small growers in production, post harvest and marketing was emphasized to increase their productivity and incomes.
3.4.2.2 There is also need for forming larger groups of farmers engaged in the production of higher quality products for specific markets within specific agro-climatic zones. There is not much evidence that agro-processing and marketing enterprises have interest in procuring raw materials from small farmers unless the crops are highly intensive or belong to niche groups and certain labor intensive vegetable crops that need frequent harvesting [e.g. - baby corn, gherkins, mangetout and sugar-snap peas].

3.4.2.3 The realization of economies of scale in procurement, technology adoption and marketing is better performed by producer groups. From the supply side it is not easy for value addition enterprises to work with a large number of small farmers, which involve problems of product uniformity, product traceability and variation in cropping programs leading to a greater management input and raw material procurement cost. In a number of countries, governments encourage small farmer involvement in agro-enterprises. The motivation for the enterprises could come from government offering tax breaks and concessions, a supporting bureaucracy or relaxing zoning laws when companies are establishing new processing units or retail outlets, Government support services related to strategic crop production, specialization etc. Consequently, the small farmer gains access to the market, the consumer welfare increases substantially, and the processors and packing houses have a focal point, for example, a producer group or association to work with.

3.4.2.4 The farmer group operation would facilitate requirements for quality and traceability for exports, which is currently not always possible with numerous small holdings. In farmer communities, due diligence will occur through proper record keeping and monitoring on the farm during the production process and with strong linkages within the supply chain.

3.4.2.5 The formation of farmers’ collectives would further facilitate crop specialization in clusters. Farmers in specific agro-climatic zones with comparative advantage for certain crops or products could obtain comparative and competitive advantage by crop specialization in conjunction with other farmers in the location. The three main reasons for specialization could be [i] the limited and finite resources in the area could be channeled to work with the farmer groups on those crops or products; [ii] processors and industry would become concentrated and established in
the production zone, if the region could provide sufficient volumes of product and continuity of supply to make a processing enterprise viable; and [iii] farmers could better manage a particular crop or a group of crops in order to achieve specialization.

3.4.2.6 Producer groups and associations organized as agribusiness enterprises could exercise either of the following product management system – [i] the growers or farmers become an integral part of the supply chain; [ii] producers who earlier were competitors, work together, with that particular product passing through a farmer marketing group that has the responsibility for the category; [iii] any marketing group has to commit to supply two to three outlets and form a working relationship based on the principles of partnership; [iv] the decision regarding type of product variety to grow will be determined by the farmer enterprise group on the basis of agro-climate, resources available, consumer and market studies; and [v] the growers and producers in charge of the programme take all the risks in the management of that product.

3.4.2.7 The proposed enterprises could take various forms, e.g. agricultural cooperatives, commodity-based collectives etc. The agricultural cooperatives in India have so far suffered from various institutional drawbacks [poor management quality, excessive government control etc.] and are not a universal success. The government may provide start-up capital to these producer enterprises through institutional support policy [credit in easy terms] as well as technical support [opening training centres to provide management skills to the village-level select representatives from the cooperatives] to avoid the potential problems, National Dairy Development Board being the best example of the success story.

3.4.3.0 Credit Policy

3.4.3.1 There is also a need for development of suitable credit policy framework for ensuring benefits to the farmers from a nationwide common agricultural market. The main motive for creation of the Common Market is to increase the internal trade in agriculture, improvement in productivity and move to high value agriculture. Given the resource-constraint of the average Indian farmer, it is unlikely that they would be able to increase investment in land or productivity on their own. In that case, the gains from the creation of the Common Market could bypass a major segment of the farming community, and the purpose would be defeated. The government may formulate a much stronger credit policy, and implement it effectively. The National
Bank for Agriculture and Rural Development [NABARD] as the development financial institution for agriculture will be required to play an important role in this regard particularly in financing the farmer associations/groups/organisations. Financing of new agri-business opportunities would require development approach and a sound knowledge of agri-enterprises. The linkages between credit and marketing will require to be strengthened and need based new credit products developed.

3.4.3.2 **With increase in trade, the development of instrument based secondary market of negotiable warehouse receipt system would become important to provide liquidity in the marketing system.** The banks are presently reluctant to provide loans against the warehouse receipts issued by the Central Warehouse Corporation when the holder is not the person in whose favour the receipt was originally issued. Transferability of the warehouse receipt is limited but for the fact that the original owner cannot transfer it to another person without clearing the bank’s dues. While the State warehouse Act provides that a warehouse receipt is transferable by endorsement and shall entitle the holder to receive the goods specified therein on same terms and conditions on which the person who originally deposited the goods would have been entitled to receive. Due to the above shortcoming the usage of the warehouse receipt, as a financial instrument has not picked up.

**Box - 10**

<table>
<thead>
<tr>
<th>Lending Against Commodities</th>
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<tbody>
<tr>
<td>Banks do have a facility for lending against commodities. However, this potential has never really been realised in the Indian context as lending against commodities is considered to be a high-risk area as this sector is considered to be one of the defined ‘Sensitive Sector’ in the economy and put on par with capital markets and real estate lending. The bank is firstly not sure of the creditability of the warehouse owner and its managerial ability. Instances are cited where the warehouse owner has disappeared or misappropriated the commodities stored in the warehouse. Cases of fraud have been experienced in the past, which has made banks distrustful of the same. Secondly, the bank is not internally equipped to evaluate the goods stored in the warehouse and is uncertain of the quantity and quality of the goods lodged therein. Thirdly, there is doubt regarding the longevity of the goods. Agricultural commodities largely are prone to deterioration in quality as they are stored for longer periods. Hence, even though the goods are pledged to the bank, in case of default the bank may not be able to realise the value due to the deterioration in quality of the farm produce. Lastly, authenticity of the warehouse receipt, which has been pledged by the farmers, is sometimes in doubt. Therefore, given the high risk attached to this kind of lending, banks have preferred to keep away from such credit and have also tended to charge high rates of interest on such loans. This has become an even more serious issue in light of the stringent capital adequacy norms that are to be implemented under the Basle II Accord where risk weights are to be adduced having regard to the level of risk in each lending structure as reflected by its credit rating.</td>
</tr>
</tbody>
</table>

*Source: P.H. Ravikumar, Trading in Dematerialized Warehouse Receipts: Opportunities for Banks and Other Financiers*
3.4.3.3 The need is to establish a more secure system. If there were prescribed norms for accrediting the warehouses and they could provide certification about the quality and quantity of goods, the receipt would have better transferability. However, this presupposes availability of acceptable grading norms and standards of goods kept in the warehouse across the country and the reliability of the certification system. The goods have also to be stored according to grades and standards so as to create market segmentation. Further, the warehouses must meet the financial standards so that the banks could trust these.

3.4.3.4 The crucial issues are evolving of commercially acceptable quality standards in respect of different commodities, the accrediting agencies working efficiently to improve confidence, having arrangements for gathering appropriate market intelligence about pricing and analyzing it for linkage with quality standards of the commodities accepted for storage.

3.4.4.0 Food Security Related Concerns

3.4.4.1 The argument in favour of retaining the barriers on inter-State trade in agriculture is sometimes based on ensuring food security. The idea is that, whatever be amount of foodgrain production by a particular region [State], it has to ensure a control on its movement so that it does not experience a shortage in case of bad harvest. Deficient regions could be particular about this argument. However, the argument is based on a wrong premise. Free and smooth movement of goods could ensure better food security. India’s poorest regions are districts characterized with poor infrastructural facility and irrigation networks.

3.4.4.2 The viability of this ideology seems quite untenable, as seen from the findings of various committees. Most of Indian States are deficit in foodgrains, and therefore there is all the more need to ensure free flow of primary products. Stating the growing cereal deficit in the country, the Committee of Long Term Grain Policy [2002] has rightly cautioned against the potential problem in the backdrop of which ensuring free movement of primary products is all the more necessary.

3.4.4.3 Local controls usually put a downward pressure on the prices received by the farmers, and the higher price, in such situations, is entirely appropriated by the
traders. Given this scenario, there is all the more reason to believe that removal of the movements on agricultural products will enhance food security and definitely not reduce it.

3.4.4.4 Certain aspects related to food and nutrition security were discussed in the Second Report of the National Commission on Farmers – Serving Farmers and Saving Farming - Crises to Confidence. **Access to food grains is related to the purchasing power of the population and the nature of public distribution system that is prevalent.** The focus has therefore to be increasing the incomes of poor and improving the implementation of the public distribution system. However, in areas, which are difficult to access, in addition to the above, the Government may also support the establishment of Community Food Banks/Grain Banks to improve food security of the poor.

3.4.5.0 Commodity Forward Trading

3.4.5.1 While India has a long history of futures markets in agricultural commodities, during the mid sixties to 2002; forward trading was banned for many commodities. The Government of India have since permitted futures trading in many commodities including wheat, gram, coarse cereals, Kharif pulses, peas, rice, paddy, sugar, khandseri, gur, coffee, potato, turmeric, cotton, raw jute, major edible oils, oilseeds and their cakes, rice barn, chillies, cloves, ginger, rubber, pepper, silk etc. Three national level exchanges and 21 regional exchanges are providing commodity forward trading facilities.

3.4.5.2 Forward and futures markets enable sellers and buyers to reduce uncertainty and consequent risks through price discovery ahead of actual production. It helps in price stabilization by damping the peaks and moderating the laws, leads to an integrated price structure throughout the country and ensures balance in supply and demand throughout the year. By aligning their functioning with spot markets, the forward/futures markets can work as a tool to handle complex situation arising from good and bad harvest through stabilising supplies prices. For the processors the facility helps to hedge price risks, avoid storing of goods and minimise the carrying costs is critical. **An orderly functioning forward market is essential for an efficient working of the markets and providing liquidity.**
3.4.5.3 At present the Forward Market Commission [FMC] regulates the forward markets in commodities. The FMC, which for decades was entrusted with the objective to curb forward traders, now has the job to develop and regulate the Commodity futures market. The Hon’ble Union Agriculture Minister has recently [while inaugurating the Fifth National Conference of Commodity Exchanges at Mumbai on 17 December, 2005] talked about strengthening and restructuring the Forward Market Commission and making it autonomous and independent regulator. It is reported that the proposed amendments to the Forward Contract Regulation Act also provide for setting up a Forward Markets Appellate Tribunal on the lines of Securities Appellate Tribunal [SAT] set up under Securities and Exchange Board of India [SEBI]. The steps for improvement in transparency in the operations of the Commodity Forward Markets are welcome particularly in view of the fact that commodity futures market was discouraged [near total ban] for many years and should now be developed to function in a very orderly and transparent manner. The Government may also consider permitting ‘options contracts’ under the forward trading in commodities for risk containment. However, option trading could also be used for purely speculative purposes.

3.4.6.0 Market Information

3.4.6.1 One of the major problems in India agriculture is the lack of timely and correct information to the farmer. The farmers and their groups/association/structure not only require information about the prices but also about the arrivals during harvest and pre-harvest period, stocks, exports/imports, trend in production, forecasts of production/prices etc. to take full advantage of price variations. Such information is essential for commercial operations. The Ministry of Agriculture website provides the data on price trends for major commodities, but at the village level such information is not always readily accessible. The above website would require to enlarge their functions. The farmers and their groups would also require information about the prices, availability, and qualitative aspects of various inputs for modern agriculture. The APMCs/ State Agriculture Market Boards could have played an important role in this area. However, it has not happened so far. These structures should see a business opportunity in providing these information to the farmers.
3.4.7.0 **Infrastructure Needs**

3.4.7.1 The infrastructure constraints could be a major issue in realizing the full benefits of a large all India market. The inadequate spread of regulated markets in many States, lack of basic facilities like electronic weighing machines, price display boards, public address system, electric lights, banks, security posts in many markets, inadequate connecting roads, storage facilities including cold storages etc are serious bottlenecks in developing a farmer centric marketing system. It is hoped that the amendments to the APMC Act would attract private sector participation and would facilitate creation of much needed infrastructure.

3.5.0 **Conclusion**

3.5.1 The Indian economy has moved away from shortages and scarcities. The agriculture sector has the potential for creating greater job opportunities and generation of incomes. However, the need is to first unchain the sector. Various Acts/orders etc., which were enacted to regulate stocking/marketing/movement of agricultural produce and generally to safeguard, the interests of the farmers and the consumers [check against dishonest business practices] appear to have outlived their utility. The APMC Acts, the Essential Commodities Act and various orders/enactments issued there under, the prevention of Food Adulteration Act, the highly complex tax structure, different rates and procedures under the Central Sales Tax, Octroi, Entry Tax in different States has made the compliances of these laws difficult and has led to development of fragmented markets. Further, the taxes at State and local level are on a cascading basis. The transport of goods across the district/State boundaries is slow and time consuming. The goods carriers could be detained at border posts for any number of reasons and for any length of time. The junior officials and others manning these checks are not too reluctant to accept ‘bribes’. All these lead to higher costs and inefficiency in trade.

3.5.2 The Government of India have already initiated various steps in the right direction. As regards the regulatory framework, the number of Essential Commodities under the Essential Commodities Act have been reduced from 70 in 1989 to 15 at present, the Government of India have circulated a draft model APMC Act to the State Governments with a view to facilitate necessary amendments to the APMC Act. The draft model APMC Act provides for enabling private/cooperative sector to
establish and operate agricultural marketing infrastructure and supporting services, 
direct marketing of agricultural commodities by farmers etc, permitting contract 
farming, introducing single point levy of market fee etc. However, the draft model 
Act would require a relook to be more effective in the context of removing the 
barriers to trade. The Government have also taken important steps in introduction of 
Value Added Tax [VAT] etc.

Box-11

**European Experience**

Looking at the European Union [EU] experience in developing a Single Market, it would 
appear that the task accomplished was quite difficult as compared to the task ahead in India. 
The European Community [EC] is a Union of independent nations with no central government 
or common currency. These countries also had different agricultural policies, different tax 
rates, different price support systems and level of support prices. The level of support prices 
was the most contentious issue with the countries having high support prices insisting that the 
price level should be near their support price while the EC wanted it to be near the level, which 
could be remunerative to the efficient producers. The other aspect is that all countries did not 
come together at the same time; rather the countries have joined slowly and mostly in batches. 
Six countries signed the Rome Treaty in 1957 and the latest to join was a batch of 10 countries 
[8 from Central and Eastern Europe, Cyprus and Malta] in 2004 taking the number of 
members to 25. Since the EC had decided in 1985 to become a Single Market by 2002, the late 
entrants [after 2002] did not get even the transition time to harmonise their technical and 
health standards.

*FAO Report [December 2005]: Towards an Indian Common Market*

3.5.3 Much work is still required to be done to remove the bottleneck in the 
transport sector, due to the multiplicity of commodity specific restrictions [essential, 
hazardous, adulterate, licenced, endangered species, forests] the goods carrier could 
be stopped at many points [State borders, district borders, municipal limits, bridges 
etc] and also regarding verification of payments regarding the Central and State Sales 
Tax, Entry Tax, Octroi etc. causing long delays and considerable harassment. As 
stated earlier, if this aspect of tax administration could be changed some of the 
harassment of the transport operators would be eliminated. The aspects regarding 
fitness certificate of the vehicle, issue of national permit, payment of road tax etc. also 
need simplification. The issue here is not so much of revenue losses but of the 
mindset and the vested interests of a large number of inspectors/junior officers and 
others who thrive in such situations. The need is to build a national consensus and 
move forward. A road map to build over the developments so far made is required. 
As stated earlier the transport barriers/bottlenecks have not so far attracted adequate 
attention of the Government for corrective measures. The implementation of the
reforms/changes, which do not have revenue implications or the impact is likely to be only marginal, need to be taken up first. The legal reforms i.e., changes in the APMC Acts, relook at the Essential Commodity Act and other related Control Orders and the Acts etc. are already under consideration and need to be expedited. The need is for deepening and broadening of the general consensus and a strong political and administrative will to move on.

3.5.4 Loss of revenues to the States is not an easy issue to tackle particularly in a federal set up. However, the progress being made in introduction of the Value Added Tax [VAT] is indicative that consensus could be arrived at in the larger national interest though it takes time. The Government of India may consider requesting the Finance Commission to address this issue for the common benefit of all.
Appendix-I

Extracts from Chapter 5 of the FAO Report [December 2005]:

Towards an Indian Common Market

Common Market in a Federal Structure and Options for Consideration

1. A common market for agricultural products means a market within which there are no institutional or legal barriers to the free circulation of such products, so that producers or traders can sell with the same freedom across state borders as he can within his own state. The analogous concept in the EU is a single market (because the EU used the term “common market” to refer to the stage in its development when there were no longer any customs duties or quantities restrictions in its internal trade but there were still fiscal charges and non-tariff barriers). In India at present there are no internal customs duties but certain fiscal levies and administrative orders are sometimes applied to restrict or prevent movement of agricultural products from one state to another, which have led to erection of check posts at borders. So India is close to being what, in European terminology, would be called a common market but has several steps to take to reach what, in EU terminology, would be called a Single Market.

2. In a common market that applied to all goods there would be no need or justification for the existence of customs officers at state borders and all such customs posts would be closed down, as has happened in the EU. The mandate for this study was limited to the establishment of a common market for agricultural products and we have not, therefore, examined the case for, and means of establishing, a common market in India encompassing all goods. Nevertheless, we observed that a comprehensive common market for good would have advantages compared with a common market confined to agricultural products both for the Indian economy as a whole and agriculture. For the economy as a whole, it would improve efficiency by encouraging the optimum allocation of resources, thereby raising GNP. For agriculture, it would allow the easier “import” of agricultural inputs into states that are in deficit. And the closure of customs posts would ensure that the objective of a common market for agricultural products was not circumvented by ingenious devices like taxes on non-agricultural products that are used in transport of agricultural products, like the tax on bags used in the transport of apples referred earlier.
Furthermore some of the accompanying measures that can be taken to make a common market work more effectively, in particular road construction and improvement are better justified as part of a comprehensive common market than of a common market confined to agriculture.

3. Analogies between the EU and India have to be interpreted with caution as the two are very different entities. India is a single nation, albeit with a form of federal constitution that provides separate powers for the Centre and the States and India is a developing country, and like most other developing countries, has a very large proportion of its population engaged in agriculture. The EU is a union of independent developed countries that have agreed to pool their sovereignty in certain areas. However, there are certain similarities. In the EU some matters are dealt with collectively at the EU level and others remain at the competence of the member states or regions within the member states. In India, the Constitution prescribes sharing of power between States and Centre in certain subjects in the Concurrent List but allows exclusive jurisdiction to each in the other subjects, which are well demarcated.

4. The original 6 members of the EU came together for both political and economic reasons. Politically they wished to move towards greater unity, in order to bind up the wounds of the war and to remove the risk of a new one. Economically they hoped that by trading freely between each other they could create wealth. It was recognized from the outset that a common market was not consistent with the retention of separate agricultural policies and that these should therefore be replaced by a single common policy. For some (e.g. Germany) this was seen as the “price” to be paid for having a common market in other products. For others (e.g. France) it was an advantage to be gained in return for providing free access to their markets for other products. The various countries that have joined the EU since it original foundation have similarly felt drawn to do so for a mixture of political and economic reasons. And, as was the case with the original Six, some see the CAP and the support it provided for farmers as an additional incentive to join, whilst for others it is a cost to be paid in return for the other advantages, political or economic, of being a member. For example, of the countries that joined in 1973, it was seen as an advantage by Ireland and Denmark and a cost by the UK. And the fear that the CAP would provide a lower level of support than their national policy was one of the factors in the
decisions of Norway and Switzerland to not to join the EU. Although, however, different EU members see the CAP as a cost or a benefit, up to now, all have accepted that a common market does imply the need for most powers relating to agricultural support to be exercised at EU and not national level. However, member states can still take their own decisions in relation, for example, to agricultural extension services or research, (although there are also some common research projects) and they have some discretion on the precise way in which some EU wide measures are applied.

5. As for the impact of the market integration on farmers in the EU the setting up of the common market in the 1960s necessitated the removal of national price support policies and the establishment of a Common Agricultural Policy [CAP] with common support prices. The same is true of subsidies. The move from a Common Market to a Single Market in 1993 did not, of itself, necessitate any change in the level of common support prices or of subsidies but it happened to coincide with major changes in both that were being introduced, for other reasons, at the same time and whose impact on farm incomes was clearly positive. This makes it impossible to identify the impact on incomes of the reduction of transaction costs that arose from the ending of border formalities. At a theoretical level, the reduction of transaction costs in international trade can be compared with the reduction of a tariff. In both cases the impact will be to facilitate the flow of goods from a surplus to a deficit countries, which will tend to increase prices in exporting countries and reduce them in the importing countries. So the reduction in transaction costs will have had this kind of impact on market prices (which can differ significantly from the support prices fixed under the CAP) within the EU. The fact that prices for some farmers will have been increased and those of others will have been reduced does not mean that the benefits for some farmers were exactly offset by the losses for others. Trade is not a zero sum game and can be mutually beneficial. For example, Spain frequently has a deficit of feed grains, which is made up by imports from other EU member states, in particular France and the UK. A reduction in transaction costs on this trade will have been of direct benefit to French and UK cereals farmers but it will also have benefited Spanish livestock producers for whom feed grains constitute an input cost."

6. More generally, the common and then single markets should have created wealth through their impact on the non-agricultural parts of the economy where, with
no common support price system, the principle of comparative advantage has applied more freely. To the extent that this has improved the overall economy by comparison what would otherwise have been the case, it will have boosted the employment prospects of people who have left the agricultural sector (or chosen not to enter it) and this will have had a favourable impact on the incomes of those who remained in the farming sector.

**Regulatory Concerns**

**Essential Commodity Act**

7. The *ECA* was introduced during a period when India was not self-sufficient in agriculture and controlling the movement and storage practices acted as an efficient check against dishonest business practices. However, given the fact that India has now created a respectable buffer stock of food grains against any disaster, thanks to the operation of the FCI, there is scope for re-looking at the actual utility of the provision. Several government committees (e.g. – Mid-term review of Tenth Plan, Planning Commission) as well as key policymakers have at times expressed concerns over the provision. There is reason to believe that the law has outlived its utility and is only contributing to the rising transaction costs. Although in the last few years both the State and the Central Governments have taken number of steps to reduce the rigors of the ECA and the number of commodities covered by it has been drastically cut down, the government still retains the right to bring any commodity under its purview, if need be. Out of the 15 commodities still kept in the list, 11 are related to agricultural products. The mere threat of potential Government action keeps the private sector participation in storage, transport and processing at a low level. It also bears consequences on verifications made at the inter-state borders on movement of goods.

8. The powers for states to restrict the movement of agricultural products out of their territory granted by the ECA are incompatible with the principle of a single market. They may have served a purpose in helping to preserve local food security but at the cost of reducing food security for India as a whole. For these reasons the provision should gradually be phased out.
Amendment of APMC Act

9. As regards the collection of market fees through the APMC Act, it still continues to be a major hurdle on the free movement of primary agriculture products from not only between States but also even within the States from one market area to another. As already stated, it sometimes results in double taxation of the same products. Moreover, its operation creates monopolies of the State Marketing Board/Market Committees in regulating the wholesale market by not allowing direct marketing, often leading to cartelization of a few brokers or arthiyas and non-transparency in price setting to the disadvantage of the farmers. The monopolistic operation of the market committee also acts as a disincentive to private sector in setting up processing units for value addition, as they do not have direct linkage with the farmers, which would otherwise help them in getting raw materials of assured quality and quantity. The policy framework should give farmers the liberty to freely market their produce anywhere including direct marketing to processors or other buyers without paying any market fees. However, in case they want the facilities of the market yard, they have to pay a service charge, which should be sufficient to cover the operation costs of the market committee. It is therefore recommended that farmers, processor companies or other private operators may be allowed to operate their own wholesale market and charged a suitable fee for the service. This would encourage more investment in setting up infrastructures and create opportunities for providing better and more cost-effective services.

10. The reform of APMC would facilitate free movement of agriculture products between different States and from jurisdiction of one market committee to another. However, as market fee is a major source of income for a number of States, it may result in loss of revenue to some of them. It is felt that in the major cereal producing States like Punjab, Haryana, Western UP and Andhra Pradesh where bulk of food grains are procured by the FCI for the central pool, the loss of market fee may not be significant as the FCI and the State Government agencies are expected to continue their procurement through the existing Mandi structure. However, the mechanism of collection of market fees is widely being used to collect a number of add-on taxes, education cess, infrastructure cess, R & D cess etc., and alternate source of finance need to be formulated. Collection of all additional fees and cess in the market should be withdrawn and alternative sources of revenue should be found for
the same. In case the State Government feel that the abolition of market fees would lead to a loss of revenue, the rate of VAT on processors or semi-processors of agriculture produce can be increased suitable to compensate the loss of revenue for (e.g. by 0.5%). As of now, most of the horticultural products are already exempt from VAT.

**Budgetary Issues**

**Purchase Tax and VAT**

11. To create single market requires inter alia that there should be no customs barriers or measures having an equivalent effect at state borders or at borders within states. There are in principle two ways to fulfill this objective. One is to exempt agricultural products from indirect taxes. The other, which would be analogous to the one the EC has used, would be to change the administration of taxes so that no border measures would be needed.

12. Most of the physical barriers on primary agricultural commodities at State borders are on account of collection of sales/purchase tax or APMC cess or Octroi. Furthermore, verification of purchase tax return etc. is also another major function of these posts. The introduction of uniform rates of VAT in all the States and network connectivity between authorities where information regarding movement of goods from one VAT jurisdiction to another can be exchanged online may do it away with need for having physical barriers. The Government of India has stressed a lot on introduction of uniform VAT rate throughout the country and most States are agreeable. On processed and semi-processed agriculture products, it is recommended that a uniform rate of VAT should be applicable in all the States and that it should be collected at the first point of sale and retained by the State in which it is sold. If the product undergoes further value addition in the same State or on different State, VAT should be charged on the enhanced value and the VAT collected earlier would be rebated. This process could be facilitated by electronic exchange of information.

13. The limited experience of the States where VAT has been introduced has indeed been very positive as it resulted in a more transparent and efficient system of collection. Moreover tax collection itself has improved greatly in the States, which have introduced VAT. It is therefore likely that other States will follow suit and uniform VAT rate will prevail throughout the country before too long and the
government need to expedite the process. Most of the fiscal barriers on agricultural commodities would go in case the APMC be removed, and the check-posts of the market committees would also be redundant. Further removal of the documentation requirement would be extremely important for ensuring free flow of trade at the borders. It is recommended that the establishment of an electronic network for VAT may be expedited so that electronic exchange of information may substitute physical checking at the borders and would cut down a lot of documentation requirements. By VAT-ing taxes on the semi-processed products, there will be no need to check the produce at the borders.

14. The EU currently has dispensed with all border formalities without having reached the stage of full harmonization of indirect taxation. Instead of full harmonization, minimum rates of such taxes have been decided at EU level (e.g. for VAT the minimum rate is currently 15%) but member states remain free to set higher rates. In order to avoid trade distortions arising from these tax differences the principle has been established that products for sale in another member state are sent across the border free of tax and tax is then applied on sale at the rate applicable in the member state of sale. The one exception to this rule is that individuals are free to purchase products that are for their own use in another member state and bring them across the border without having any further tax to pay. The EU Commission regards this system as less than ideal, in particular because of the control problems arising from product being moved without have been taxed and has proposed fuller harmonizing but this proposal has not yet been adopted.

15. Abolishing indirect taxes on agricultural products is a policy that would not only resolve the problem of border taxes but would also be more socially equitable. As farm incomes lag behind average Indian incomes and the poorest sectors of non farm society spend the highest proportion of the income on food, indirect taxes applied to food products are doubly regressive. Furthermore, removing internal indirect taxes on agricultural products would tend to make Indian agricultural products more competitive on export markets. It is therefore recommended that Purchase tax or VAT should be exempted on primary agriculture products. It may be noted that a number of States are not collecting any purchase tax on primary
agriculture products. Moreover, State Governments have recently been empowered to exempt cereals and pulses from VAT.

16. The alternative would be to retain indirect taxes on agricultural products but not permit them to be collected or controlled at state borders. Purchase tax, for example, would be paid on first sale wherever first sale took place. Within this option, there is a choice between elaborate systems under which, if first sale took place outside the state of production, the collecting state would remit the proceeds to the State of production. Or the principle that the collecting states would retain the tax, which is the one that applies in the EC could be chosen. In either case, it would be desirable to unify the rate of tax, to avoid distortions under which operators would seek to make the first sale in the State with the lowest tax or, as a second best, to follow current EC practice and establish minimum tax rates that all States would agree to apply.

Octroi

17. As regards Octroi, it is well recognized that it is an onerous tax and the cost of collection is huge. More and more States have gradually abolished Octroi. However, it is an important source of revenue for the local bodies like Municipal corporations, which are often fund starved. Therefore it is suggested that if Octroi has to be continued as a revenue source, at least primary agriculture produce should be exempted from its coverage so that the farmers can be benefited.

Other Local Taxes

18. Some states have introduced certain other taxation measures, which impact agricultural products by impeding their movement and thereby adversely affect farmers’ income. It is recommended that they should be abolished. The measures like Himachal Pradesh Taxation (On Certain Goods Carried by Road) Act, 1999 are put in place in order to build up infrastructure by exploiting the frequently traded primary products. The same objective could be met by introducing indirect taxation policies (e.g. – by introducing an equivalent amount of cess on petrol so as to compensate the loss in revenue) in Himachal and other willing states. The indirect taxation introduced like this at least would create minimum distortion on the price received by the farmers.
Transport related issues

19. It has been observed that the reduction of the inter-state barriers might not lead to any direct benefit received by the farmers, given the prevailing cartelized nature of the transport industry. In order to translate the regulatory reforms undertaken into material gains received by the farmers (individuals as well as farmer cooperatives), the government must enact a definitive law against cartelization of the road transport industry.

20. In the EU the construction and maintenance of transport infrastructure is a national not a EU responsibility. But the contribution that transport links can make to regional development and the need to improve certain key intra Community transport links in order to create a Trans European transport network in the interests of improving the Single Market has been recognized. Therefore, member states may use some of the EU funds that are allocated to them under the EU’s regional policy, to part finance the construction of roads. And, as a means of improving the internal market, the Council and Parliament adopted in 1996 Community Guidelines covering roads, railways, waterways and traffic management systems in order to improve certain key connections. Under this, Directives have been addressed to member states in respect of key projects within this overall project and EU funding to cover part of the cost is being made available under a variety of legal instruments. India would do well to emulate the EU example in this respect.

Standardization and Harmonization of the Quality Standards

21. It has been mentioned earlier that the technical standards prevailing across the states are quite divergent and confusing at times. The prevailing scenario is also in a way responsible for the current level of lower internal trade. In addition, the regional confinement due to diversity of standards often does not allow the players to enjoy the economies of scale. Furthermore, in coming years organized retail is going to be very important in the country, and therefore there is an urgent need to ensure harmonization of the various prevailing standards across Indian states. Given the wide difference in the use of standards as well as selection of units prevailing in the country, the harmonization need to be introduced in every stage (e.g. – grading, packaging) to facilitate quick transaction. Apple is a fair example in this regard, where the level of standardization in the country is quite comprehensive, explaining the
intensity of inter-state trade in it all over the country. The Food Safety and Standards Bill (2005) is a welcome step by the Government, which will ensure the desired harmonisation as it would supersede the State laws, once enacted.

22. Harmonization of standards removed many non-tariff barriers in the EU. If, when the Food Safety and Standards Bill in India have been enacted, it emerges that there remain some state standards that differ from national standards then the principle of mutual recognition that applies in the EU in areas where there is no EU wide standard could be applied. Under this principle, whilst member states can establish their own standards in cases where there is no EU wide standard, they are not permitted to prevent the sale on their market of products that meet the standards applied in another member state.

23. The absence of common grading standards can also act as a form of non-tariff barrier even if it is not compulsory to use the standards applicable in the state of sale, because the absence of standards inhibits direct sales from producers to distant markets, because as such standards are needed to allow contracts to be entered into without prior sight of the products. Again the Food Safety and Standards Bill should help to address this issue.

24. In India the Bureau of Indian Standards (BIS) and AGMARK are there but the level of enforceability varies widely across states. Indian standards are formulated through participation from various stakeholders, including representatives from the government, consumers and industry. The standards are laid for various categories like vegetable and fruit products, spices and condiments, animal products and processed foods etc., and product quality is checked through either ISI laboratories at Delhi, Bombay, Calcutta, Madras, Chandigarh and Patna or in a number of public and private laboratories recognized by them. On the other hand, the AGMARK ‘seal’ provided by AGMARK standard, set up by the Directorate of Marketing and Inspection of the Government of India in 1937, ensures quality and purity of a product. The government should utilize both these provisions for ensuring harmonization across the country, apart from the provisions of Food Safety and Standards Bill (2005). While ISI certification is purely voluntary, AGMARK seal has been made mandatory for only a few products. As a result, a large number of products are brought to market without standardization. Moreover, there is no compulsory
standard packaging requirement except for edible oils and vanaspati. More products should be brought under the ambit of AGMARK and that even packaging should be standardized. The fluidity and transparency of a Single market would be further enhanced if grading standard for food process, particularly horticultural products, were established on an India wide basis.

Non-Regulatory Issues

Policy Support for Creation of Farmer-Centric Environment

25. The gain from removing indirect taxes or savings in transaction costs as described earlier would initially benefit traders and the transport industry. Both are areas where competition is limited, by the accreditation system that limits free entry into the trading sector and by the agreement that exists between truck owners. It is difficult to ascertain whether these limitations on competition in fact raise the charges they make above the cost of providing their services but, to ensure that the savings arising from the removal of border checks were transmitted back to growers and on to consumers, it would be desirable to increase competition, by freeing up access to the trading sector and forbidding restrictive agreements in the transport sector. The realization of the benefits of market integration to benefit small farmers depends on the measures to address supply side constraints, which prevent this category of farmers to take advantage of the opportunities opened up by greater market access, and help them to increase competitiveness or diversify. Some of these issues are examined below.

Formation of Producer Organizations

26. The economies of scale in procurement, technology adoption and marketing are better attained if small farmers combine together as producers groups. From the supply side it is not easy for value addition enterprises to work with a large number of small farmers, which involve problems of product uniformity, product traceability and variation in cropping programs leading to a greater management input and raw material procurement cost. In a number of countries Governments also encourage small farmer involvement in agro-enterprises. The motivation for the enterprises comes from government offering tax breaks and concessions, a supporting bureaucracy or relaxing zoning laws when companies are establishing new processing units or retail outlets, Government support services related to strategic crop
production, specialization etc. Consequently, the small farmer gains access to the market, the consumer welfare increases substantially, and the processors and pack houses have a focal point, for example, a producer group or association to work with.

27. The farmers group operation would facilitate export requirements for quality and traceability, which is currently not always possible with numerous smallholdings. In farmer communities, due diligence will be accorded through proper record keeping and monitoring on the farm during the production process and with strong linkages within the supply chain.

28. The formation of farmers’ organizations would further facilitate crop specialization in clusters. Farmers in specific agro-climatic zones with comparative advantage for certain crops or products can obtain a comparative and competitive advantage by crop specialization in conjunction with other farmers in the location. Already there are areas in the country that have a reputation for growing certain types of horticulture crops - Nasik for grapes and onions, Nagpur for mandarins, Nawasari for chikoos, Durg for papaya, Kullu for apples, the Kashmir Valley for saffron and Hoshiarpur for kinnaw. The three main reasons for specialization are; (i) the limited and finite resources in the area can be channeled to work with the farmer groups on those crops or products; (ii) processors and industry will become concentrated and established in the production zone, if the region can provide sufficient volumes of product and continuity of supply to make a processing enterprise viable; and (iii) farmers can manage a particular crop or a group of crops in order to achieve specialization.

29. The proposed producer companies’ enterprises could take various forms, e.g. - agricultural cooperatives etc. The agricultural cooperatives in India have so far suffered from various institutional drawbacks (poor management quality, absence of the right decision-making capability, excessive government control etc.) and are moderately successful. The government should provide start-up capital to these producer enterprises through institutional support policy (credit in easy terms) as well as technical support (opening training centres to provide management skills to the village-level select representatives from the cooperatives) to avoid the potential problems. National Dairy Development Board being the best example of the success story. The Company Law has been recently amended to permit formation of producer
companies, which have certain tax and other advantages. This form could be well suited to form strong farmer enterprises.

**Credit Policy**

30. One of the major goals of the study is to recommend suitable policy frameworks towards creation of a common agricultural market. While the need for extending the credit net for enhancing agricultural growth has been well known, its necessity for creation of the common market is also quite obvious. The driving motive behind the creation of the common market is to increase the return to the farmers through enhanced internal trade in agriculture and increase in agricultural production as well as the productivity is a pre-requisite for that. Given the resource-constraint of the average Indian farmers, it is unlikely that they would be able to increase investment in land or productivity on their own. In that case, the gains from the creation of the common market would bypass a major segment of the farming community, and the whole purpose would be defeated. Therefore, the government needs to formulate a much stronger and wider credit policy, working in the interest of the small and the marginal farmers.

31. While the current government credit policy is already focusing on extending the facilities to the small farmers, there is an urgent need to the broad base it further. It will not be possible for the government to help the formation of producer enterprises all over the country in one go. While the formation of producer enterprises could be encouraged in some select areas (where specialization is readily possible) initially through financial and technical support, access to credit could be extended to the uncovered regions both directly as well as indirectly. A significant proportion of the farmers is not covered by the official credit net, and has to go to the moneylenders or arthiyas for credit. The regional rural banks need to be energized to solve this problem. Secondly, having a vibrant private sector would indirectly contribute in this regard as they have already started providing credit to the farmers selling their product to them in the form of quality farm inputs. Removing the remaining barriers for private sector operation would facilitate this trend further.
Provision of Market Information
32. It has been noted earlier that absence of market information (both on prices and appropriate post-harvest measures) acts as a major negative force on Indian farmers. It is the responsibility of the Government to provide the timely information especially to the small and medium farmers. The current level of Government effort remains mostly inaccessible by these groups at large. The Private sector initiatives like the e-choupal model of the ITC and the innovative marketing strategies of several other private players are successfully supplementing the Government initiatives and appropriate policy measures must be undertaken in order to encourage these types of arrangements. The proposed reform of the AMPC Act would be a major step in facilitating the entry of more private players in this sector. The optimality of the operation of private players have already been reflected through higher price to the farmers and increased productivity.

Creation of Rural Infrastructure
33. In order to create a common market, creating a minimum level of infrastructure connectivity is necessary. Infrastructure services such as roads, electricity supply and telecommunication and others are limited in rural areas. Warehouses, cold storages and post-harvest practices are awfully inadequate. As private investors are generally shy in investing in such infrastructure which is more in the nature of public good, government must continue to be the major investor in creating rural infrastructure. A recent study undertaken on behalf of IFPRI on “Linkages between Government Spending, Growth and Poverty in Rural India” found that for each Rs. 10 Lakh spend on roads, 165 people will be lifted above the poverty line. Rs. 10,000 crores are spent on roads will increase productivity growth by more than 3 percent as well as increase in non-agricultural employment.

34. Ongoing projects like “Bharat Nirman” will certainly help in achieving the objectives. Apart from enhancing the government support to the agricultural sector, the private sector has to be encouraged to invest more in the infrastructure building, as the state participation is clearly less than satisfactory. There is a need to adopt various innovative projects to enhance public-private partnership to build adequate infrastructure, both marketing as well as physical, for the primary sector.
To attract promoting agencies to take up infrastructure projects, the Central / State Governments need to additionally extend support in the allocation of suitable land to set up the market, provisions of village land for farmers’ association and collection centres, deregulation of area from the APMC Act where new markets were to set up, ensure first approval of foreign technical assistance, import of equipment and services like electricity, service, sewage, telephones etc.”

35. The disguised unemployment in Indian agriculture is a major problem, and transfer of the surplus labours to other economic activities is a major challenge to the government. Although extension of labour intensive horticulture is capable of absorbing a proportion of the excess labour employed in traditional agriculture, there are limits to diversification and promoting off farm opportunities is quite important. Apart from focusing on ‘Bharat Nirman’, the government needs to concentrate on ‘PURA’, which plan to enhance physical, electronic and knowledge connectivity of the villages, with significant positive externality on agriculture sector.

36. Apart from strengthening the road network, attention also needs to be paid to the mode of transportation of agricultural produce. Railways are an efficient means of transport of goods over long distances, but most railway wagons in India are not designed to carry agricultural and food products in bulk. Products have to be generally transported in gunny bags in open or closed wagons, which do not have any facility for mechanical loading or unloading. Silo storage or bulk handling and movement is rarely undertaken. Cost of transportation could be greatly reduced if suitable steps are taken for bulk handling for agricultural produce by trains. There is also a need to increase availability of refrigerated vans for carriage of fresh farm produce, which are highly perishable, this would minimize travel and transit losses and be time and cost efficient.

37. Another cost-effective means of transport would be to encourage internal trade in agriculture through inland waterways. There is an extensive network of rivers and canals in the country and most of the productive regions are adjacent to them. However, unlike in Europe, China and many other countries in the world, inland waterways are rarely used in India to transport bulk commodities. In fact, over time most of the waterways have gone into disuse. They need to be revamped by regular ridging, if necessary. One additional benefit of introducing this would be a favourable impact on environmental pollution.
CHAPTER IV
TECHNOLOGY MISSIONS: WAY FORWARD

4.1  Historical Backdrop

4.1.1  Technology Mission as a technique or a method to achieve specific development goals was initiated in 1986 by the former Prime Minister late Shri Rajiv Gandhi. Five Technology Missions were initiated, out of which Technology Mission on Oilseeds was one. In his Convocation Address at the IARI, New Delhi in February, 1986. Late Shri Gandhi said - “One of our biggest problems today in the agricultural sector is the oilseeds. We are setting a thrust Mission for oilseed production. When we talk of a Mission we mean an exercise starting from engineering of the seeds and, finishing with the finished products of the vegetable oil, which could be delivered to consumer. We would like to put of one person in-charge of such a mission with full funding with no restriction on him whether bureaucratic or otherwise. The only limits will be certain achievements, which must come within a certain time frame. This will cut across a number of Ministries where you find a lot of hassles and we find our projects getting stalled because the interaction is not smooth enough. We have already decided on this particular Mission ………”.

4.1.2  Till the 1980s, programmes for enhancing the production and productivity of various agricultural crops was sought to be achieved through investment in inputs and provisions of subsidies to farmers through specific programmes along with investment in infrastructure like major and minor irrigation etc. However, with the ascent of Shri Rajiv Gandhi as Prime Minister of India, it was felt that new approaches and methodologies were necessary to give the required fillip to various crops, particularly those which were items of mass consumption and whose shortage led to large import bills. Fortunately, this was the stage when the importance of technology driven growth in agriculture was realized more clearly. It was also the time when the problems of coordination in meeting the felt needs of the farmers and the need for an end to end approach towards growth of production and productivity was also realized. The 80s also saw the arrival of Dr. Sam Pitroda with his reputation in the field of science and technology and his known capacity to cut through the traditional methods of governance, for leading the Technology Missions.
4.1.3 These developments at the Centre were matched by substantial enthusiasm in the States because of the enthusiasm and vision of Shri Rajiv Gandhi in the context of his very large political mandate and the zeal of Dr. Sam Pitroda in converting the States into new thinking for rejuvenating agriculture.

4.1.4 The 80s therefore saw the congruence of several positive factors when the Technology Missions were born. The Centre had formulated a new methodology to ensure significant technology inputs and more efficient delivery mechanism for optimising yields of crops and the States were equally enthusiastic in implementing the ideas in order to gain political mileage and also benefit farmers in drylands.

4.1.5 The following key elements of the Technology Mission approach emerged:

(i) Effective transmission of available technology even while encouraging research on newer technologies.

(ii) An end-to-end approach in order to meet all the requirements of the farmers in an integrated way.

(iii) An effective integration of the activities of various Stakeholder Departments so that the needs of the farmers could be understood comprehensively rather than through segmented lenses.

(iv) Crops where there was a significant gap between the actual and possible productivity mainly due to insufficient/ inappropriate transmission of technology to the fields.

4.1.6 Briefly, the Technology Missions were designed to be technology rich and to comprehensively transfer the available technology enhance profitability and incomes of farmers through appropriate attention to both production and post-harvest and processing issues. This was expected to be achieved through full collaboration between the Centre and the States and collaboration amongst various departments involved.

4.1.7 These Missions were also supposed to be driven by dynamic and knowledgeable missions Directors who had the capacity to comprehend the technology as well as the delivery systems and who had the vision to deliver results in
a time bound manner. Last but not the least the Technology Missions were expected to be backed by appropriate policy support in order to protect the incomes of farmers. With this historical background, the formulation and implementation of the discontinued as well as ongoing Technology Missions in the Agriculture Sector are being analysed.

4.2 Technology Mission on Oil-Seeds and Pulses (TMOP)

4.2.1 Between 1981-85, the area under oilseeds was fluctuating between 18-20 million hectares, production between 9-12.9 million tonnes and productivity between 563-684 kgs per hectares. The percentage of area under oilseeds, which received irrigation, was less than 14-17%. The soils in which oilseed crops were cultivated were mostly hungry and thirsty because the resource poor farmers particularly under dryland conditions were not able to provide the needed inputs of fertilizers, water or plant protection. The erratic monsoons further put the oilseed production at risk. There was no well-developed technology and high yielding varieties like in wheat and rice to push up the oil-seed production. Most of the oilseed crop varieties were susceptible to a large number of pests and diseases and they were also affected by abiotic stresses like drought, salinity, alkalinity etc., Devious market forces also dampened the enthusiasm of the farmers to go for oilseed cultivation. The efforts that had been made earlier through research and development activities had not increased production to any appreciable extent while the growing population and industrial needs of the vegetable oils, both edible, and non-edible had been steadily going up. To meet the growing demands India had to resort to import of edible oil which reached 1.6 million tonnes costing Rs.1319 crores in 1983-84 and 1.4 million tonnes costing Rs.1122 crores in 1984-85. This was a huge drain on foreign exchange resources of the country and if it was not controlled through proper strategies to step up the production of domestic vegetable oilseeds import of oils could reach an estimated Rs.3000 crores by 2000 AD. The major edible field oilseed crops of the country were groundnut, rapeseed-mustard, sesame, safflower and niger and among the non-edible castor and linseed. Area under soybean and sunflower was limited and coconut oil consumption was localized. In this background, the Technology Mission on Oilseeds was expected to achieve the goal of self-sufficiency in a stipulated time frame.
4.2.2 A SWOT analysis revealed that we had the strength of soils, climate, research and developmental infrastructure to grow horizontally and vertically by encouraging oilseed crop cultivation and also by use of need-based necessary inputs. Since the soil and climatic conditions of the country were very diverse, a number of oilseed crops could be grown which was not the case in most of the countries around the globe. The yield gap was a great opportunity to exploit. The well laid out demonstrations by the scientists on farmers’ fields by use of available knowledge and technology had brought out clearly the possibility to raise the yield significantly. Besides, this opportunity there was a well-developed developmental infrastructure of Departments of Agriculture, Forestry, Scientific Institutions, input agencies and industry in the country. The major threat was the import of cheap vegetable oil from abroad without proper checks and balances that dampened the initiatives of the local farmers.

4.2.3 The target to raise the present oil seed production from 12.4 to 26.0 million tonnes and vegetable oil production from 3.6 to 8.0 million tonnes by 2000 A.D. was fixed as the goal of the Mission.

4.2.4 **Strategy Development:** To bring a new vigour into the vegetable oil scenario, several steps were taken. Intensive discussions between scientists of ICAR and administrators of Department of Agriculture and Cooperation (DAC) Government of India were taken up to take stock of the existing scenario and explore opportunities to step up oilseed production. This was followed up with interactions with the officials of the Commerce and Civil supplies Departments on supply-demand scenario, with the scientists of Council of Scientific and Industrial Research, on technological options on improving the efficiency of oil extraction and organizations and departments that fix the prices of the different oilseed crops. Based on these deliberations at the Central level, similar interactions were organized at the level of different important oilseed crop growing States of the country.

4.2.5 Based on all these intensive discussions and keeping the critical role of the farmers who grew the oilseed crops for bettering their income, four MMs (MM) covering all the activities of the oilseed scenario in totality were started both at the
Central and State level and to impart momentum to the Mission. These four MMs were:

- MM I – Dealing with crop technology
- MM II – Farmer support system
- MM III – Price support, processing, storage and marketing
- MM IV – Post harvest and processing technology.

MMs I and IV where technology is involved, were to be operated by DARE and CSIR respectively and Missions II and III were to be looked after by DAC.

4.2.6 The leaders for these MMs were identified both at the Central and State levels. Seventeen different agencies were involved in the various activities dealing with vegetable oil scenario. To coordinate, facilitate and execute the different activities and programmes, a full time Mission Director was appointed. The Technology Mission on Oilseeds recognized at the very outset the critical role of technology in production and processing and coordinated and integrated action, with follow up. The participatory role of all the agencies and farmers was also fully realized and a bottom up rather than a top-down approach was followed. Incentive prices for each of the oilseed crops were announced from time to time to enthuse the farmers. The National Agricultural Research System involving ICAR, State Agricultural Universities, Central Commodity Boards, private industry, Oilseed Federations, CGIAR, CSIR, ICMR and other scientific institutions, development departments/ministries/agencies were all brought together and all of them identified themselves as partners in achieving the objectives of the Mission. This cooperative, coordinated approach with a sense of ownership and commitment by all partners was one of the reasons for the success of the Technology Mission on oilseeds.

4.2.7 The Technology Mission on Oilseeds launched in May 1986, drew up the following strategic plans after due deliberations:

1. Identification of crops/States/areas, which have the highest potential for increasing production.
2. Development of short term and long term plans.
3. Identification of institutions and leaders at every level who will implement the plans and programmes.
4. Organisation of field demonstrations on a massive scale with available technologies and sensitise farmers and extension workers.

5. Documentation of all the strategies with cooperation of scientists/administrators/policy makers at the Central and State levels.

6. Development of activity milestones, time frame and implementation and review methodologies.

7. Constant and frequent reviews by the Mission Director and mid term course corrections where and whenever needed.

8. Mission activities to be reviewed once in three months by the high powered Steering Committee headed by the Secretary, Agriculture and Cooperation and Secretary, DARE with all the MM leaders and the Mission Director. Reporting to the PMO on a regular basis about the progress.

9. Organisation of national seminars and States level seminars, regional workshops involving scientists, industry, policy makers etc., and organizing training programmes.


11. A very objective and result giving strategy laid out and followed which gave good results was:
   a. Identifying crops, technologies and areas that could be exploited for increasing production, productivity and extractability of oil at the shortest possible time
   b. Identification of non-traditional areas of the country where the crops could be introduced and exploited
   c. Introducing non-traditional crops on a large scale
   d. Improving the oil extraction technologies in different mills
   e. Exploitation of rice bran and cotton seed as a source of oil and
   f. Exploitation of tree species of forest origin.

12. In the strategy, high importance was given to –
   a. Rabi groundnut production
   b. Promoting rapeseed-mustard in a big way in Rajasthan and non-traditional areas like Central, South and East India
   c. Extending area of cultivation and intensifying production and processing technologies of soybean
d. Import of seed of high yielding varieties/hybrids of sunflower and popularising it  
e. Introduction of high yielding tenera hybrid plant material of oil palm  
f. Import of rice bran technologies from USA/North Korea  
g. Improving solvent and other rice bran technologies  
h. Announcing remunerative prices  
i. Extension of existing knowledge and development of new knowledge  
j. Extraction of oil from cotton seed and maize  
k. Blending, package and storage technologies  
l. Strong support of DAC by developing National Oilseed Development Programme (NODP)  
m. Gradually reducing the import of oils

The above strategies based on scientific analysis gave significant boost to oilseed production and reduced the import bill. An attempt was also made to look at alternate crops like Simarouba glauca, Pongamia, Sal, Mahua and other tree species for meeting the needs of both edible and non-edible oils.

4.2.8 As a result of the thrust given by the Government of India, the Technology Mission on Oilseeds (TMOP) achieved the goals of increasing domestic production and reducing the dependence on imported oil.

(i) Between 1985-86 and 1998-99 the production of oilseeds increased from 10.83 to 24.75 million tonnes, yield per hectare increased from 570 to 944 kgs. and the area under oilseed crops increased from 19.02 to 26.23 million hectares.

(ii) The strategy of non-traditional areas and non-traditional crops paid rich dividends.

(iii) The thrust given to rabi groundnut, soybean, rapeseed-mustard, sunflower, oil palm paid well.

(iv) The solvent extraction technologies, the conversion of hullers to shellers and rice bran extraction technologies gave good results.

(v) By 1992-93, the import bill on vegetable oils came down very significantly.
4.2.9 Addition of Pulses

Buoyed by the initial success of the Technology Mission, pulses were also brought into the ambit in 1990. The objective of the Mission was expanded to increase the production and productivity of oilseeds and pulses and to make the country self reliant in these vital sectors. The total outlay of Ninth Plan for Oilseeds (OPP) and Pulses (NPDP) production programmes was Rs. 498 crore and Rs. 181 crore respectively. This went upto Rs. 540 crore and Rs. 215 crore for the Tenth Plan.

4.2.10 The pattern of assistance under Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) is on 75:25 sharing basis between Govt. of India and State Govts. in all components except infrastructure development and publicity. Under infrastructure development, the pattern of assistance is 50:50 sharing basis whereas for publicity, 100% assistance is provided by GOI on lump sum basis (Rs. 2.00 lakhs for each State).

Table 4.1 : Area, production and yield of oilseeds and pulses from 1986-87 to 2004-05

<table>
<thead>
<tr>
<th>Year</th>
<th>Oilseeds</th>
<th>Pulses</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Area (Lakh ha.)</td>
<td>Production (Lakh tonnes)</td>
</tr>
<tr>
<td>1985-86</td>
<td>190.20</td>
<td>108.30</td>
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<tr>
<td>1986-87</td>
<td>186.30</td>
<td>112.70</td>
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<tr>
<td>1987-88</td>
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<td>1992-93</td>
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<td>1999-2000</td>
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<tr>
<td>2000-2001</td>
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<tr>
<td>2003-2004</td>
<td>237.40</td>
<td>252.90</td>
</tr>
</tbody>
</table>
4.2.11 Following production constraints were noted in oilseeds and pulses

4.2.11.1 Oilseeds

(i) Low productivity primarily due to their cultivation in un-irrigated drought prone areas.

(ii) Highly risky crop affected by vagaries of nature like floods and drought in Kharif and frost in Rabi.

(iii) Susceptibility to a number of pests and diseases, which lower productivity.

(iv) Use of poor quality seeds by the farmers and their reluctance to provide cash inputs as growing of oilseeds was risky.

(v) Distress sale of oilseeds during the harvest period where marketing channel was weak.

(vi) Lack of high-yielding varieties suitable to the local agro-climatic regions.

(vii) Non-availability of hybrids in Mustard, Groundnut, Sesamum, Soybean, Niger and pests and disease resistant varieties.

4.2.11.2 Pulses

(i) Cultivation of pulses was less remunerative than that of cereals such as rice, wheat, and oilseeds or of other commercial crops. The farmers, therefore, diverted the better lands and resources for the cultivation of other crops.

(ii) Pulses were raised under rainfed condition on marginal and sub-marginal lands, which were poor in fertility with minimal input application.

(iii) The varieties available were susceptible to a number of diseases like yellow mosaic virus and powdery mildew in moong, urd and cowpea, sterility mosaic in arhar, wilt and blight in gram, reducing the yield; they were also vulnerable to termites and susceptible to pests.

(iv) No major break-through had been achieved in pulses production technology and improvement of high yielding germ plasm. The varieties evolved in pulses had narrow adaptability and, therefore, the farmer had to manage within the limited range of varieties for different seasons and agro-climatic situations.

(v) The production of pulses especially in summer/kharif season was affected by stray cattle and Blue Bull, which damaged pulse crops such as arhar, moong and urd more than any other crops.
(vi) Lack of proper marketing infrastructure and highly fluctuating prices led to uncertainty in economic returns.

(vii) Inadequate seed availability (about 2-5% seed replacement rates)

(viii) Inadequate transfer of technology programmes.

(ix) Poor storage facilities

4.2.12 The following suggestions for improving the relationship between financial outlay and output in terms of production, productivity and quality of produce can be made

(i) Timely administrative approval for implementation of the schemes.

(ii) Funds should be released directly to implementing agencies;

(iii) Timely issue of State Level Sanctions/release of funds by the State Govts. for the programme

(iv) Arrangements of inputs, well in time by the implementing agencies under the programme.

(v) Close monitoring of the implementation of the programme activities;

(vi) Review of programme on quarterly basis;

(vii) Advance planning for inputs, particularly for seed. 5-6 years rolling plan for seed, variety/hybrids, season-wise and year-wise, agro-climatic zone wise, should be prepared by the State;

(viii) More involvement of good private sector in input supply and extension activities as provision has been made in ISOPOM guidelines;

(ix) Use of maize for production of ethanol for its further use as fuel

(x) Encouraging primary processing facilities, rural godowns, marketing infrastructure etc. in rural areas.

(xi) Involvement of farmers associations/groups/societies in implementation of the programmes/activities;

(xii) Hiring of locally available, agriculture graduates/post graduates/doctorates at various levels, viz; grass root level, district level, States level, and national level, on contract basis.

(xiii) Setting up of maize processing industries used on dry maize processing at district level;

(xiv) Encouraging the production of speciality maize like QPM, Baby Corn, Sweet Corn, Pop Corn etc.;
4.2.13 Analysis

4.2.13.1 The substantial achievements of the TMOP were made possible not only by the political commitment and zeal at all levels but by a very favourable minimum support prices regime till 1994. The tide however, started turning in 1994-95 due to the changes in the Government. The sharp monitoring petered off after the departure of Shri Sam Pitroda. At the same time, voice of urban consumers for cheap edible oil became vociferous and international edible oil prices also registered a fall. The Government liberalized of import and put edible oil under Open General License (OGL). Even more importantly, and unfortunately, the bound rate for crude and refined soybean came down to 45 per cent whereas the bound rate for mustard and all other oils came to 75 per cent and 300 per cent. This was a death knell for the concept of self-sufficiency in edible oils. It also discouraged the oilseeds farmers within the country so much so that the production and area have tapered off ever since in sharp contrast to the impressive gains in the first ten years of the Mission. Briefly, therefore, the demands of the urban consumers and the interest of oilseeds producing farmers worked at cross-purpose and the trade policy negated the benefits of the Technology Mission on Oilseeds. While it can be argued that the policy move towards imports of edible oilseeds under Open General License was a component of the trade liberalization set in motion in 1991 for commodities across the board and that it was perhaps not possible to resist international pressure on reduction of bound rate for imports, it must be said that if the trade policy had to be adopted as a component of the country’s foreign and economic policy, the Technology Mission should have been wound up at that stage itself without having to be continued till 2002 and be blamed for failing to achieve its objective, in the last years.

4.2.13.2 India is now amongst the largest importers of edible oils in the world today. There is a significant co-relation between the trade policy, minimum support price and self-sufficiency in oilseeds. The reduction in import duty to 50 per cent in 2002-03 led to one of the lowest level of production of 155.7 lakh tonnes, thereby negating the gains of the Technology Mission since its inception. The percentage of self-sufficiency of around 95 percent during 1990-91 and 1992-93 came down to only 50 percent during 2002-03. While per-capita availability of edible oils has increased because of increased availability of imported oil, it has very severely affected the
production of oilseeds and edible oil within the country and correspondingly it has meant substantial decrease in the income of farmers through production of oilseeds.

4.2.13.3 After the initial success, several other problems also cropped up. Even though several posts were specifically created for the Mission, many of these remained unfilled. The posts were filled on the basis of administrative convenience rather than on specific suitability of the concerned officials. The situation was replicated in the States where the reduced priority/ fervour for the Technology Mission in the Centre was felt. Consequently the Technology Mission became another division of the DAC with its own problems of vacant posts and inappropriate staff.

4.2.13.4 Compounding the problems further, the various officers in the Technology Mission were burdened with responsibilities for many other crops also in view of overall constraints on the staff of the department. This also led to a reduced focus on the activities of the Mission and oilseeds became one of the several crops of crops in the overall umbrella of the Crops Division of the DAC. The Mission became a conduit for passage of subsidy for oilseeds crops with substantially reduced focus on technology generation and dissemination. An era of technology poor and subsidy rich Technology Mission thus began in mid 90s due to a combination of political, economic and administrative reasons. It would be very wrong therefore to place the blame on the Technology Mission as a concept and as an institution.

4.2.13.5 The picture would not be complete without commenting on the linkages amongst the MMs, since back to back approach was a critical component of the concept of Mission. In the first ten years of the Mission, CSIR played a very important role in providing the valuable component of post harvest technology and generated some viable research particularly for extraction units, which enhanced income opportunities for farmers and led to value addition. Fillip was also provided to establishment of oilseeds processing and extraction units and technologies for refining oil particularly soybean oil that led to very substantial growth of soybean oil consumption within the country with its well known benefits as a source of rich vegetable protein and simultaneous production of deoiled cake which commanded a premium price in international market for cattle feed production. This led to substantial growth in the incomes of the oil processing units and led to proliferation of
such units. The credit for the generation of this technology and the expansion of the skill of oilseeds processing industry must be given to CSIR which was an important stakeholder in the Technology Mission and whose representative was included in the regular staff of the Technology Mission.

4.2.13.6 The pulses component, however, failed to achieve the success achieved in the early years by the TMO, primarily because the new varieties with potential for quantum jump in yield could not be supplied by MM-I. For pulses, such major technological inputs were not available in 1990 and not much happened for generation and adoption of revolutionary packages of technologies. Moreover, necessary policy supports (inputs, pricing, marketing etc) were also not extended to pulses. Consequently, the productivity and profitability levels in pulses have remained stagnant in spite of its inclusion in the Technology Mission. Consequently, the farmers diverted better lands for other crops and only the marginal soils with little potential for quantum jump in productivity and profits were reserved for pulses. Obviously a Technology Mission could not achieve much in such cases especially when there was a lack of proper marketing infrastructure and price fluctuated in a wide range. Similarly, unlike oilseeds where processing and oil extraction held great opportunities for profit through domestic and international sales, pulses did not offer this incentive because of limited export market and inadequate technology for processing. Thus, even MM III & IV for pulses did not deliver the same results for pulses as they did for oilseeds.

4.2.13.7 In 1995-96, the then Union Agriculture Minister ordered the creation of a separate Technology Mission on Maize since maize offered good opportunities for quantum jumps in production and productivity, had a good export market particularly as cattle feed and also enjoyed a good market domestically as an industrial raw-material for starch. It therefore offered incentive for the farmers to increase production since the demand was growing. This was one crop, which was amenable to the Mission Mode. Unfortunately, since the Technology Mission on Oilseeds and Pulses had meanwhile started floundering due to indifference and adverse trade policies, the Planning Commission did not approve the setting up of Technology Mission on Maize. Strictly speaking therefore the Technology Mission Mode for Maize never really took off. It remained only a route to implement the existing
Accelerated Maize Development Programme of the DAC. Administratively-, however
the Mission Director for the Technology Mission on Oilseeds and Pulses was also
entrusted with the responsibilities for Technology Mission on Maize and maize was
therefore taken off from the overall umbrella of crops under Agriculture
Commissioner. Mission Mode for Maize was only a cosmetic appellation without the
benefits associated with a true Mission.

4.2.14 The Mid Term Appraisal of Tenth Five Year Plan for the Agriculture and
Food Security sector has also commented on the Technology Mission on Oilseeds and
Pulses as under:

4.2.14.1 “Pulses yields continued to stagnate although these crops have been under
a Technology Mission since early 1990s, and the area under cultivation has also
shrunk. Despite some promising new varieties and proven benefits from
micronutrients and sprinkler irrigation, there is as yet no breakthrough at the farm
level. Although the MSP of pulses has been increased recently to encourage
technology adoption, it is the view of the Commission for Agricultural Costs and
Prices (CACP) that a sharp increase in imports has blunted this effort. Oilseeds have
been under a Technology Mission since 1986 and there was substantial expansion of
area, yield and production till the mid 1990s. But in the absence of technological
breakthrough and because of pressure from cheaper imports, the Ninth Plan period
saw stagnation in yield and decline in area. There was a rebound to a record 25.1
million tonnes in 2003-04, but growth continues to be negligible. In the current year,
2004-05, there has again been a marginal fall in output. Imports of edible oils are now
at par with domestic production. Rising domestic demand, trade liberalization and a
sharp fall in world edible oils prices in the late 1990s contributed to this rise in
imports. Domestic prices of edible oils/oilseeds remained low and were disincentives
to domestic producers. Productivity improvements are required for domestic oilseeds
production to remain competitive. This calls for a fresh look at the working of the
Technology Mission on Oilseeds and Pulses (TMOP), which appears to be falling in
its objectives”.

4.2.14.2 Technology Mission on Oilseeds and Pulses and the Technology Mission
on Maize were discontinued in the Tenth Plan (2002-07). It was felt that the
Technology Mission on Pulses had not led to any appreciable increase in the productivity of pulses. While Mission Mode approach in the Technology Mission for Oilseeds has led to a significant increase in production and productivity, yet further increase in the production of oilseeds would be increasingly dependent on the market and price signal and the Technology Mission cannot \textit{per se} address these issues. It was, therefore, felt that the extension of the Technology Mission on Oilseeds and Pulses may not serve any effective purpose.

It was realised at highest level that Technology Mission had to address major issues regarding price procurement and custom duty and closely integrate research with development and Technology Mission with its present structure would not be able to achieve this objective. It was also noted that the DAC had not been able to suggest some alternate structure for this.

4.2.14.3 However, the importance of oilseeds crops for the farmers and for the country was recognized and the concerned departments were asked to continue various programmes and schemes for development of oilseeds, pulses and maize. There was, ample justification for giving special thrust to the oilseeds, pulses and maize not only from the point of view of reducing imports but also from the point of view of livelihood of farmers involved in their cultivation.

4.2.14.4 In this context it has however to be noted that DAC had prepared an alternative structure for the Technology Missions on Oilseeds and Pulses which could not be debated and meanwhile the Tenth Plan came into operation without the Technology Mission on Oilseed, Pulses and Maize.

4.2.14.5 However, TMOP was replaced by a comprehensive and integrated scheme of oilseeds, pulses, oil palm and maize with substantial outlays and with reasonably differentiated approach and restructuring of the erstwhile Oilseeds Production Programme, National Pulses Development Project / Accelerated Maize Development Programme and Oil palm. A greater flexibility was also provided to the States for inter-component diversion of funds and provision for innovations, participation of private sector in the implementation of the programme etc. Briefly, therefore, the stress on oilseeds, pulses, maize and oil palm was continued without the structure of the Technology Mission, which in any case had become fairly weak over the years.
due to several internal and external reasons mentioned earlier. It must also be said that it is doubtful whether the achievements of the Technology Mission on Oilseeds in the early years in a protectionist environment could be replicated in a far more open economic environment, both nationally and internationally, prevalent today.

4.3 Technology Mission on Cotton

4.3.1 Cotton is an extremely important commercial crop providing raw-material for 1500 mills, 4 million handloom and 7 million power looms providing livelihood to 60 million people who depend on cotton cultivation, processing and textile trade. On the economic front, India contributes around 15 per cent of the global cotton production and textiles including cotton contribute more than 20 per cent (2003-04) of total Indian export.

4.3.2 In view of lower yields and poorer lint quality of cotton as compared to many other countries, the Government of India launched Technology Mission on Cotton (TMC) in February 2000. The TMC is being implemented in 13 States viz. Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal and Tripura.

4.3.3 The Technology Mission on Cotton consists of four Mini-Missions (MMs), MM-I on research is being implemented by Indian Council of Agricultural Research (ICAR), MM-II for enhancing production and productivity is run by DAC and MM-III on the development of market infrastructure and MM-IV on modernisation of ginning / pressing factories are being dealt by the Ministry of Textiles.

4.3.4 The MM-I and MM-IV are 100% funded by Government of India, while the expenditure for MM-II and MM-III are shared by Government of India & States on 75:25 basis and 60:40 basis respectively. The concerned Ministries are providing funds for implementation of their Mini-Missions.

4.3.5 The approved outlay for Tenth Plan is Rs. 568 crores, Rs. 355 crores, Rs. 108 cores and Rs. 85 crores respectively for the four MMs.
4.3.6 Achievements under various Mini Missions are as under:

4.3.6.1 MM I

The output under MM-I is primarily related to handling of biological population and basic research on cotton, hence, the output is composite by including quantitative and biological indicators.

- About 15 diploid and tetraploid cotton cultivars with high fibre quality have been identified for different zones of cotton cultivation for fast track release by All-India Coordinated Cotton Improvement Programme.
- In germplasm screening, genotype resistant to cotton leaf curl virus and jassids have been selected. Some entries have additionally been identified for drought tolerance.
- Evaluation of promising cultures for cottonseed oil provided seed oil content up to 27%.
- Morphological markers have been developed and documented to characterize the varieties and hybrids (including the parents) on the basis of easily identifiable characters. Bio-chemical and molecular finger printing of cultivars is also progressing fast.
- Evaluation of soil suitability for cotton based cropping systems was undertaken in 9 States and database developed for soil suitability has been processed for its depiction on soil resource map.
- Newer strains of bio-inoculants have been developed for their mass multiplication to result in sustainable and cost effective production of high quality fibre.
- In integrated Pest Management, almost 50% reduction in insecticide sprays was possible in IPM blocks as compared to farmers’ practice.
- In bio-control studies, fermented culture methodology was found suitable for mass production of *Tricoderma*.

4.3.6.2 MM II: Assistance has been provided during the Tenth Plan for distribution of certified seeds (37398 quintals), field demonstrations (60175), training of extension workers (883), Farmers’ training (4978), seed delinting plants (2), sprinklers (12339) and drip sets (2514) pest surveillance IPM demonstrations (5548) etc.
4.3.6.3 MM III: Improvement is undertaken in marketing infrastructure through setting up of new market yards, improvement of existing market yard and activation of dormant yards. 60 per cent of the cost of development being borne by GOI and the balance by APMC/State Governments. Central assistance is limited to Rs. 1.50 crores for new yards, Rs. 0.09 crores for improvement of existing yards and Rs. 0.25 crores for activation of dormant market yard, although this last category is no longer prevalent in the Tenth Plan. Grant in aid is provided to Agricultural Produce Market Committees. A total of 161 market yards have been sanctioned of which 93 have since been completed.

4.3.6.4 MM IV: Takes care of modernisation of ginning and pressing factories for which a capital subsidy @ 25% of the cost limited to Rs. 20 lakh per unit is provided. A total of 616 ginning and pressing factories have been sanctioned of which 322 factories have been completed. To achieve the enhanced targets, the Ministry of Textiles increased the number of consultants and the programmes have been placed at the disposal of the Cotton Corporation of India (CCI) in order to make the facility of manpower and infrastructure available in CCI for the project. CCI has a TMC cell headed by the ex-CMD of CCI which has been spear heading MM-III & IV. This strategy of earmarking a professional exclusively, with technical and administrative backup available from a professional body, can be cited as one major reason for the comparative success of MM-III&IV vis-à-vis other MMs.

4.3.7 Constraints impeding progress

(i) Nearly 65 percent cotton area is rainfed mainly in the Central and Southern zones.

(ii) Cotton crop is particularly prone to pests and diseases

(iii) The excessive use of pesticides and the synthetic pyrethroids have also led to development of immunity in insects against the pesticides.

(iv) Large scale use of linted seed by farmers causing poor plant stands resulting in loss of yields and build up of disease and pests.

(v) Wide fluctuation in cotton prices and inadequate market infrastructure.

(vi) High incidence of contamination in cotton due lack of proper marketing infrastructure and modernized ginning / pressing facilities.
4.3.8 Technology Mission on Cotton has its four constituents MM under different administrative Department / Ministries. The DAC had entrusted impact evaluation study of MM-II of TMC to Agricultural Finance Corporation Ltd. (AFCL). The main recommendations / findings made by AFCL, were as under: -

(i) Non-availability of certified seeds of new varieties / hybrids as a result of poor seed requirement planning by States.

(ii) The field demonstrations may be organized on five hectare size for more effective dissemination of technology.

(iii) Training courses for upgrading the knowledge and skills of farmers, extension officials are needed.

(iv) The establishment and production of bio-agents and their sale may be entrusted to private sector.

(v) Pheromone traps are not available in required number.

(vi) Adopting seed village concept would be appropriate for production of certified seeds.

(vii) The results of Insecticide Resistance Management (IRM) reported so far are encouraging and may usher in a new era in pest management in cotton.

(viii) All individual components of IPM need to be implemented as a package in the interest of cotton growing farmers.

4.3.9 The Ministry of Textiles have also taken up the impact assessment of the implementation of MM-III and IV by Textile Research Associations (TRAs) and Central Institute for Research on Cotton Technology (CIRCOT). Indian Cotton Mills’ Federation (ICMR) and East India Cotton Association (EICA) have also been associated with the impact assessment. Preliminary report of impact assessment suggests that the development of market yards and modernization of G&P units will help textile industry in getting good quality of cotton. The trash percentage in cotton processed by the modernized ginneries has also come down from 6-8% to less than 2%.

4.3.10 The Technology Mission on Cotton has helped to achieve the target of production of cotton. The production target under TMC was set at 215 lakh bales by the terminal year of the Tenth Plan. The cotton production during 2005 has however touched a peak record at 232 lakh bales and record productivity of 440 Kg per hectare.
as per the estimates of Cotton Advisory Board (CAB) in the Ministry of Textiles. Besides, pesticide consumption has decreased in cotton resulting in decrease in cost of cultivation and thereby raising income of farmers. However, the productivity of cotton in India needs to be increased further. To improve the production, productivity and quality, following points are suggested:

(i) To bring more area under irrigated / semi-irrigated conditions particularly in central and southern zones.

(ii) Providing matching share by State Governments under MM-II and MM-III of TMC and timely release of funds by them.

(iii) Immediate modernization of more ginning & pressing factories to improve the cotton quality.

(iv) In situ conservation of rainwater by dovetailing watershed and other such schemes.

(v) States to involve industries, cooperatives as stakeholders in the implementation of TMC particularly through contract farming.

(vi) All cotton growers to be covered under Crop Insurance.

(vii) Cotton Corporation of India, NAFED etc. needs to be strengthened so that no cotton is sold by farmers below MSP.

(viii) More efforts for educating farmers and others to reduce cotton contamination.

(ix) Stringed punishment for spurious sale of seeds included Bt-cotton as well as pesticides / bio-agents etc.

4.3.11 The Mid Term Appraisal of Tenth Five Year Plan for the Agriculture and Food Security sector has however commented on the Technology Mission on Cotton as under:

“Cotton production had also fared poorly during the Ninth Plan. Yields decline due to a combination of lower prices and increased pests incidence following rapid price-induced area expansion in the previous decade. India’s cotton economy continues to suffer from well-known problems causing low yield and poor quality. It is also well known that, if these problems are addressed, very large gains are possible with end of the Multi-Fibre Agreement. In view of this, a Technology Mission on Cotton (TMC) was launched in February 2000 and approval given for cultivation of Bt varieties. With limited results from these efforts thus far, mills are importing larger quantities of
quality cotton. There is an urgent need to re-look the TMC and in particular, to involve the textile industry more closely on cotton technology”.

4.3.12 Analysis

4.3.12.1 The Technology Mission on Cotton (TMC) has been analysed in the First Report of the NCF (Serving Farmers and Saving Farming, December 2004) in Chapter VI on “Enhancing Cotton Productivity, Quality and Global Competitiveness”. It has already being commented that the performance of the Technology Mission as a whole has been mixed. While MMs III & IV appear to be working satisfactorily towards achievement of physical targets for establishment and renovation of market yards and renovation and modernization of ginning units respectively, the achievement of MMs I & II do not appear to be on track. Mere increase in yield and production during 2003-04 and 2004-05 cannot go to prove the efficacy of the MMs I & II since good prices in increased areas of Bt hybrids as well as increased involvement of cotton mills and private sector for technology transfer have been equally responsible for the higher yields. The core activity of MM-II would have involved a quantum jump of supply of seeds of open-pollinated varieties and the adoption of INM, IRM & IPM technologies beyond the project areas; this does not seem to have happened.

4.3.12.2 Another major shortcoming in the TMC appears to be the operation of the four MMs in seclusion without observable linkages and integrations. This has resulted in sub-optimal performance of the TMC. Some of the States also have not contributed their share of the budget and have consequently under-utilized the central resources particularly in MM–II. Consequently, the TMC is reduced to a routine departmental programme, individually implemented by the concerned departments. Unless the various MMs work together cutting across departmental lines and receive inputs and provide feedback to the other partner MMs and to the State governments, the benefits of the Mission approach would be difficult to achieve. Indeed, some growth in production and productivity would in any case come about in the normal course as has been happening with many other crops which do not have the benefit of a Mission for them. Even though cotton is an extremely important crop with wide ramification for the income of farmers and export earnings for the country, the Technology Mission on Cotton has not performed comprehensively to its full potential.
4.3.12.3 It may be useful to analysis some of the reasons for the varying success of the various MMs under TMC.

4.3.12.3.1 Mini-Mission I

As regards MM-I, the progress had been slow because the process of research and development of new varieties of seeds is a time consuming job. This research job is undertaken either by the Government Department or by the Government Institutions where they have to follow all the procedures, which further take time.

4.3.12.3.2 Mini-Mission II

In MM-II again the transfer of technology is undertaken by the Ministry of Agriculture, Govt. of India through the State Governments. If the attitude of the State Government is indifferent naturally the progress becomes slow. It is felt that the results and the extent of success of MM-I and MM-II may become more clear after the passage of few years.

4.3.12.3.3 Mini-Mission III

As against MM-IV, the MM-III i.e. modernization of existing Market Yards or setting up of new modern Market Yard had been some what slow.

- In the initial years, the cash rich Market Yards came forward and modernized the Yards by taking TMC share, as they did not need any money from the State Government.
- However, Market Yards with shortage of funds had to depend on the State Governments for their share for modernizing and hence the progress of modernization of Market Yards has now become slower.
- The Market Yards undertaking modernization have to follow the prescribed procedure of the Government for sanction, tendering etc. which require lot of time.
- The participants in the modernization i.e. Market Yards, State Governments do not feel any direct economic benefit as in the case of Ginning & Pressing factories where direct economic benefit goes to the owners.
4.3.12.3.4 Mini-Mission IV

The reasons for the better success of MM-IV can be brought out as under:-

- **The first and foremost reason for the success had been the single window system between the Government through Technology Mission on Cotton and the entrepreneurs i.e. Ginning & Pressing Factory owners or prospective entrepreneurs.**

- **Due to expected increase in the productivity and production of cotton**, the Ginning & Pressing factory owners were eager to modernize their factories to compete both domestically as well as globally for sale of their cotton and to have larger turnover and profits.

- **Due to increased demand for cleaner cotton** as well as for contamination free cotton and the willingness of the spinners (textile mills) to pay a premium on cleaner cotton, entrepreneurs came forward both for modernization of their existing factories as well as for setting up of new factories.

- The Cotton Corporation of India Ltd. (CCI), which was the implementing agency for TMC under the Ministry of Textiles, Govt. of India, started giving preference to the modernized units for processing its stocks. This also motivated many of the Ginning & Pressing factories to modernize.

- The technology i.e. machinery and equipment proposed for the modernization of the Ginning & Pressing factories was available indigenously from multiple manufacturers and hence the same was available on short notice and at competitive rates.

- **Direct economic benefit** to the Ginning & Pressing factories due to larger turnover, reduced complaints and better client relationship with the spinning mills motivated the Ginning & Pressing factories for modernization.

- The cost benefit analysis indicated larger profit margin in processing and packing of cotton to the Ginning & Pressing factories due to savings in electricity, repairs and labour as compared to conventional factories.

- The results were assured and guaranteed benefits in terms of productivity; quality of processing and reduction in contaminants and risk factor was limited one for the production of cotton in the catchments areas.

- The Ministry of Textiles, Govt. of India and CCI with the help of other institutions like Office of the Textile Commissioner, Textile Committee,
CIRCOT, ATIRA etc. held awareness meetings by involving all sectors like Ginning & Pressing factory owners, Spinning mills, farmers etc. to motivate for modernization.

4.3.13 Remedial Measures

4.3.13.1 Looking to the importance of cotton as a crop for a very large number of farmers, particularly in the dry lands and its downstream contribution, to a very large numbers of weavers and high end industrial products in textile which have vast foreign and domestic markets and considering the opportunities expected to arise due to the demise of the Multi-fibre Arrangement in 2005, it was only appropriate that the Mission approach for cotton was adopted in 2000, itself in order to achieve growth in production and productivity of cotton and expansion of facilities for marketing and processing of cotton into textiles. It was also conceptually in order to work through the four MMs since the goals of the Mission could not be achieved by a single department. Concerned departments like Agricultural Research, Agriculture and Textiles had to come together for coordination and implementation to achieve the prescribed goals within the shortest possible time. However, certain congenital problems need to be highlighted at this stage, which constrained the TMC from the very beginning. The Technology Mission must be a self-contained entity with its own full time professional Mission Director who could tap on the expertise of experts in research, extension, marketing and processing for value addition. As it were, the Agriculture Commissioner with his multifarious duties relating to various crops was designated as Mission Director. Not-withstanding his expertise seniority and position in the Government, he could not be expected to devote single minded attention to the activities of the Mission. Even the lower levels of the administrative hierarchy were burdened with other responsibilities for many other crops and this too acted adversely on the focus needed for cotton in the Mission Mode. Cotton, therefore, became just another crop in the portfolio of the Agriculture Commissioner thereby whittling down the very concept of Technology Mission.

4.3.13.2 It is further noted that no separate staff has been provided for the TMC and the work is being handled through deployment from amongst the existing departmental staff. Once again the degree of single-minded devotion to the goals of the Technology Mission seems to be missing. The staff also has not been selected on the basis of any specific suitability but on the basis of administrative convenience. A
specialized vehicle like a Mission cannot run to its full potential with such a diffused human resource.

4.3.13.3 Even, the Committee system of directing, controlling and monitoring, although well designed had its problems in practice because senior officers were not attending the various meetings due to their pre-occupation and adequate steps do not seem to have been taken to ensure their attendance. Consequently, the effectiveness of the meetings in sorting out coordination issues suffered. It would be necessary for instructions to be issued that only officers above certain levels should attend the meeting on these departmental committees for the various MMs.

4.3.13.4 Presently, the Cabinet Secretary is the Chairperson of the Empowered Committee and this is ample evidence of the importance attached by the Government to TMC. It is, however, seen that the meetings of the Empowered Committees are not frequent enough in view of the pre-occupation of the Cabinet Secretary who cannot be expected to devote enough time to the deliberations of the Committee on a continuing basis. It may perhaps be desirable to consider naming Secretary (Coordination) to be the Chairperson for the Empowered Committee on behalf of Cabinet Secretary.

4.3.13.5 In view of importance of cotton both for the farmers and India’s domestic and international trade, the TMC is a thrust area under the Prime Minister. While, this is very welcome, it has added to the volume of reporting by the TMC in respect of progress of the Mission. While monitoring is extremely important, a lot of time gets devoted to compilation of data, which become repetitive. There appears need to rationalize reporting of the TMC in order to ensure more time for the officers to devote to the actual work of the Mission. Particularly touring. Perhaps reporting only to the Empowered Committee and to the Planning Commission may suffice.

4.3.13.6 The Mission guidelines also provide for National Level Monitoring Team (NALMOT) consisting of officers from the Mission and knowledgeable retired officials who tour in the field in order to provide ground level information about the quality of implementation in stead of mere statistics. While this is a very welcome initiative it may be useful to make these monitoring teams a little more broad based with involvement of farmers/NGOs also. It is however learnt that the State Level Monitoring Team (SALMOT) have not functioned with equal efficacy. It may be
useful for the Empowered Committee to specially review the functioning of monitoring at the State level and give suitable directions to the defaulting States.

**Box- 1**

**Insecticide Resistance Management in Cotton**

1. Cotton pest management has become complicated over the past one decade. The incidence and damage caused by American boll worm (*Helicoverpa*) during the 1997-98 seasons was the most severe in recent times. It is estimated that yield losses up to 25-50% were caused, primarily due to *Helicoverpa armigera* coupled with bad weather and farmers were forced to use more insecticide applications of up to 20-30 rounds. Based on studies at Central Institute of Cotton Research (CICR), evidence indicates that excessive use of insecticides also led to problems of insecticide resistance in *Helicoverpa* and *Spodoptera*, which further necessitated the repeated application of insecticide. Scientists have focused on the management of resistant pests through the use of the insecticide resistance monitoring data generated over many years and a simple strategy based on ecological principles was designed to conserve beneficial organisms to assist pest management.

2. Area wide farmer participatory ‘Insecticide Resistance Management’ (IRM), field demonstrations were carried out by scientists in nine villages in Maharashtra, three villages in Andhra Pradesh, eleven villages in Punjab and one village in Tamil Nadu. These were just the beginning of a planned effort to help the Indian farmer appreciate the value of making good pest management decisions.

3. In an excellent case study in Wardha district in Maharashtra, about 650 farmers of nine villages have harvested an average of 800 to 1600 kg. of seed cotton (kapas) per hectare with just two third of the normal production cost due to saving accrued from reduction in insecticide use. The IRM strategy was implemented in about 1200 hectares. Ninety per cent of the farmers sprayed 0-1 times at Economic threshold limit (ETL) of *Helicoverpa armigera* (American Bollworm) mostly with Endosulfan at a time when resistance of bollworm to this chemical was the least. This resulted in 70-80 per cent reduction in pest population.

4. Based upon the experience gained by scientists, Central Institute for Cotton Research (CICR) of Indian Council of Agricultural Research (ICAR), proposed to the DAC, Ministry of Agriculture to adopt this technology and provide funds as the institute will carry out the project.

5. Accordingly, the DAC provided funds to CICR for this purpose under MM-II of Technology Mission on Cotton. 26 districts in the country were selected where maximum pesticide consumption takes place. In each district 20 villages were selected. A Project Officer having sufficient knowledge in IRM was meant for each district while 20 skilled field worker (one for each village) was also assisted under the scheme for their salary etc. The Project Officer with a two-wheeler moves around 20 villages to guide continuously the field workers who will in turn guide farmers throughout the cotton season for the pest management particularly in the use of insecticides so that besides pest management, the resistant in pests does not evolve quickly with the results the number of sprays decreased and accordingly the pesticide use was reduced substantially. Furthermore, assistance was also provided under IRM project towards farmers’ field days, farmers’ exchange programme, training of project officers, field workers, publication of training manuals, booklets etc.

6. The IRM project made tremendous impact in pest control in the selected villages and improved productivity and economic conditions of the cotton growers substantially. This can be judged from the progress of IRM during 2004-05. As per report of CICR for the year 2004-05, the IRM project was implemented in 11 major cotton-growing states in the country covering 444 villages in 27 districts. 21617 farmers adopted these strategies on 61732 ha area under cotton crop. The average number of cotton sprays was reduced from 8.93 in case of non-adopting farmers to 4.8 in case of adopting farmers resulting in 46% reduction in number of sprays. Rs.2890/ha were saved in case of IRM farmers on account of the cost of plant protection and also 11% increase in the yield resulted in to Rs.6900 additional profit over the non-adopting farmers besides less environmental pollution.
**Box- 2**

**Contract Farming in Cotton**

1. The cotton produced by the farmers is used by the mills for the manufacture of textile goods. The value of textiles and garments depends upon the quality of cotton i.e. various characteristics of cotton fiber and contaminants therein. Therefore, the mills require a specific type of cotton to meet their specific requirement. In this process, it is very important that farmers should produce the type of cotton and the quantity required for use by the mills. In this respect, it will give more dividend if farmers i.e. the producer and the mills i.e. the user, are brought face-to-face for the type of cotton and quantity of the cotton required by the mills through a kind of contract farming. This will provide linkage between farmers and mills.

2. The necessary contract farming rules can be framed by both producer and user themselves. In fact, such contract farming has already started in India for cotton. The contract farming started by Appachi Indian Company, Pollachi and others as well as Cotton Corporation of India (CCI) in the Ministry of Textiles in some states during 2002-03, are the examples of such endeavours. CCI organized first such national level Seminar in Hyderabad during 2002 and started such contract farming in cotton during 2002-03 itself.

3. Besides initiatives by private sector and CCI, the Tamil Nadu Government, with the active involvement of CCI, has also started contract farming in cotton with the mills in Tamil Nadu during 2005-06.

4. The benefit of contract farming is:

   **For the Industry:**
   Assured supply of good quality, unmixed and uncontaminated cotton, thus no more hassles of importing cotton.

   **For the Growers:**
   No dilemma about choice of seed / variety and buying inputs. Easy availability of loans for buying inputs. Higher yields with reduced expenditure leading to more profit from cotton cultivation. Easy and assured sale of cotton. Mills often facilitating supply of inputs / services for the success of contract

5. CCI is actively facilitating / catalyzing the contract farming in the country since 2002-05. Since 2005-06, CCI has also been involved for the implementation of MM-II of Technology Mission on Cotton, which will help CCI to accelerate bringing farmers and mills in contract mode of cotton production and procurement. The mills and others involved in contract farming are as under:

   - Many mills come forward to collaborate contract-farming programme in cotton with CCI. Some of them are (i) Nahar Group of Mills, Ludhiana (ii) Gokak Group of Mills in Karnataka (iii) Pratibha Sintex, Indore (iv) Super Spinning Mills, Coimbatore (v) Sanghi Spinners India Ltd. Hyderabad.
   - Royal Classic Mills (Tamil Nadu) has also come forward for contract in collaboration with State Government and CCI.
   - Private organizations like Appachi Cotton Co., Pollachi that have followed contract programme since 2002-03, have also joined CCI for implementation of the project during 2005-06.

6. The coverage in cotton contract, which is still at initial stage, has shown very encouraging results. The coverage of the cotton contract since 2002-03 particularly by CCI is as under:

   - CCI has taken up programme project during 2002-03 for first time in four states, viz. Gujarat, Madhya Pradesh, Andhra Pradesh & Orissa covering an area of 2996 hectares in 92 villages involving 3157 farmers.
   - During the same year programme was also taken up by three other organizations viz. Super Spinning, Coimbatore, Appachi Cotton – Pollachi, and Amit Traders in Andhra Pradesh, on an area of 11500 hectares. Thus, during 2002-03 contract farming in cotton was taken up on an area of 14496 hectares in the country.
   - During 2003-04 CCI had taken up the programme on an area of 1250 hectares in the states of Haryana and Andhra Pradesh involving 713 farmers. Other organizations in the state of Maharashtra (4), Karnataka (2), Punjab (1), Haryana (1), Gujarat (1), Andhra Pradesh (1) & Tamil Nadu (1) have taken up the programme on an area of 4196 hectares.
   - During 2004-05 CCI has taken up the programme in collaboration with other companies on an area of more than 6000 hectares. Others have also undertaken on area of 2648 hectares on their own.

7. The past results obtained by CCI in such contract farming programme, are briefly as under:-

   - Productivity was increased. Productivity increase from 80 kg to 240 kg. was observed in different locations.
   - Cost of cultivation was lower.
   - The quality of cotton was superior in case of contract farming fields as compared to other fields, as mixing of variety was not there.
4.3.13.7 A major problem identified for the TMC is the financial release procedure for assistance. It must be remembered that Technology Missions must be treated as a special purpose vehicle for achieving specified goals in the shortest possible time. Obviously, therefore, the rules and procedures for Technology Missions must be different from those, which govern the normal programmes of the Ministries. Specifically speaking, it is well known that in spite of improvements, the procedures for release of funds from the Central Government to State governments take time and are in many cases not in tune with the requirements in the field, because of the time schedule of the budgetary exercise. There is a substantial delay in the release of funds received from the Central Government to the field, especially when the State share has to be provided. Such procedural bottlenecks are lethal for work in the field since crop cycle particularly for cotton demands availability of funds at the beginning of the crop season in April itself. This too is a issue which should be addressed on priority by the Empowered Committee. It may be worthwhile to follow the pattern whereby funds from the Ministry of Rural Development pass directly to the District Rural Development Agency. It may also be worthwhile to see whether the procedure followed in the Technology Mission for Horticulture in the North-Eastern region of routing funds through Central and States level Small Farmers Agri-Business Consortium (SFAC) could be followed.

4.3.13.8 In general, while it can be said that Technology Mission on Cotton has benefited due to the multi stakeholders’ involvement, it must also be commented that certain key areas still require greater and time bound attention for MM-I. It would be very necessary to develop extra long/long staple cotton varieties, which not only have the requisite length but also have the strength. This would help in generation of higher incomes for farmers undertaking production of extra long/long staple varieties of cotton and would also reduce and hopefully ultimately eliminate large imports of Egyptian cotton. Another area where ICAR would have to work harder in MM-I relates to research for Bt. Cotton hybrid in the public domain, in order to provide competition to the private sector, which rules this segment, and also to protect farmers from the high prices being charged by the private sector. Bt cotton has grown in terms of area coverage in most States, even though the varieties in the private sector were not formally released by the ICAR system for quite sometime simply because of its known high productivity and in spite of its high price. It is, therefore, clear that more
and more farmers would go in for Bt varieties if only they could get the quality assurance and reasonable price of seed.

4.3.13.9 While MMs III & IV have been doing well it must be recognised that the consumption of cotton in the mills is not rising, commensurate with the rising production in the wake of increase under Bt cotton and the work done by the MM-II for increasing the production and productivity of cotton. If this situation is allowed to continue, the higher supply and stagnant demand would lead to a fall in prices of cotton, causing substantial distress to cotton farmers and adverse effect on their desire to grow cotton as also their willingness to invest in the requisite quantities of inputs. While the Technology Upgradation Fund of the Ministry of Textile has benefited the mills substantially, a lot can still to be done beyond the stage of ginning. It is unfortunate that yarn is being exported to China and its conversion to textile through expansion of capacity and modernisation has not been up to the mark. It must be recognised that increase in area, production and productivity of cotton by itself may be desirable at the macro level but it is the income of the farmers which should be the major concern and this can be achieved only if the marketing arrangements and demands improve substantially. The real challenge lies in enhancing the quality awareness amongst farmers and ensuring transparent and scientific marketing and finally modernisation of the through the various stages. This can be and has to be achieved through more frequent interactions between the farmers and NGOs, scientists, and mills. TMC is the ideal instrument to facilitate this interaction on a continuing basis in order to positively assure incomes of cotton farmers.

4.3.13.10 Considering the priorities and potential of the TMC and taking in to account the operational problems which are making the Mission prone to business as usual approach and making it a clone of the normal Intensive Cotton Development Programme, it would be timely to set up a National Cotton Council with participation from farmers, Textile industry, NGOs, public sector and other major stakeholders under the chairmanship of Union Agriculture Minister and with Union Ministers of Textile and Commerce serving as Co-Chair persons. The establishment of the National Cotton Council on the lines of International Cotton Council has already been recommended in the First Report of the NCF. (Para 20 of Chapter VI)
4.4 Technology Mission for Integrated Development of Horticulture in North Eastern States, J&K, Himachal Pradesh and Uttarakhand

4.4.1 The Technology Mission for Integrated Development of Horticulture in North Eastern States, J&K, Himachal Pradesh and Uttarakhand Scheme was launched in the eight North-Eastern States namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim w.e.f. 29th February 2001. During the Tenth Plan, the scheme was extended for implementation in other three contiguous hill States namely Jammu & Kashmir, Himachal Pradesh and Uttarakhand w.e.f. 23rd August 2003.

The objectives of the Mission, now running in its fourth year, are as under:

- To establish Convergence and Synergy among numerous ongoing governmental programmes, achieve horizontal and vertical integration of these programmes
- To ensure adequate, appropriate, timely and concurrent attention to all links in the production, post harvest and consumption chain
- To maximize economic, ecological and social benefits from the existing investment and infrastructure created for Horticulture development and
- To promote ecologically sustainable intensification, economically desirable diversification and skilled employment.

4.4.2 The Mission is being implemented in a mission mode with an end-to-end approach which includes development and introduction of high yielding varieties and technologies, expansion of area, post harvest handling and management, marketing, value addition and processing of horticultural produce with the following four MMs.

4.4.2.1 MM I: Research – coordinated and implemented by Indian Council of Agriculture Research. This MM concentrates on technology generation appropriate to the region. Major components under MM-I are supply of basic seed and planting material, technology standardizations, refinement, on farm demonstration and training.
4.4.2.2 MM II: Production and Productivity – coordinated by DAC and implemented by State Departments of Horticulture/Agriculture. This MM aims at increasing production and productivity of Horticulture crops by adoption of improved production Technologies.

4.4.2.3 MM III: Post-harvest management and Marketing-coordinated by DAC and implemented by Directorate of Marketing & Inspection/ National Horticulture Board. This MM aims for efficient post-harvest management techniques, which include development of cold storage facilities, efficient transport and marketing facilities etc.

4.4.2.4 MM IV: Processing-coordinated and implemented by Ministry of Food Processing Industries, Government of India. This MM aims at promoting processing industry for value addition to Horticulture produce by promoting new processing units, up gradation of existing units.

4.4.3 A total of Rs.453.36 crores were allocated for the Mission since inception. By far, MM II accounted for the highest share of Rs. 368 crores followed by MM III with a share of Rs. 56 crores. MM I & IV lagged at Rs.18 crores and Rs. 9 crores, respectively. Together, MM II and III accounted for more than 90% of the funds allocated. The proportion of subsidy as a percentage of total outlay was as high as 95%. During the Tenth Plan a total of Rs. 386.11 crores were allocated out of which more than 90% was allocated for MM II and MM III. In fact, the allocation under MM II is nearly 20 times that under MM I.

4.4.4 Under MM I, the coordinating research institutes have identified suitable crops for developing technologies and for production of planting material in the region.

4.4.5 Under MM II, assistance was provided for promotion of potential horticulture crops in these States besides creation of infrastructure facilities for improving the productivity of the crops such as irrigation sources, integrated pest management, protected cultivation, organic farming, on-farm handling and other related activities. In addition, assistance was provided for training of farmers within
and outside the States, training of trainers as well as women entrepreneurs involved in horticulture programmes for large-scale adoption of scientific technologies in these States. Besides some of the major achievements reported under MM II include bringing an additional area of 55,087 hectares under various horticultural crops, which includes fruits (24887 ha), vegetables (9336 ha), spices (13445 ha), plantation crops (3713 ha), medicinal plants (1125 ha), aromatic plants (1683 ha, flowers (793 ha). This amounted to an increase of nearly 8%. Among the 8 NE States Sikkim, Mizoram recorded a maximum percentage increase in area of 38.11% and 34.83% followed by Arunachal Pradesh (17.45 %) and Nagaland (13.8%). Among the perennial fruits expansion of area under citrus fruits, which includes orange, lime, lemon is 7286 ha followed by banana, (4503 ha) passion fruit (3885 ha) pine apple (3214 ha) and apple (1113 ha) & litchi (1109 ha). Besides, Kiwi was introduced in an area of 65 hectares Among spices, ginger cultivation has increased by 3356 ha followed by large cardamom 3775 ha, black pepper and turmeric. An additional area 1125 ha of medicinal plants, 1683 ha of aromatic plants and 818 ha of flower crops have increased the opportunities for tapping the potential of high value crops over the pre-mission period (2000-01). A few States like Mizoram and Manipur have made impressive progress in vegetables, promoting cultivation of second crop in a year after paddy, adopting cluster approach, thus helping the growers to earn better returns from same unit area of land. Major success has been achieved in promoting Anthurium in Mizoram using planting material imported from abroad through a private company based in Bangalore. Besides, grapes (Bangalore Blue variety) are being promoted in and around Champai. Passion fruits of Kaveri variety of Bangalore are being popularised on a large scale in Mizoram, Manipur and Nagaland. A total of 295 nurseries have been set up. A successful mushroom unit has come up near Mao in Manipur cultivating ‘shitake’ and button mushrooms involving 200 farmwomen. Success was reported in creation of water bodies and on-farm water management. Under the component of organic farming, 535 earthworms /vermi compost units were reported to have been developed. Training of farmer/extension officers has also been taken up. The tissue culture laboratories have been mostly set up by the State Directorates of Agriculture.
4.4.6 Under MM III, assistance was provided for development of 29 wholesale markets, 199 rural primary markets, 26 Apni Mandis and 15 State grading laboratories.

4.4.7 Under MM IV, assistance has been provided for establishment of 9 processing units.

4.4.8 Analysis of the constraints affecting the Mission:

4.4.8.1 Unlike the other Missions, the TM for NE & Himalayan States is not restricted to a single crop. Keeping in view the diverse climate and favourable soil conditions conducive for their commercial exploitation in the Himalayan hill States, the Mission focuses on horticultural crops. The entire Himalayan region is a favourable agro-ecosystem for growing a wide range of fruits, vegetables, medicinal and aromatic plants and other cash crops. The holistic development of horticulture in the region with backward and forward linkage is expected to result in horticulture led transformation in terms of increased productivity, nutritional security, enhanced income and well being of the local farmers.

4.4.8.2 However, review of the Mission activities shows a large gap between the original concept and actual implementation in the field. This was brought out clearly in the First Report of NCF. A Committee was set up by Ministry of Agriculture to carry out the Technical Evaluation of this Technology Mission. This Committee submitted its Report in 2005, which highlights the problems observed in the implementation of the MMs.

4.4.8.3 A total of Rs. 18.8 crores was allocated under MM I. Five ICAR institutes/centre based in the North East region are involved in implementing the R&D programmes of MM I. R&D activities taken up under MM I do not provide need-based technological support for the crops and activities identified for development by the States. It was found that the States had not consulted the ICAR for the varieties/hybrids recommended for particular State/region of the crops identified for area expansion under MM II.
4.4.8.4 No evaluation of suitability and quality of varieties/hybrids marketed by the private companies and freely used by the farmers was undertaken by the ICAR Institutes.

4.4.8.5 Similarly, experimental trials had not been carried out for all the States to evolve package of practices appropriate to the agro climate condition for guidance to the departmental staff and the farmers. The State departments also did not place any requisition for specific information/technical advice before implementing the area expansion programme.

4.4.8.6 The ICAR Regional stations have also not taken up any systematic studies for developing packages of practices including vegetative propagation techniques. It was observed that the farmers were applying inputs in an arbitrary manner.

The ICAR units are also not involved in the working of different laboratories allotted to each State.

4.4.8.7 Under MM II, a total of Rs. 368 crores were allocated since inception. Every State has been allotted financial support for all crops and all the components, irrespective of the commercial potential and need, suggesting a lack of an agro-ecological and comparative advantage approach in priority setting.

4.4.8.8 It was also observed that each district had been allotted all the crops with small area fixed as target for each crop. Such an approach is not conducive to long-term impact of the investment being made in area expansion, nor is conducive for proper planning of infrastructure for storage, marketing or processing of the produce expected from each district.

4.4.8.9 Varieties / hybrids promoted are chosen arbitrarily mostly out of those available in the market, irrespective of the adaptability and superiority. In fruits, selection of some crops was done in an arbitrary manner without any established experience of the crops performance in the States; for example, Meghalaya was found promoting cultivation of peach and apricot in high altitude, which is not congenial for temperate fruits. A high mortality was observed in tree crops. The beneficiary farmers selected for area expansion in tree crops did not have any knowledge or training,
methods of planting, nursery plant in the open field and their after-care. No authentic records were maintained on the survival of the plant supplied, nor was any formal mechanism in operation in the district to monitor the performance. It can therefore be presumed that the area planted a few years back would have no surviving plants, and the same area could even be earmarked for area expansion programme in the coming years.

4.4.8.10 Production of planting material is yet to take off within the States and hence procurement is done from outside the State from untested sources. A permanent damage thus likely to be inflicted because of the perennial nature of the fruit species.

4.4.8.11 Procurement procedures for seed and planting material adopted leave considerable doubt about the quality of the planting material being used. In some States, procurement is done through authorised dealers who do not necessarily have knowledge of handling agricultural material. In a few other States, the farmers are asked to buy the planting material themselves, again leading to inferior material being used.

4.4.8.12 The subsidy per hectare for area expansion under MM-II is Rs. 13,000 per hectare wherever the seeds/planting material was supplied to the farmers by the Department. The cost of planting material was deducted from the total subsidy allowed and balance paid to the beneficiary for input purchase. Except in one or two States, no inputs seem to have been applied nor any instruction to the effect given by the staff. Consequently the objective of granting subsidy for input application as a component of improved technology was not achieved.

4.4.8.13 A total of 295 nurseries were set up but there was a shortage of planting material. The nurseries in the public sector suffer from acute shortage of funds and there is no verification of genuineness of mother plants being used for further multiplications in the private or public sector. Unless mother plants are developed from genetically superior clones of a particular variety, the nursery programme is bound to suffer from serious technical deficiency contributing to proliferation of inferior types through area expansion programme.
4.4.8.14 The design of organic farming structure varied from State to State despite the fact that the guidelines for the TMHNER had provided all the details and drawings. This clearly points to lack/absence of monitoring by technical staff of the State departments.

4.4.8.15 Assistance for highly technical units such as plant tissue analysis lab, disease forecasting lab, tissue culture units, plant health clinic etc has been provided to all States irrespective of the needs, competence of the staff and availability of appropriate technology for using the facilities for the farmers. Each State has been allotted more than one tissue culture unit for multiplying banana, Anthurium, orchid etc. This type of investment would be justified only when the demand for planting material is not less than one or two lakh plants for each unit to make these units economically viable. It will be difficult to sustain operations of these laboratories without trained manpower and recurring expenditure.

4.4.8.16 Under MM III a total of Rs 5600 lakhs were allocated since inception and 29 wholesale markets, 199 rural primary markets and 26 Apni Mandis were established, besides 15 State grading laboratories were reported to have been established as per the progress report of each State. However, Tripura and Nagaland have not set up any market. The structure created in Mizoram for collection and storage was found to be technically deficient in design, as it does not provide for any improved method of cleaning, grading, packing and storing. This could lead to post harvest loss. Infrastructure for Post Harvest Management (PHM) including marketing and processing is planned without any relation to the total production targeted at a given point of time.

4.4.8.17 The funds under MMIV were allocated for setting up new units as well as upgrading some existing units. In total 9 units have been set up out of which two are upgradation ventures. No established private sector firm has taken the advantage of MOFPI facilities under MM IV to set up units in the North Eastern Region. These were set up by NGOs or State/regional undertakings. Under MM IV a total of Rs. 9.66 crores was allocated since the start of the Mission. In the first two years Rs. 4.25 crores were released in the North-Eastern States for setting up processing units mostly in Manipur, Meghalaya and Mizoram. Out of this Rs. 2.15 crores or nearly 50% was
sanctioned to one unit in Mao, Senapati district Manipur, which is processing passion fruit. It was found that the plant was negotiating with the producers in three States for the supply of raw material. The plant should operate in two shifts each day for at least 200 working days in a year to make it a viable venture. During 2003–04, no funds were sanctioned for North-Eastern States. A total of Rs. 5.41 crores were sanctioned during 2003-04 & 2004-05 for the Himalayan States out of which Rs. 2.2 crores were released.

4.4.8.18 The Food Processing sector in the North-Eastern States has been in existence for more than 40 years on a very small scale. Performance of the existing units is far from satisfactory. Most of the units have become economically unviable resulting in closure. The common reasons for poor performance are:

- Lack of stable links between the grower and the processing units on the one hand and the processing units and markets on the other.
- Dependence of units on a single fruit rendering the plant un-operational for a major part of the year.
- Absence of adequate post-harvest management structure
- Absence of tetra / aseptic packaging
- Inadequate credit including working capital from banks and other financial institutions.
- Inadequate power supply
- High cost of transportation due to difficult terrain, frequent bandhs etc.
- Inability to take advantage of opportunities offered by border trade
- Lack of quality testing facilities
- Lack of good manufacturing practices
- Problems related to entrepreneurial ability and intent
- Problems of collateral security for raising bank finance given customary land tenure system

4.4.8.19 With the host of problems mentioned above, it is not surprising that private sector is reluctant to invest in this part of the country in spite of incentives under the North-East industrial policy and departmental promotional programmes. For food processing units, heavy equipments are purchased including imported ones, which if
not utilized, would be deprived of the cover available for any defect under the warranty clause of each supply contract. The machines especially calibrated ones may lose their accuracy if kept idle for a long time. Therefore, without adequate supply of raw material and proper planning, investment on expensive equipments purchased in the beginning will go down the drain. With troubled history and failure of processing units to take off under the Technology Mission a serious mismatch may occur between MM II and MM IV.

4.4.8.20 The issues highlighted above clearly show that each MM is working independent of the other under the control of their respective administrative agencies. Linkages among the four MMs are weak.

4.4.8.21 With subsidies under MM II eating up the largest share and without any credible linkage established with MM I, the Mission has turned out to be subsidy rich and technology poor.

4.4.8.22 Consequently, the basic objective of the TMHNER of promoting integrated development of Horticulture in the region for improving production with the induction of improved technologies has not been achieved so far.

4.4.8.23 The research carried so far has remained stand alone without much responsive, corrective, participatory or prescriptive role. In general the coordination among ICAR Research Complex, State Agriculture University, Officers/Departments handling MM-II, III & IV was found weak resulting in communication gap among the four MMs both at the planning and implementation stages.

4.4.8.24 The State governments in the North Eastern Region are besotted with the problems of resource constraint to provide matching shares for centrally sponsored programmes and lack of technically skilled and dedicated staff for field level coordination and monitoring.

4.4.8.25 The Mission is headed by the Horticulture Commissioner, DAC and its progress is annually monitored by the Central Steering Committee headed by Secretary, DAC. The focus and leadership required to run the Technology Mission as
a special purpose vehicle may get compromised by treating the Mission Director’s post as a routine post, without special staff and proximity to field required for running the Mission. A Directorate of Technology Mission was envisaged and till it comes to force, Small Farmers’ Agri Business Consortium (SFAC) is performing its role of monitoring & reporting progress. In fact, funds under MM II, III, IV are routed through Central SFAC/ State SFAC. This was required due to typical lag in the release of funds in the region and funding the required administrative staff within the government machinery. SFAC has hired technical and managerial staff at the State level to monitor MM II, III & IV. This gives flexibility to its operations.

4.4.8.26 While the Technology Mission may not be flawed in conception, a substantial coordination and backward and forward linkages amongst participating Departments and various stakeholders in the public and private sector is needed to achieve Mission objectives. This has not happened adequately with the existing set up

4.4.9 Remedial Measures

- Development of appropriate technologies, which bring about a strategic jump in production / productivity with full involvement of research agencies has to take place to make horticulture a commercially viable occupation for the stakeholders and improve their income and profitability.
- MM I needs to focus on creating adequate mother plant resources for supply to the nursery; Practices for production and post-harvest handling of passion fruits; evaluation of vegetable hybrids promoted by the private sector for their yield and resistance to the major diseases of the region; evaluation of variety / hybrids release by the public sector for their adaptability etc.
- Based on the various agro climatic zones in States, crops should be selected for specialization and promotional activities should be in tune with this.
- A ban should be in place on import of planting material from outside the region and the nurseries both in private and public sector should be regulated.
- All the States have low capacity of absorption of new technology and therefore required to be exposed to basics of crop production and management before getting into higher levels of technologies.
• The beneficiaries identified for area expansion should get thorough training in improved methods of planting and other recommended packages of practices before distribution of seeds/planting materials. The guidelines should be published in local languages. Proper record should be maintained of the beneficiary, status of the crop, yield per unit area, return obtained etc. These are essential for analysing the impact of the investment and technology.

• Instead of providing cash subsidy, coupons should be provided for acquiring inputs from authorised dealers.

• Processing capacity should be projected given the availability of raw material and expected demand. The processing unit should be sanctioned based on this broad calculation.

• Marketing is one of the biggest lacuna and for the disposal of the surpluses. The Second Report of NCF had recommended that a campaign can be launched for development of Rural Periodic Markets (RPMs), Seasonal Markets, Daily markets and PRIs controlled markets preferably through Mission. Specialized marketing Self Help Groups (SHGs), Small Farmers Enterprises (SFEs) and marketing cooperatives should be promoted to undertake Group Marketing, linking the produce directly with the consumer/buyer. The NER could be integrated with South and South East Asian economy for converting this remote and isolated Region into the main route for trade and economic linkage of mainland India with South and S-E Asia. Steps should be undertaken to formalize the huge informal border trade in the region. Progressively, value addition should take place in India, so that farmers could benefit more.

4.5 Technology Mission on Coconut

4.5.1 Traditionally, coconut was grown for edible oil. It served as an ingredient for various industrial applications too. The changed food habits and availability of other cheaper edible oils both in the edible and industrial sectors, however, have brought out a drastic decline in the use of coconut oil in these areas. During the last few years, on account of heavy imports of cheaper vegetable oil, especially of the Palmolein, the price of coconut oil has been depressed despite the large-scale price support operations undertaken. The Price Support Scheme could not make much impact in pushing up the price level and was not beneficial to the farmers as expected.
In this context, it was realized that only diversification of coconut derived products and value addition could help the coconut growers in getting remunerative prices. The coconut crop has also been affected by severe pests and debilitating diseases. It was realized that a major initiative should be started towards controlling the pests and diseases in coconut to improve its productivity and promote product diversification and better value realization from various coconut products, thereby helping the marginal farmers to optimize their income from coconut.

4.5.2 Technology Mission on Coconut was formally launched on 30.1.2002 and it is being implemented as a part of the Coconut Development Board’s ongoing programmes with the following objectives:

- To establish convergence and synergy among numerous ongoing governmental programmes in the field of coconut development in order to bring in horizontal and vertical integration of these programmes.
- To ensure adequate, appropriate, timely and concurrent attention to all the links in the production, post harvest and consumption chain.
- To maximise economic, ecological and social benefits from the existing investment and infrastructure created for coconut development.
- To promote economically desirable diversification and value addition to generate skilled employment.
- To disseminate technologies using participatory approach through demonstration and promotion to address the gaps in a mission mode.

4.5.3 Mission Components & Programmes

The Technology Mission covers four major components / programmes:

- Development and adoption of technologies for management of insect pests and disease affected coconut gardens.
- Development and adoption of technologies for processing and product diversification.
- Market research and promotion.
- Technical support, external evaluation and Emergent requirement.
4.5.4 Total Outlay for the Mission since 2001-2002 upto 31st March, 2005 amounted to Rs. 39.50 crores

4.5.5 Subsidy ranging from 25% to 100% of the total cost is extended to government /private institutions for Development and adoption of technologies for i) management of insect pest and disease affected coconut gardens ii) processing and product diversification and iii) market research and promotion.

4.5.6 Some of the major programmes initiated under this programme and achievements made so far are as follows:

- Establishment of 16 integrated Coconut Processing Units with infrastructure facilities worth Rs. 11.92 crores with a capacity to process 90 million nuts per year with financial assistance of Rs. 2.08 crores for value addition and bye product utilisation.
- Establishment of 4 Tender coconut Preserving and Packaging unit with a capacity to process 10 Million nuts per year.
- Popularisation of use of Packed Tender Nut water and other convenience foods.
- Establishment of a processing unit for Activated Carbon with an installed capacity of 5 metric tonnes per day.
- Creation of awareness on the health aspects of coconut products.
- Creation of awareness on eco-friendly and sustainable production system.
- Extension of opportunities for diversification of coconut products.
- Containment of Root Wilt disease with in the endemic area by preventing the spread by removal of 6.94 Lakh Root Wilt diseased trees from the border districts of Kerala and replanting with quality planting material and adoption of better management practices.
- Enhancement of market potential for coconut products both in domestic and international markets.
- Management of pests and diseases.
- Setting up of three nos. of Bio-control laboratories for the control of leaf eating caterpillar.
- Action initiation for establishing Quality Control Lab for coconut and coconut products for the first time in the country at Bangalore and Kochi.
• Creation of infrastructure facilities for farm level primary processing of coconut by installing 1500 copra dryers with a capacity to process 50 million nuts per year.

4.5.7 Constraints

(i) Difficulties faced by the State Governments in providing matching shares.
(ii) Reluctance of financial institutions for extending loan facility for setting up coconut processing units.
(iii) Violent fluctuations in the price of raw material viz. coconuts.
(iv) Apprehension about influx of coconut products at a much lesser price from Sri Lanka and other major coconut growing countries.
(v) Lack of price competitiveness of coconut products owing to high domestic price of raw material.
(vi) Lack of access to superior packaging technology act as bottleneck for coconut processing industries in the country.
(vii) Import substitute with cheaper products of similar nature for domestic use, greater competition for export and market share, inadequate market promotional activities, increased cost of production, improper labelling, non-uniformity of standards and improper packaging, not matching with consumers’ choice in price and package, inadequate shipping and shipyard facilities for storage, high freight charges and other related problems and the like will continue to pose threats and challenges.

4.5.8 Analysis

It appears that significant departures have been made from the original concept of a Technology Mission in the case of Coconut. The Technology Missions in other commodities have envisaged an end-to-end approach, which includes development and introduction of high yielding varieties and technologies, expansion of area, marketing and processing. Here, the entire focus is on disease control and product diversification. These issues may be having merit of their own in the context of coconut but whether Technology Mission is the most desirable way of achieving it is debatable. The functions of Coconut Development Board and Technology Mission also seem to be common and overlapping. This further dilutes
the essence of the Mission and renders it indistinguishable from the several ongoing Departmental programmes.

4.5.9 Recommendations

4.5.9.1 Technology transfer, motivation and capacity building at farmer’s level can be effectively done through Farmers Participatory Approach, Farmers Field Schools, forming coconut growers groups and exchange of ideas and technologies. Further, these farmers’ groups can be linked to market information so that they know the prices for their produce. This linkage should be available to all the villages and people should be trained to access such information. This automatically motivates the farmers to produce more if the prices are better.

4.5.9.2 These groups of farmers with adequate training and seed money coupled with micro credit facilities can go for farm level processing of primary products which in turn provide raw material for large scale production of coconut products. For example if the farm level processing as a group is producing husk, shell, coconut water and coconut meat, the bulk of raw material for further use are available at one place, it is easy to collect and transport to the big processing units. This can be a linked programme, which could be pro coconut grower and ensure public-private partnership for making coconut industry competitive. This programme could enable the coconut farmers or their groups to be shareholders in the large-scale process.

4.5.9.3 Coconut, a versatile crop, which yields innumerable products right from root to the tip of the palms, is known as “tree of life”. The prospects for coconut in the years to come are bright. Coconut can be processed as a food, drink, infant foods, pharmaceuticals, nutraceuticals etc.. As a green fuel, coco biodiesel, bio lubricants are also gaining momentum in various other countries. R&D will be required to identify and standardize the diversified products. Processing component will require lot of attention. Briefly, The Technology Mission would need to be redesigned with an end-to-end approach, if it is to be continued in view of its potential.

4.6 National Horticulture Mission

4.6.1 The National Horticulture Mission has been launched in the country during the current financial year (2005-06) for implementation with an outlay of Rs. 2300
crores for remaining period of Tenth Plan which will address the issues of production, post harvest management and marketing. With a budgetary outlay of Rs 13,300 crores (Rs. 11,000 cr. For Eleventh Plan) for the next seven years (remaining 2 years of the Tenth Plan and 5 years of the Eleventh Plan), the National Horticulture Mission (NHM) aims to double the national horticulture production to 300 million tonnes by the year 2011-2012. The focus area of the Mission is as under:

- Capacity building for production and supply of adequate quality planting material including setting up of scion banks of high yielding mother plants
- Increased coverage of crops under improved/high yielding cultivars.
- Enhanced production and productivity of horticulture crops.
- Strengthening of infrastructure facilities such as soil and leaf analysis laboratories, survey and surveillance of pest and diseases, green house, poly houses, micro irrigation, plant health clinics, vermin compost etc.
- Build adequate infrastructure for on farm and post harvest handling.
- Enhanced production of high value low volume horticulture products for exports.
- Strengthening infrastructure facilities for marketing and export.
- Enhanced production of high value processed products.
- Build a strong base to enhance efficiency in adoption of technologies.

4.6.2 Sanction for Rs. 314 crores for 12 States has been issued during current financial year (2005-06).

4.6.3 The Mid Term Appraisal of Tenth Five Year Plan for the Agriculture and Food Security sector has also commented on the National Horticulture Mission as under:

4.6.3.1 “Given climatic diversity, India has long run comparative advantage in horticulture. But despite appreciable production growth through area expansion, yields and produce quality remain unsatisfactory on international comparison. The National Horticulture Board and the Technology Mission for the North East run a number of schemes but major constraints remain, namely, senility of many existing orchards, non-availability of quality planting material, lack of strong extension machinery and inadequate marketing, cold-storage and processing infrastructure. The
Tenth Plan had proposed to double horticulture production by 2011-12 through a National Horticulture Mission (NHM) linking ICAR, DAC, Ministry of Food Processing Industries (MFPI) and the private sector. With area under horticulture already growing and responding to demand, no special effort (e.g. subsidy) is necessary to shift areas from existing crops. Rather the priority must be on technology to improve yield and quality and on post-harvest management, infrastructure and processing.”

4.6.3.2 It must, however, be said at this stage that even though Mid Term Review clearly speaks of priority on technology and in any case the Mission Mode is ideally suited for development and dissemination of technology in these times of knowledge based agriculture, the National Horticulture Mission somehow misses out the term “Technology” in its name. This gives the impression that unlike the Technology Mission on Oilseeds and Pulses and the Technology Mission on Cotton, the National Horticulture Mission is somewhat insipid on technology. This must not be allowed to happen.

4.6.4 Analysis
4.6.4.1 The National Horticulture Mission has taken off only recently and it would be premature to comment on its working. However, in a communication sent to the Planning Commission in January 2005, on the draft NHM, NCF had urged that the following facts and issues must be considered while firming up the design and implementation of the Mission;

- During the past 10 years, increase in horticulture production had occurred essentially through area expansion, whereas the overall productivity had remained low and even declined.
- The progress under the “Horticulture Revolution” has been skewed, both geographically and socially.
- The estimated post harvest losses in horticultural commodities continue to be at the level of 25% to 30%, valued at Rs. 20,000 crores to Rs. 80,000 crores, raising questions regarding the effectiveness of the huge investments made through the DAC, APEDA, NCDC, NAFED, MFPI etc. during the past 10 years or so for remedying this malady.
• Hardly 2% of the total horticultural produce is processed, and India’s share in the global market of horticultural products remains extremely low, about one percent.

4.6.4.2 A “business as usual approach” will not help to realize the goal of the Mission, especially the desired improvement in productivity and economic and ecological security. Our strategies and priorities would, therefore, need to be adjusted.

4.6.5 The key issues highlighted are as under

4.6.5.1 End-to-end Approach: The Mission should pay greater attention to “social engineering”, “inclusiveness” and “group dynamics”. In order to enhance the economies of scale for majority of small farmers, and to ensure end-to-end approach by integrating production – post harvest management – processing – marketing, Small Holders’ Horticulture Estates to institutionalise decentralized mass production by masses coupled with centralized services should receive high priority. Rural institutions such as PRIs, cooperatives, NABARAD and other banks (for credit flow), SHGs, KVKs and ATMAs must play a crucial role in production, processing, marketing, income generation, skill development and technology transfer and adoption. Appropriate mechanisms should be in place to ensure effective participation and contribution of these institutions. Highest priority should be given to the prevention of post harvest losses, processing, value addition, quality and marketing. From the very beginning, synergistic and holistic approach should be adopted to integrate production, quality, post-harvest management, processing, value addition, pricing, marketing, sustainability, profitability and equity. The worldwide concept of “Packing House” – a self-contained unit for cleaning, grading, sorting, packing, pre-cooling, storage, etc. of the fresh produce owned by the Small Farmers’ Horticulture Estate/Farmers’ Groups/Cooperatives should be adopted to link production with market. These “Houses” could also house agriclinics and soil and nutrient testing laboratories operated by Graduates (thus also promoting employment).

4.6.5.2 Capacity-building for Productivity Enhancement: Since our productivity is low and there are wide yield gaps, high attention should be paid to
increase per hectare yield and productivity through transfer and adoption of proven
technologies. Farm schools should be established and supported to promote farmer-
to-farmer learning. Demonstrations of high-density orchards, high-tech greenhouse
horticulture as well as low-cost greenhouse horticulture should be supported for
enhancing productivity and quality. There are serious research and technology gaps,
not only in production and quality but also in PHM, processing and marketing. These
gaps should be clearly identified for different settings and concerted effort should be
made to address them in a Mission mode. A strong information and database system
should support this venture.

Allocation of funds for establishment and renovation of tissue culture and leaf
analysis laboratories must be based on analysis of the existing facilities and location
specific needs. The past experience shows that adoption of drip/sprinkler
irrigation/fertigation has generally been subsidy driven, without arrangements for
certification and quality control which has brought bad name to this otherwise highly
acclaimed and proven technology. Appropriate monitoring and certification of
production and distribution of quality hardware components of micro irrigation should
assume high priority.

4.6.5.3 Critical Linkage: The Food for Work and Employment Guarantee
Programmes, should be used for area expansion of horticulture (e.g. in Maharashtra),
particularly in degraded and wastelands under integrated watershed development
programmes – a kind of asset creation. The funds thus saved should be redeployed
for further strengthening of the “humanware”, i.e. skilled human resources who could
move up in their employability and income and thus lessening the number in the
Below Poverty Line category.

4.6.5.4 Providing Services and Seeds: Greater support should be given to the
strengthening of services. Subsidy-driven horizontal expansion of horticultural area
should be a lower priority. It is unrealistic to expect diversion of sizable cultivable
area year after for new plantings/sowings of horticultural crops, as this will derail
production of staple food grains and commercial crops, thus jeopardizing food
security. A scientifically proven strategy would be required for adoption by each
State on priority basis for rejuvenating old plantations and replanting senile and
unproductive plantations.
Poor supply of quality planting materials is the key constraint and its redressal should receive the highest attention. Specialized women SHGs should be provided land in State Farms to produce seed and planting material of high value crops to obviate the constraint.

4.6.5.5 Accent on arid and semi-arid horticulture: Horticulture must play a pivotal role in enhancing and sustaining livelihood security in rainfed dry and semi-arid regions. In this context, rather than reinventing the wheel, the successful experience of horticultural revolution in Maharashtra, coupled with detailed analysis of national and international markets and trade, may be replicated in other parts of the country, with due adjustments based on location-specificity and avoiding the pitfalls encountered and other lessons learnt in Maharashtra.

4.6.5.6 Focused priorities: Given the multiplicity of horticultural species and the production, consumption and distribution settings, only a few high priority and wide-impacting programmes should be identified and implemented in each State through participatory approaches also involving private sector, NGOs farmers, rural institutions such as Panchayats, cooperatives and SHGs. Thrust should be on those areas and commodities, which already have a commercial base or have the potential to become commercial. Public-private partnership will be crucial for creation of cluster-based production, processing and marketing through Nucleus-Estate and contract farming systems. These aspects should be covered in the planning process itself.

4.6.5.7 Increase domestic consumption: In order to achieve the nutritional goal and also for price stability, domestic consumption of horticultural products should be increased. Social marketing, such as bulk vending of fruit juices in Mother Dairy depots and involving Home Science Graduates in establishing Health Food Markets, should be actively promoted.

4.6.5.8 A separate Mission on medicinal and aromatic plants: Considering the vast gaps and opportunities along the production-processing-marketing chain of fruits, vegetables and flowers, the National Horticulture Mission may concentrate only on selected species of these commodities, and even promote precision and protected horticulture. Recognizing the treasure of rich biodiversity, indigenous knowledge and
fast-expanding global market of botanicals, a separate National Mission on Medicinal Plants in association with the National Medicinal Plants Board will prove more effective. China, with no greater treasures on biodiversity than that of India, annually exports medicinal and aromatic plants valued at over US $ 50 billion against India’s export of less then US$2 billion, let alone the vast potential of employment generation and realization of Farmers’ Rights.

4.6.5.9 Mission management: The National Horticulture Mission is designed and planned to be implemented on the pattern of the on-going Technology Mission for the Integrated Development of Horticulture in the North eastern Region. The structure proposed in the Mission does not inspire confidence. The progress of the Mission in the North eastern Region has so far not been commensurate with the volume of investments. Therefore, it will not be prudent to follow the pattern of the NER Mission. There should be a stronger built-in mechanism for monitoring, evaluation and adjustments and a greater sense of accountability at all levels. In order to achieve convergence and synergy, the Mission capacity to comprehend technical issues and the ability to coordinate and implement through sufficient experience in the field and in the States should be managed by a full time Director, who should be a professional with a proven record of achievements, particularly in the commercial aspect of horticulture. He/She should be on contract for 5 years in the post and should have both authority and accountability. The Director of the Mission should be the Member Secretary of the proposed National Horticulture Council and the National Executive Committee. Treating the Mission Director’s post as a routine administrative posting will be a disaster.

4.6.5.10 State Governments: Horticulture being a State subject, the State Governments should agree to the Mission being operated on the model of a specific Mission, where all the links in the production, storage, processing, marketing and consumption chain function in an integrated manner.

4.6.5.11 National Horticulture Board (NHB): The National Horticulture Board was set up in 1984 on the recommendations of the ‘Group on Perishable Agricultural Commodities’ headed by Dr. M. S. Swaminathan. The Group had observed that different aspects of Horticulture Industry
were looked after by the various Departments/Organizations at the Central and State level. To coordinate the activities of these departments, and develop horticulture industry in an integrated manner with an end-to-end approach, it was felt necessary that a national organization should be set up. Under NHM NHB is setting up cold storages in selected clusters in the States. They also provide technical support for NHM schemes. The structure of National Horticulture Board (NHB) needs to be redesigned on the NDDB pattern.

4.7 Recommendations

4.7.1 Summing up, it is observed that there is a need for revival of the concept of Technology Mission and its potential for achieving productivity gains and higher incomes for farmers. NCF has also recommended the setting up of a Technology Mission on Sugarcane to bring the benefits similar to that reaped by oilseeds farmers in the early years of TMOP and for achieving end-to-end approach through infusion of technology and achievement of coordination amongst the stakeholders. However it is reiterated there is no use in having a faith in the concept of Technology Mission without bothering about its operational design. Technology Mission should be one, which is technology rich, and which is characterised by well defined outcome indicators and monitoring tools. It is also characterised by an end-to-end approach covering all subjects in the cultivation-consumption-commerce chain. Unfortunately, the Farm Technology Missions are tending to become subsidy rich and technology poor. Accountability has also been lacking and in the wake of inappropriate policy environment, the domestic production has stagnated and imports have increased. This has led to expansion in the distress of farmers particularly in the dry farming areas. The following ingredients therefore can be suggested as touchstone in the review of the existing Technology Mission and for the design of future Technology Missions:

(i) The target crop should have available technology with inadequate dissemination.

(ii) It should have the potential for generation of technology, particularly new seed varieties capable of providing quantum jump in productivity and practices for adoption in the field.

(iii) The Technology Mission created for the target crop should be a stand-alone entity with its own full time Mission Director who should have a fixed five
years tenure and who should be having substantial technical and administrative abilities not only to comprehend issues relating to technology but also to get them implemented in the field through coordination amongst departments and coordination with the States. Above all, he should be accountable for the success of the Mission. The Mission should have a Core Group of multi disciplinary posts which should be filled on contract for a period of five years from amongst participating departments / public / private sector/NGOs. Incumbents to posts must not be on routine deputation or should not be holding additional charge.

(iv) The work of the Mission should be divided into MM for research, dissemination of technology, marketing, post-harvest technology and trade policies. The research components must not only cater to technologies for production of the crops but should also tap technologies for post-harvest technology. Department of Biotechnology and CSIR therefore could be successfully utilised for inputs in addition to ICAR.

(v) In consonance with the observations in the Mid Term Review of the Tenth Plan (2002-07), it must be stressed that Research and Development of technology under a MM must focus on the need to enhance the income of the resource poor farmers. Further, the research must take into account the cost return factor. If the cost risk factors are low and returns are high, the technology would be easily adopted by the farmers even with minimal extension efforts. Further, agriculture research/technology should be gender sensitive by devising agriculture equipments, which are women friendly and which result in reduction of drudgery.

(vi) Above all, with the experiences of TMOP where trade policies adversely affected the outcomes, a MM on Trade Strategy would be necessary since external environment is as important for production and income of farmers as dissemination of technology.

(vii) The Mission should place greater stress on marketing efficiency and price signals in addition to infusion of technology and not so much on mere passage of subsidy, which have been the hallmark of normal departmental programmes.
(viii) Decision-making at the Central level should be in the hands of an Empowered Committee headed by Secretary, Coordination in the Cabinet Secretariat. The Mission Director should be the Member Secretary of the Empowered Committee and should report the progress every quarter to the Prime Minister’s Office and to Deputy-Chairman of the Planning Commission. Excessive reporting which may cut into the time available for work in the field / touring should be curtailed.

(ix) The MMs could be headed by Additional Secretaries in the concerned Ministries since the Secretaries may not have the requisite time to devote.

(x) Planning Commission should ensure active collaboration from the States through its powers to approve the Plan outlays of the States.

(xi) Frequent inspection of the fields to check the adequacy and timeliness of the Mission inputs for the farmers should be ensured to supplement the efforts of the regular staff of the Mission. Small multi disciplinary teams consisting of retired officials, scientists, farmers, NGOs and representatives of the industry should be constituted to broad base the monitoring efforts.

(xii) Concurrent evaluation for mid course correction would also be critical and should be done through independent institutions like AFC / NABARD / State Institutes of Administration / Industry Associations etc.

(xiii) Internal financial / release procedures should be specially designed for the Mission. It should also be necessary to ensure that Central assistance is not blocked up in the States in view of their ways and means problems. This can be achieved if the funds in the Mission are made available to it and are routed through organisations like SFAC etc and channelised through similar State level societies directly to the field level implementing agencies. Mission activities would have a propensity to degenerate into normal programmes if these special instruments are not made available to it from the beginning.

(xiv) Mission should have a term of ten years in order to ensure that they maintain their vitality as well as a time bound focus.

(xv) Farmers should be associated at all levels in the decision making and monitoring activities of the Mission since they are central to the existence of the
Mission. The key indicators in the work of the Mission should include priority to the growth of income of farmers.

(xvi) In the States, activities of the Mission should be reviewed in the State Planning Board, in order to ensure that the Technology Mission is not seen as a departmental programme of a single department but as a priority of the Government as a whole. The State Planning Board would be in the unique position to ensure participation of all the concerned departments through its control over their Plan proposal.

(xvii) Another key ingredient for the success of Technology Mission would be to make the watershed or the irrigation command area the point of convergence and integration of all relevant Technology Missions like those relevant to oilseeds, pulses, maize, cotton, horticulture, milk etc. Convergence and synergy among the numerous technology missions now in progress will improve their utility and impact and also help to reduce overall transactions costs. All the Missions could be integrated under an umbrella set up which could be called “National Federation of Farm Technology Missions”. Pulses and Oilseeds are important nutrition and income providing crops in rainfed areas and farmers in dry farming areas would continue to suffer in poverty and deprivation unless the proposed National Federation of Farm Technology Mission extends to them the necessary help at the right time and place. Such a National Federation of Farm Technology Missions should be chaired by a practicing farmer who has a proven record of unleashing the power of creativity in small farmers management. Its major aim should be to enhance farming productivity and agrarian and rural prosperity. Recommendations in this regard have already been made in the First Report of the NCF Chapter 1 Para 9 (d).

(xviii) It is important for on going and future Technology Missions to realize that it is not merely the increase in area production and productivity of target crops which should be the key objective. It is far more important to focus on increase in the income level of farmers since it is the face behind the production statistics, which should never be forgotten. There have been
examples where increase in production and productivity without adequate price support and insufficient demand has led to decline in the farmers’ income from the crops. This is a very undesirable way of rewarding the farmers for their increased expenses for use of inputs whose cost have risen and his increased efforts in the field for achieving productivity. It is perhaps due to insufficient attention to the income of farmers that around 40 percent of the Indian farmers are willing to move out of Agriculture if they have an alternative. It has been noted in the Mid Term Review of Tenth Plan also that agriculture is becoming uneconomic as a profession and technologies are needed which can enhance the farmers’ income, particularly for the resource poor farmers.

(xix) Since technology is at the core of technology mission, it is necessary that Technology Missions, both ongoing and future ones, effectively use technology driven communication methodologies for speedier and more cost effective dissemination of know-how for the farmers to enable them to cope with demands of knowledge based agriculture. Technology Mission thus can benefit all the farmers through use of Village Knowledge Centres to be set up at the village level. The concept of Village Knowledge Centres has been extensively elaborated and recommended in Chapter VIII of the First Report of the NCF. President A.P.J. Abdul Kalam has also opined recently that Village Knowledge Centres would act as a front line delivery system

(xx) Last but not the least, it should be realised that agriculture is an extremely important subject, allocated to the Panchayati Raj Institutions in the wake of the 73rd amendment of the Constitution. The centrality of the Panchayati Raj Institutions must be built in while formulating the Technology Mission. At the same time, it should be realised that this would be feasible only if and when the technical staff at the grass root level is placed at the disposal of the Panchayati Raj Institutions, which has unfortunately not happened uniformly in the country.

4.8 Technology Missions: Way Forward

4.8.1 To sum up, the Technology Mission is an efficient tool for programme design and implementation for achieving well defined production goals on a time bound and cost effective basis. The Mission mode method of programme design helps
to facilitate concurrent and adequate attention to all links in the production-
processing-consumption-marketing chain. It has built in methods of continuous
monitoring and evaluation, so that mid-course corrections can be introduced in
operational strategies when needed. For its success, the following important
ingredient identified by late Shri Rajiv Gandhi is fundamental – “We would like to
put one person in charge of such a Mission with full funding and with no restriction
on him whether bureaucratic or otherwise. The only limits will be certain
achievements, which must come within a certain timeframe.

4.8.2 NCF recommends that the existing organizational and managerial
structures, in the case of the Technology Missions in Cotton and Horticulture be
reviewed in the above context. During the early years of planned development in
India, Jawaharlal Nehru said, “I do not want reasons for failure; I want to know how
to succeed”. A Technology Mission has a national vision and need behind it. To
achieve success, the Mission will need a dynamic Mission Director who is known to
be an achiever. He/she should be in position for a minimum five-year period, so that
there is adequate time to achieve results. Authority, Accountability, and
Achievement, should be the basic management principles underpinning Technology
Missions.

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experience.
EXECUTIVE SUMMARY

CHAPTER I – 2006-07: YEAR OF AGRICULTURAL RENEWAL

1. The inadequate progress in achieving the Tenth Plan targets in agriculture is well documented in the mid-term appraisal of Plan achievements by the Union Planning Commission. This has serious implications for not only food security, but also for rural livelihood security and for reducing hunger and poverty. In its first two reports submitted to the Union Minister for Agriculture and Food in December 2004 and August 2005, NCF has analysed the reasons responsible both for agricultural decline and farmers’ distress leading occasionally to suicides. Several suggestions have already been made to reverse this decline.

2. During the last one year, the Government of India has taken several significant steps to take the country once again on the path of rural prosperity and farmers’ wellbeing. These include the National Rural Employment Guarantee Act, Bharat Nirman, National Horticulture Mission and National Rural Health Mission. Several other important steps have been taken in the areas of credit and market reform. The time is therefore opportune for initiating during the Agricultural Year of 2006-07, an integrated programme for agricultural renewal. This programme designated “2006-07: Year of Agricultural Renewal” should consist of the following five mutually interactive and reinforcing action plans:

a. Soil Health Enhancement: Government Departments, ICAR institutes, Agricultural and Rural Universities, Fertilizer Companies, NGOs, Farmers’ Associations, Krishi Vigyan Kendras and Panchayati Raj institutions can undertake during the agricultural year 2006-07, a concerted soil health awareness and improvement programme. The programme should give concurrent attention to the physics, chemistry and microbiology of the soils. Both macro- and micro-nutrient deficiencies in the soil, as well as special problems like the occurrence of a hard pan in the subsoil and low soil organic matter content need attention. Every
farm family may be issued with a Soil Health Card to enable the family to monitor the biological productivity of their soils. Breeding soils for higher productivity may be initiated in the case of problem soils and waste lands. Community Land Care movement may be launched by Panchayats and training programmes may be organized for this purpose.

b. **Irrigation Water Supply Augmentation and Demand Management:** In addition to the steps proposed under Bharat Nirman, rainwater harvesting and aquifer recharge should be made mandatory. The conjunctive use of river, rain, ground, sea and treated sewage water should become a national habit. The cultivation of low water requiring but high value crops should be promoted in areas where water is a constraint. Low cost green houses for the cultivation of vegetables and flowers and for seed production may be promoted under conditions where evaporation exceeds precipitation. Efficient irrigation techniques like micro- and drip irrigation should be widely popularized. Watershed management should be linked to appropriate Technology Missions, so that the benefits of water can be maximized. Seawater farming involving coastal forestry and aquaculture could be promoted along the coast and in Andaman and Nicobar and Lakshwadeep islands. Water conservation and sustainable and equitable use should become everybody’s business. Water literacy and water quality management should receive attention from Panchayats.

c. **Credit and Insurance:** Credit reform holds the key to ensure the economic survival of small and marginal farmer families. Keeping in view the decline in the profitability of agriculture, and the farmers’ distress, the Government of India may consider providing support to the banking system for reducing the rate of interest for crop loans to 4 percent during the Year of Agricultural Renewal. Micro-finance should become livelihood finance by linking credit to essential support services so that credit becomes the pathway to sustainable livelihoods. An Agricultural Risk Fund should be established to provide farmers relief in the case of successive droughts or other natural calamities including disease outbreaks.
Kisan Credit Cards should be issued to woman farmers, even if the title to land is not in their names. Negotiable warehouse receipt is another urgent need. A Rural Insurance Development Fund and Credit Counseling Centres are needed. The Self Help Group movement can be strengthened by setting up at the Block or District level Self Help Group Capacity Building and Mentoring Centres. The Crop Insurance scheme needs to become farmer-friendly and the premium should be reduced. Crop insurance through SHGs can be promoted.

d. Technology: Technology is the prime mover of change. Both technology fatigue and technology gap should be avoided. This will call for revitalization of research, education and extension systems. It is suggested that all ICAR institutions and Agricultural Universities may commemorate 2006–07 as the Agricultural Technology Year. The major aim of this year should be to strengthen participatory research and knowledge management with farming families and the organization of about 60,000 Lab to Land programmes in the area of post-harvest technology and value addition to primary products. Biomass utilization and the creation of skilled jobs in the non-farm sector should receive high priority. Management procedures should be developed such as the organization of Small Holders’ Cotton and Horticulture Estates for the purpose of providing the power and economy of scale to small producers both at the production and post-harvest phases of farming. There should be income orientation to farming by promoting crop-livestock integrated production systems and improved post-harvest technology. New technologies like biotechnology and Information, Communication Technology (ICT) should be demystified and a cadre of Rural Farm Science Managers should be developed by training a couple of women and men members of every Panchayat/ local body in the management of new technologies, such as the establishment of refugia in Bt Cotton fields. ICT should be effectively harnessed to empower rural women and men through the Every Village a Knowledge Centre Movement.
e. **Market:** Market reform should begin with production planning so that every link in the cultivation-consumption-commerce chain receives adequate and timely attention. Farmers need proactive advice on land and water use based on potential meteorological and marketing factors. A National Land Use Advisory Service linked to State and Block Level Land Use Advisory Services may be established for this purpose. These can be virtual organizations with the capacity to provide land use advice on a location and season specific basis. The National Land Use Advisory Service should have continuous contact with IMD, ISRO, Agricultural Universities and Departments, Commodity Exchanges and Futures Market, APEDA, Commodity Boards and all credible national and international sources of information on domestic and international markets. The Land Use Advisory Service should cover crop and animal husbandry, horticulture, inland fisheries, forestry and agro-forestry and have the capacity to proactively assess potential surpluses and shortages of essential commodities. Attention is also needed to farmer-friendly contract cultivation practices.

3. To sum up, the National Agricultural Renewal Year programme of 2006-07, should deal concurrently with soil health enhancement, augmentation of the area under irrigation coupled with efficiency and equity in water use, credit and insurance reform, technology upgradation and dissemination, and farmer-centred marketing. The aim of the Agricultural Renewal Programme will be enhanced productivity per units of arable land and irrigation water, higher profitability, increased on-farm and off-farm employment opportunities and long-term environmental sustainability. Distress hot spots should receive priority attention.

4. **Establishment of an Indian Trade Organisation (ITO):** As a national self-empowerment measure, we should consider establishing an Indian Trade Organisation (ITO) and our own boxes for domestic agricultural support on the model of WTO’s Blue, Green and Amber Boxes. The value of our annual agricultural
production including livestock in 2002-03 was Rs. 5,60,516 crore\(^1\). The value of our exports of farm commodities in 2002-03 was Rs. 34,654 crores (6.18 % of total agricultural production)\(^2\). Thus only a small proportion of our agricultural commodities enter the global market, since with a population of over a billion, there is a large home market. Hence, we must segregate the very modest support we extend to our farmers into two groups – those which are of the nature of life and livelihood saving support to small farm families, and those which could be considered as trade distorting in the global market. The ITO can be a virtual organisation and should help to build a long term memory system in relation to home and external trade and help checkmate adverse global trade tends by stimulating timely action.

5. Launch of the Year of Agricultural Renewal Movement: This movement which will cover the crop year of 2006-07 should be launched on Baisaki day (13 April 2006) with the support of State Governments, Farmers’ Organisations, Business and Industry, Academia, Civil Society Organisations, Panchayati Raj Institutions and Mass Media. The year should end with the adoption by Parliament of a National Policy for Farmers, which will help to assure farm women and men that “Jai Kisan” is not an empty slogan. NCF will provide to the Ministry of Agriculture a draft National Policy for Farmers in April 2006, so that it can be widely discussed with farmers’ organisations during May-December 2006 and finally adopted before the 60\(^{th}\) anniversary of our independence.

6. The active involvement of State Governments and Union Territories is essential for accomplishing the goals of the Year of Agricultural Renewal programme. It is suggested that the programme may be discussed at meetings of the Agriculture Coordination Committee chaired by the Prime Minister, and the NDC Committee on Agriculture chaired by the Union Minister for Agriculture and Food. The programme should be initiated after careful planning from the 2006 Khariff season onwards.

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\(^1\) National Accounts Statistics of India, 1950-51 – 2002-03, EPW Research Foundation, Mumbai, 2004
\(^2\) Agricultural Statistics at a Glance 2004, Ministry of Agriculture, Govt. of India
7. **Indian Farmers and Bharat Nirman**: To ensure the success of this massive rural infrastructure development programme the following four steps will be needed:

   i) **Consultation and Consensus** - this is essential in the case of bringing 10 million hectares of additional land under irrigation.

   ii) **Capacity Building** - At least one women and one male member of every one of the about 240,000 Panchayats/ local bodies should be trained to become Members of a Bharat Nirman Corps. The training of the Members of the Bharat Nirman Corps can be done by Agricultural, Rural and Women’s Universities, IITs and by appropriate NGOs, Farmers’ Organisations, NABARD and Financial Institutions and Business and Industry.

   iii) **Care and Management** - Gram Sabhas should be involved in providing oversight and advice in the area of maintaining and managing the costly infrastructure developed.

   iv) **Convergence and Synergy** - Steps should be taken to bring about convergence and synergy among other major social and human development programmes such as the National Rural Employment Guarantee Act, National Horticulture Mission and the National Rural Health Mission.

8. **Knowledge Connectivity**: Inclusion of knowledge connectivity as an integral component of Bharat Nirman, as recommended by NCF, is a welcome step. There is need for a forward looking policy with reference to community radio, since the community radio – internet/ cell phone combination can help us to travel the last mile in knowledge connectivity and reached the unreached. A far-sighted community radio policy which will be in keeping with the spirit of the Right to Information Act is the need of the hour.
1. **Science and technology are the engines of agricultural growth and development.** Green Revolution, built through synergy of technology, policy, services and farmers, ushered in 1968, resulted in tripling of foodgrains production (80% through yield enhancement), which more than halved percentages of hungry and poor people, enhanced employment and farmers’ income, and increased food self-sufficiency and national confidence. Today, however, India’s agricultural growth rate has slipped below the population growth rate. This has serious implications for economic growth, food security, equity and rural welfare.

2. Stubbornly high incidence of hunger and poverty, technological fatigue, serious yield gaps, huge post-harvest losses, decreasing net trade intensity, low and stagnant farmers’ income, declining holding size and widening rural-urban divides are matters of serious concerns. **There is consensus that the unfolding challenges of Indian agriculture can only be addressed through science and technology, and that a different R&D paradigm - a national innovation system integrating all facets of rural life and stakeholders would be necessary.**

3. Agricultural growth in recent years has thrown new sectors and regions into prominence. Livestock, fisheries, horticulture, specialty enterprises (spices, medicinal, aromatic, organic) and value-added products illustrate this trend. Market-driven diversification in a global perspective has become the new paradigm driving future agricultural growth. Rising capital intensity, particularly in the high-growth sectors of agriculture, has set in motion a new set of forces. Declining growth in public investments and eroding institutional infrastructure are other disturbing features of the current trend. World agriculture, particularly trade, places high premium on quality. Public health and food safety concerns are central themes of global regulatory negotiations. Indian
agriculture has to respond to these. Equally important are sustainability of natural resources (particularly water) and other environmental externalities including global warming and climate change.

4. Recent policy announcements have stressed the importance of investment in agricultural research as revealed by the following:

- The Common Minimum Programme of the UPA Government states, “The UPA Government……will ensure that **public investment in agricultural research and extension, rural infrastructure and irrigation is stepped up in a significant manner at the very earliest.” …… “will follow policies and introduce programmes that strengthen India’s vast science and technology infrastructure.”....

- The Finance Minister in his Budget for 2005-06, announced an initial provision of Rs. 50 Crore for operationalising a National Fund for Strategic Agricultural Research arising from Swaminathan Task Group.

**Overview of Agricultural R&D Infrastructure in India**

5. The National Agricultural Research System (NARS) comprises a network of Central (90), State (40) R&D organizations and coordinated research programmes (91). Agricultural R&D in the country owes its origin, growth, and sustainability to public support as **more than 85 percent of aggregate R&D funding comes from public exchequer. With more than 20,000 scientists and expenditure of Rs.31 billion, it is one of the largest systems in the world.** The ‘D’ component has been with the States, under the control of State departments of agriculture. Its isolation has not been successful and there has been a decline in the extension system across the board. Consequently, the centrally supported frontline extension system has grown covering frontline demonstrations and KVKs. The institutional edifice of the State R&E system continues to grow. The number of SAUs has grown from a mere handful in early seventies to 40 now. Unfortunately, funding levels have not kept pace with this and operational as well as scientific resources have degenerated.
6. **The rate of return on investment in agricultural research has averaged as high as 50 to 60 percent – one of the highest in the world.** Although there has been an increasing trend in R & D investment, it has flattened in recent years. Operational support, however, has not kept pace with overall trends. The problem has been serious in the State system whose share in the total R&E expenditure has consistently declined over the past four decades. The edifice is large in nominal terms. In relation to the size of the agricultural sector, however, investment intensity is low. **At 0.34 percent of agricultural GDP, research intensity is only half of the overall average for all developing countries (0.6 percent) and about one-sixth of the average for developed countries.** There is considerable inter-State variability in intensity of State funding (ranging from 0.08 in U.P. to 1.4 in H.P.). **With the exception of a few States, commitment to R&E is not strong and in some States the situation has deteriorated.** Dependence of State R&E on the Centre has grown.

7. For outreach programmes also, Central support has become more important. Priority accorded to agricultural R&D is revealed by the fact that this large network was built mainly from domestic resources. There has been a slowdown over the last decade or so and this is reflected in restraints on recruitment of scientists. This has been attributed to the overall policy thrust on downsizing public bureaucracy. Until the contours of a national policy on public R&D are redefined and clearly enunciated, managers of public finances will remain apathetic.

8. More than three-fourth of the scientific manpower resources are in States which account for half of the national R&E expenditure. With nearly uniform salary patterns, this reveals structural weaknesses - support per scientist is significantly lower in the State system (Rs. 0.84 Million against Rs. 1.72 Million). As attention shifts back to strengthening local R&D institutions, this dichotomy needs to be addressed. Matching human and other resources has not received adequate attention. **Two serious issues are decline in scientific manpower in the State system and stagnation in the Central system,** both of which have happened during the phase when the research agenda expanded and diversified. **This had consequences like loss of critical mass in research units and programmes resulting in decreasing scientific productivity and research**
impacts. Second, lower support per scientist in the State system does not auger well for the future, particularly since these scientists are expected to play a larger role in research outreach functions.

Major Challenges and Policy Directions

9. The challenge before us therefore is to build research and technology development capacities and partnerships which will contribute to and capture the impact of Gene Revolution and other scientific revolutions. For this the Commission recommends a three pronged approach:

- Prioritise strategic research and technology development programmes, including cutting-edge technologies, geared to meet the technological problems retarding and decelerating agriculture-led growth and development.

- Realize that science and technologies must have a human face and cannot operate in a vacuum. Therefore, it is absolutely necessary to formulate clear cut goals, policies, strategies and programmes and build partnerships for harnessing the (unlimited) power of science and synergizing technological and social resolutions.

- The National Agricultural Research System, the Technology Assessment and Transfer System, the Knowledge System (skill development, re-tooling, indigenous knowledge), the Humanware aspects, Enabling Mechanism (IPR, SPS) and Services must be synergistically aligned, restructured and revitalized.

10. Science and technology for crops, livestock, fish and forests, must address the following four interrelated areas in order to attain higher productivity and sustainability and thereby help alleviate hunger and poverty:

- Enhancing yield ceilings, bridging yield gaps, protecting yield gains, minimizing post-harvest losses, augmenting value addition and improving productivity and promoting eco-technologies rooted in the principles of ecology, economics, equity and employment;
• Exploiting the gene revolution (biotechnology), benefiting from information and communication technology revolution, space, nuclear and nanotechnologies and promoting **knowledge-based precision farming systems**, intensification, diversification and value additions;

• **Protecting and improving natural resources** (land, water and biodiversity), addressing environmental concerns, and managing climate change and natural disasters; and

• **Seeking congruence of productivity, profitability, sustainability and equity**, addressing gender issues and problems of the poor and the excluded, and managing liberalized trade in the globalized world by addressing issues related to global competitiveness in the context of the WTO AoA.

11. International quality and safety standards for agriculture products, including GMO related biosafety and biosecurity are very high. Meeting of their standards involves substantial costs for building technical and physical capability. There is a need for pooling talents and resources available in both public and private sectors to build this capacity. Finally **public research system should shoulder the responsibility to protect small farmers from ill-effects of trade reform process**.

12. With a view to bring special focus on women in agriculture, a **National Network of Women Scientists and Institutions** interested in engendering the development through S&T based interventions to develop an end-to-end approach, for the various agro-climatic zones, should be started. Such a national level action and policy research network should carry out longitudinal studies of women’s roles in agriculture and rural livelihoods in the various agro-ecological regions of the country.

13. **Participatory research and knowledge management** is the key to promote relevance and effective adoption of technologies and new information by pursuing holistic and system–based approach for converging “global” knowledge to tackle local problems. The unique nature of agriculture makes agricultural R&D different from other sectors and makes extension vital. The context is different and other providers are emerging. A new ball game has been set up and our response has remained outdated.
Clear enunciation of the roles of the Centre, States, local bodies, Panchayati Raj Institutions, private sector, and NGOs in a client-centred R&D structure is a critical task. Critical scientific and resource mass and modern management must back the human resources and research – extension – farmer – market – consumer linkage.

Recommendations

14. In line with the Central Government’s decision to establish a National Science Education and Research Foundation and allocation of Rs 1000 Crore for commencing two institutions to serve as flagship institutions of science to render India as a strong knowledge society, the National Commission on Farmers recommends a provision of Rs. 1000 Crore as a one–time grant to NARS to bridge the critical gaps in scientific infrastructure in frontier areas of technologies, so as to enable the Nation to enhance its agricultural competitiveness and to benefit from science–led Second Green Revolution. This additional allocation will particularly strengthen work on conservation and improvement of livestock heritage of the Nation, genomics, bioinformatics, bioremediation and harnessing gene–richness of microorganisms, biomass utilization, value addition and use efficiency of plant nutrients and water. A National Board for Strategic Research in Agriculture may be set up to coordinate and harness advances in basic science for agricultural progress. The ICAR should position itself to effectively utilise the available funds and additional funds allocated to the NARS.

15. The NARS covers the entire spectrum of crop, fishery, forestry, natural resources and agro processing and agri-business. However, there are gaps in several areas awaiting redressal or are not receiving focused attention. Some of such areas, as listed below, require more intensive and inter-disciplinary attention.

- Climate Change and its implications
- Harnessing space, ICT, nanotechnology and other frontier technologies for precision farming
- Organic recycling and value addition to biomass, biofuels and bioenergy
- Crop livestock-fish integrated production systems
- Pre-breeding and participatory breeding
- Scientific organic farming.
16. The Commission recommends setting up of new National Centres / Institutes in the above areas or mandate existing ones to address those areas specifically. Such institutions could be set up in existing ICAR institutes or SAUs or institutes of other relevant Ministries but should be functionally and financially autonomous with their own Governing Boards. In the Commission’s view, the institutions should be built around outstanding scientists and research leaders of proven capability in these fields. Such committed research leaders should be first identified and involved in the project design process. The National Challenge Programmes (identified by the Task Group and other committees) should likewise be led by scientist–achievers.

17. The premier research institutes, such as IARI, IVRI, should be designated as Institutions of National Importance. The Commission recommends that such institutes should be given special funds and organizational and management supports to empower them to enrich the Indian agricultural knowledge system necessary for enhancing country’s competitiveness at the global level on one hand and to serve the majority small and marginal farmers, often inhabiting vast rainfed drylands and other poorly endowed non-congenial agro-climatic regions, on the other hand. A National Council for Global Leadership in Agricultural Science and Education should be set up under the chairmanship of the Minister for Agriculture to give guidance to these new initiatives and to position India as a leading player in international agricultural R&E system.

18. It is strongly recommended to increase the R&E intensity to 1.0 percent (from current level to 0.34 percent) of AgGDP. The existing serious imbalances in funds allocations to different agro-ecological regimes and commodities should be corrected by allocating larger proportions to eastern region to harness the high untapped agricultural growth potential, as also to rainfed arid and semiarid drylands and to livestock and fisheries subsectors. The resources recently allocated to the National Horticulture Mission need to be aligned to priority areas for technology development for prevention of post–harvest losses, processing, value addition,
development of specialty varieties (viz. for processing) and production and distribution of quality planting materials.

19. A package of reforms aimed at enhancing autonomy, improving decentralization and devolution of power, and improved financial management through built-in monitoring and evaluation is required. Both ICAR and SAUs should commit themselves to such reforms. Support of high level policy makers at both the Central government and State government levels is needed to implement this far reaching reform agenda.

20. The following additional policy reforms by Central and State Governments are recommended:

- Balance expenditure per scientist in SAUs at par with ICAR.
- Maintain critical levels of scientific and resource mass in different ICAR Institutes and SAUs.
- Enhance share of operational expenses of scientists.
- Dedicate adequate public funds to promote basic and strategic research as well as to develop human capital.
- Promote competitive funding for networking, institutional reforms, addressing R&D challenges.
- Strengthen project-based funding with clearly defined outlay-outcome matrix on the lines of The Log Frame Options.
- Evolve National Innovation System aligning policy, incentives and regulations to foster innovation and entrepreneurship.
- Establish Genius Awards for young scientists to attract talented youth to agricultural research, technology development and education.
- Strengthen IPR regime for technology transfer, resource generation and evolving competitive market with due provision for social inclusion in access to new technologies.
21. **Codes of Conduct** should be introduced for public-private sector partnerships based on respect for each other’s obligations, where IPR, breeders’ rights and other forms of proprietary control over technologies and products of commercial significance, are important. The code of conduct should be developed through extensive consultation among all partners and can be used in the entire national scientific research system.

22. In order to promote investment in agricultural research by private sector, the following suggestions may be considered:

- **Provide tax concessions** and **tax holidays** to promote private sector’s contribution to R&D from 14 percent to 33 percent.
- **Strengthen regulatory mechanisms**, especially IPR, SPS and quarantine facilities, to promote technology acquisition.
- Encourage testing of private sector’s new varieties and other technological products by public sector regional and national testing programmes.
- **Undertake joint research activities** with clearly defined responsibility and accountability of and profit sharing by various partners.

23. SAUs are generally starved of operating funds and now largely depend on ICAR. The shortage of funding in the SAUs has had adverse effects on human resources development, research infrastructure, and linkages with farmers. There is an urgent need to sensitize policy makers at the State level to the payoffs to investing in research. At the same time, the Central Government might develop a funding formula that supports the weaker States, but provides incentives to stronger States to increase their **funding** (e.g., matching grants). A key role of Central research is to generate spillovers to enhance efficiency in State research programmes.

24. In order to enhance effective technology transfer and to bridge the yield and other performance gaps at various levels, the Commission recommends the following:

- Convert the Krishi Vigyan Kendras into **Krishi and Udyog Vigyan Kendras** in order to give concurrent attention to on-farm and off-farm livelihood and to
promote end-to-end approach and to link production with marketing and consumption.

- Establish 50,000 **Farm Schools** in the fields of farmers-achievers to spread proven technologies through farmer-to-farmer learning.
- Integrate the activities of KVKs, ATMAs (Agricultural Technology Management Associations), Lab-to Land and Land-to Lab programmes, Self Help Groups, agricultural cooperatives and other grassroot institutions.
- Establish **National Participatory Research, Demonstration and Training Centres** to integrate available scientific institutions, extension programmes and grass-root institutions related with agricultural development including the proposed initiatives, namely, Farm Schools, Soil Health Cards, Kisan Credit Cards, Agriclinics and Agribusiness centres.
- Establish a **National Council of Innovative Farmers** to provide a structured opportunity for sustained scientist-farmer dialogue.
- Establish National and local level **Science and Technology Alliances (Consortia)** for rural livelihood security.
- **Increase the involvement of small holders in public-private partnership in high-value agriculture** by integrating the small-holders with the high-value agricultural and supply chain and making necessary provisions for remedying market failures and **structuring the SFEs on the NDDB model**.

25. The recommendations of the **Swaminathan Task Group on Revamping and Refocusing of National Agricultural Research** to meet current challenges and those of the **Mashelkar Committee on Reorganization of ICAR** should be examined and the accepted ones should be implemented without further delay.
Executive Summary

CHAPTER III - TOWARDS AN INDIAN SINGLE MARKET

1. Trade is an important sector of the economy. The share of internal trade in the Indian economy in 2001-02 [advance estimates] stood at around 13.4% of the GDP. It employed about 36 million people, a majority of whom were self-employed, engaged in retail and wholesale trade. It is the most important sector in the tertiary/service sector. However, internal trade faces many problems due to the diversity of controls exercised by multiple authorities at different levels, restrictions of inter-State and inter-district movement of goods, lack of uniformity in standards laid down by different authorities and agencies and in taxes. As a result, the price strategies get affected by differential tax rates and become localised. All this has led to breaking up the vast India Market into a large number of smaller regional markets. The paperwork involved in complying with the various controls, regulations and licenses, the costs involved in terms of time and resources and the inevitable corruption and malpractices that this leads to, have served as a big drag on the efficiency of trading operations in the country.

2. The Hon’ble Prime Minister of India, Dr. Manmohan Singh has recently observed as under:³

“The time has come for us to consider the entire country as a common or single market for agricultural products. We have to systematically remove internal controls and restrictions.”

3. With a view to benefit from the international experiences, the FAO at the request of the National Commission on Farmers, through the Government of India, Ministry of Agriculture, studied the European Union Market integration experience and looked into the legislative, political and economic measures taken during the process. The European experience is documented in the study mainly to understand the political processes and the economic measures that led to the adoption of a common and eventually a single market in that region. The Report has since been received.

³ Agriculture Summit, 2005
4. The barriers to internal trade in India could be grouped under the following broad heads:
   [a] Restrictions imposed by the Essential Commodities Act [ECA], 1955/Prevention of Food Adulteration Act, 1954, etc.
   [b] Fiscal issues
   [c] Transport related
   [d] Agriculture trade related

**Essential Commodities Act, 1955 and other Acts/Orders**
5. Using the powers under ECA, 1955, the various Ministries/Departments and the State Governments/UTs have issued a large number of control orders covering items such as paddy/rice, edible oils etc. The ECA, 1955, and the Control Orders were relevant and issued in situation of demand exceeding the supply. The demand-supply balance and the economic environment have changed in recent years but the restrictions and controls are continuing and coming in the way of efficient functioning of the marketing system and also the agricultural development in the country.

**Suggestions**
6. The number of essential commodities has been reduced from a high of seventy in 1989 to only fifteen. It would be useful if the remaining agricultural product are also removed from the list of essential commodities. Alternatively, the ECA, 1955, may be put under suspended animation for the present and revived by Government notification if any emergency situation develops, for a limited time, for a specific commodity and in a specified area. After watching for a few years and being satisfied that under the changed environment it is possible to tackle even emergency situations with market operations, it may be possible to scrap the Act all together. Further, to ensure that the States do not issue fresh control orders, the Central Government may consider the feasibility of making Central legislation to ban imposition of any restriction in the movement, stocking etc. of agricultural commodities. In any case, the powers of the Government to restrict the movement of goods out of their territory are incompatible with the principle of a single market.

7. The proposed **Food Safety and Standards Bill [2005]** would repeal the outdated Prevention of Food Adulteration Act, 1954 and the concerned control orders issued by various departments, and create a streamlined framework. The Food Regulatory
Authority of India [FRAI] envisaged under the proposed Bill, would be the supreme authority for standard setting and enforcement in food sector against the present situation where a number of Ministries are involved in matters concerning food and food processing.

**Fiscal Issues**
8. Fiscal reforms are important in facilitating the growth of efficient trade. There exist various forms of charges/taxes on the traded commodities in India. There are considerable variations in the market charges and taxation rates across the States. The complex tax structure and multiplicity of State-level taxes distort the process of trade. Inter-State and Centre-State harmonization of tax law and administrative procedures could facilitate the simplification of the tax system. Further the multi-point tax system in India has cascading effect on prices.

**Suggestions**
9. Efforts have for be made to introduce the Value Added Tax (VAT) in all the States. The State VAT may, in due course be replaced by National VAT, once there is an agreement between the Centre and the States regarding sharing of the tax. The octroi or any other local tax introduced by any State needs to be abolished. If however, for revenue reasons the octroi etc. cannot be abolished in all cases, at least the primary agriculture produce should be exempted from their coverage.

10. Another approach could be the abolition of all indirect taxes on agricultural products as a policy that would not only resolve the problem of border taxes but would also be socially more equitable. A possible measure for compensating the States for loss of revenue could be to increase the devolution of funds from the Centre to the States most affected by incomes foregone. Another suggestion particularly relevant for compensating the loss of revenue could be the increase in VAT rate on processed and semi-processed products by say 0.5% or raising the tax say on petrol, by 0.5% to generate additional incomes to compensate loss of revenue by abolition of octroi, Central Sales Tax etc.

11. An important step could be to change the administration of taxes so that no border checks etc. are needed. Most of the physical barriers on primary agricultural
commodities at the State borders are on account of collection of sales/purchase tax or APMC cess or Octroi.

**Transport related**

12. Commercial vehicles moving across the borders face a multiplicity of checks from different authorities relating to road tax, license fee, payment of excise/VAT, Essential Commodities Act, forest conservation, pollution control, etc. Further the transport vehicles are required to obtain ‘fitness certificate’ and pay road tax on an annual basis. For movement beyond the State, the transport vehicle owner has to apply for ‘National Permit’ covering at least four States and is required to pay the road tax and permit fee for all the States concerned. The rate of road tax in different States is different. Further, the appropriate authority at the checkpoints reserves the right to stop and detain the vehicles, which significantly adds to the cost of transportation. The interruption of the trucks/transport vehicle could be on various grounds and it is quite possible for a particular vehicle to face detentions on each of them, increasing the transaction cost substantially and hurting internal trade especially in perishable products.

**Suggestions**

13. To simplify the arrangements, it is suggested that a uniform amount may be charged for the National Permit and the permit holder may be allowed to ply the vehicle anywhere in the country. Similarly, the system of annual fitness certification and road charges may be replaced by a lifetime charge assuming around ten-years life for a transport vehicle. For plying the vehicle beyond the above limit, the vehicle may be subjected to an annual fitness certification and payment of fee etc. Further, the centralization by truck operators is common which effectively bars entry of new players in the transport sector. This aspect leads to be studies and appropriate measures be derived to remedy the situation.

**Agriculture Trade Related**

14. The wholesaling of agricultural produce is governed by the Agricultural Produce Marketing Acts of various State governments. Once a commodity is notified, the APMC Act makes its transaction mandatory in the regulated market. APMCs have generally
failed to provide adequate infrastructure at the *mandis*. Further, the focus of the APMCs has been on regulation and not development of markets for the local products, introducing grading and encouraging local processing etc. The APMCs have also not played any significant role in bringing better market information to the farmers. It is felt that direct marketing could enable the farmers to sell their produce to the processors or bulk buyers at lower transaction costs and maybe at better prices than what they get from intermediaries or from the wholesale markets in the regulated markets.

**Suggestions**

15. In order to improve the transparency in the operation of the APMCs, it may be made obligatory for them to publish the daily arrivals, maximum and minimum prices and the balance of stock available. Availability of this information on the internet for all APMCs on a day-to-day basis could be the first step to develop an all India market. The monopoly of the APMCs has meant that the private sector including cooperatives have not been able to contribute towards developing and building up marketing infrastructure in the country and the farmers have been denied choice. The Ministry of Agriculture, Government of India have already formulated a Model Act on Agricultural Marketing incorporating the necessary reforms and circulated it among the States for suitable amendments in their respective APMC, Acts. However, the **Model Act would require a relook if all barriers to internal trade were to be removed.** There is also a need is to promote alternative and mega markets especially near the big cities and metropolitan towns outside the purview of the APMC Act.

**Supporting Measures**

16. A host of supporting measures would be needed to ensure that the benefits of the Indian Common Market reach the farmers and the consumers and are not appropriated largely by the traders/truckers etc. Some of the supporting measures needed are:

- Standardization and harmonization of the quality standards
- Policy support in creation of farmer communities/groups etc.
- Need for development of suitable agriculture credit policy framework for increase in investment credit, financing to farmers’ groups/communities and new agri-business opportunities.
- The development of instrument based secondary market of negotiable warehouse receipt system.
- Attending to food security related concerns- increased employment opportunities, improved PDS and establishment of Grain Banks in areas with difficulty in access.
- An orderly functioning commodity forward market with orientation towards improving farmers’ access.
- Improved market information
- Development of infrastructure and connectivity.

**Conclusion**

17. In FAO terminology, India is nearly a ‘Common Market’ as there are no customs duties and presently no absolute quantitative restrictions in movement of goods from one State to another. However, several steps are required to make it a Single Market. The need is to build over the developments already made like the introduction of Value Added Tax (VAT) by many States, introduction of the Food Safety and Standards Bill and the Warehouse Receipt Bill in Parliament, circulation of a draft Model APMC Act to facilitate amendment of the APMC Act by the States and reduction in the number of commodities covered under the Essential Commodities Act 1955. The need now is to expedite introduction of State VAT in the remaining States, introduce uniformity in taxes on commodities, withdrawal of octroi and other local taxes, replace annual payment of road tax and renewal of fitness certificate by a life-time (atleast ten year) payment/system and introducing a National Permit for plying commercial vehicles anywhere in the country. The tax administrations also have to change so that the border check posts are not used for collection/verification of payment of taxes. The above changes would need building a consensus and constant persuasion in our federal system. The matters relating to revenue sharing/compensation for loss of revenues to the State Governments, etc. may be referred to the Finance Commission for suggesting methods by which Indian Single Market may become a win-win situation for all.
CHAPTER IV – TECHNOLOGY MISSIONS: WAY FORWARD

1. Technology Mission was conceptualized by late Shri Rajiv Gandhi, former Prime Minister of India in 1986 and designed and pursued by Shri Sam Pitroda. Five Technology Missions, including Technology Mission on Oilseeds, were launched. The key element of the Technology Mission approach involved effective transmission of available technology even while encouraging research on newer technologies, an end-to-end approach to meet all the requirements of the farmers in an integrated way, an effective coordination amongst stakeholder departments / organizations and the State Governments.

2. The Missions were, therefore, designed to be technology rich, paying due attention to its transfer for increasing the productivity of the crops grown by the farmers and also focusing on post harvest and processing issues. They were expected to be driven by dynamic and knowledgeable Mission Directors supported by full funding and dedicated staff. The Mission had to deliver identified objectives within a certain time frame and they were to cut across several Ministries with their own coordination hassles. Above all, there had to be an appropriate policy environment to protect the income of farmers.

Technology Mission on Oilseeds & Pulses (TMOP)

3. Since oilseeds were identified with a yield gap and since India had the advantage of a diversity of soils, climate, research and development infrastructure, oilseeds were chosen as a fit case for being targeted through a Technology Mission. Rising demand for edible oil, and insufficient use of technology for optimum oil extraction and rising import bills for edible oil were some other reasons for the need to enhance oilseed productivity through a Mission. Pulses were added as a target crop to the TMO in 1990 and a Technology Mission on Maize was also ordered in 1996 consequent to the early success of the TMO.
4. The Mission was set up with a full-time Mission Director and was operated through four Mini Missions dealing with crop technology and research, farmer support system, price support processing, storage and marketing and post harvest and processing technology. Seventeen different agencies were involved in various activities of the Mission and a bottom up participatory approach was followed along with a scheme of incentive prices for various oilseed crops to encourage the farmers.

5. This cooperative, coordinated approach with a sense of ownership and commitment by all partners was a major reason for the initial success of the TMO. The target was to raise oilseed production from 12.4 million tonnes to 26.0 million tonnes and vegetable oil production from 3.6 to 8.0 million tonnes by 2000 AD.

6. The initial results were heartening in that by 1998-99, the production rose to 24.75 million tonnes and the yield rose from 570 to 944 kgs. per hectare. The solvent extraction technologies, the conversion of hullers to shellers and rice bran extraction technologies also developed well, and led to substantial reduction in edible oil import bill by 1992-93.

7. The decline, however, set in with the decline in political direction from the Centre and in the States for the Mission consequent to the demise of Shri Rajiv Gandhi and departure of Shri Sam Pitroda. Simultaneously, the clamour of urban consumers for cheap edible oil, declining international prices, policies of liberalization leading to placement of edible oil under Open General License and reduction in bound rate for crude and refined soybean down to 45%, led to a severe adverse effect on the efforts of the oilseed farmers towards self-sufficiency. Briefly, therefore, the trade policy worked counter to the stated goals of the Technology Mission leading to the Mission being wound up with the beginning of the Tenth Plan. It was recognized at the highest level that the Technology Mission with its existing structure could not deal with major issues relating to procurement price and trade policies and, therefore, had obviously outlived its utility. The Government, however, reaffirmed its commitment to oilseeds, pulses and maize as important crops for small and marginal farmers in resource-poor conditions by launching a comprehensive and Integrated Scheme for Oilseeds, Pulses, Oilpalm and Maize (ISOPOM) with increased outlays and greater flexibility and involvement of the
private sector. Summing up, the Technology Mission displayed its capabilities in the early years when it was treated as a special-purpose vehicle with close monitoring and suffered its demise only because of reduced political and administrative direction and adverse trade policies. Therefore, a Mini Mission on Trade Strategy would be necessary since external environment is as important for production and income of farmers as dissemination of technology.

**Technology Mission on Cotton (TMC)**

8. Cotton is an extremely important commercial crop, providing livelihood to 60 million people depending on its cultivation, processing and textile trade and also provides raw materials for 1500 mills, 4 million handlooms and 7 million powerlooms. In view of lower yields and poor lint quality of cotton, TMC was launched in February, 2000 in 13 States. It was operated through four Mini Missions focusing on research, enhancement of production and productivity, development of market infrastructure and modernization of ginning/pressing factories. The Tenth Plan outlay is Rs. 568 crores consisting of Rs. 20 crores, Rs. 355 crores, Rs. 108 crores and Rs. 85 crores, respectively, for the four Mini Missions (MM). TMC has succeeded in producing 232 lakh bales during 2005 against the target of 215 lakh bales by 2007. However, merely good yields cannot prove the efficacy of MM-I and II since good prices, higher productivity through Bt. Hybrids and increased involvement of cotton mills in private sector for technology transfer have been equally responsible. MM-II should have resulted in quantum jump of supply of seeds of open pollinated varieties and adoption of INM/IRM/IPM technologies beyond project areas, which has not happened.

9. It is further noted that the four MMs have often operated in seclusion without observable linkages and integrations. Some States have also not contributed their share of the budget. TMC does not have an independent full-time Mission Director and there is no additional staff in support. TMC is, therefore, reduced to a routine departmental programme. Consequently, the periodicity and quality of inspections has suffered. The close monitoring of the early years of TMO is missing and there appears to be excessive reporting, leaving lesser time for field visits. No special procedures have been devised for release of funds to the States, leading to delays in the passage of funds to the field and this has worked adversely for time-bound field operations for cotton. In general, while
MM-I and II leave room for improvements, MM-III and IV have performed fairly well due to multi-stakeholder involvement and creation of a Cell in the Cotton Corporation of India (CCI) exclusively for MM-III and IV under a professional. In particular, MM-IV has benefited through operation of a single window system, demand for cleaner cotton through premiums and preference given by CCI to modernize units for processing its stocks. It is, however, felt that production and productivity of cotton can go up further, if the consumption of cotton in the mills rises. While the Technology Upgradation Fund of the Ministry of Textiles has benefited the mills, a lot can still be done beyond the stage of ginning. The real challenge lies in enhancing the quality awareness amongst farmers and ensuring transparent and scientific marketing as well as modernization at all stages of ginning, pressing, spinning, weaving etc. TMC can help through frequent interactions amongst farmers, NGOs, scientists and mills. It would be useful to set up National Cotton Council with participation from all major stakeholders under the chairmanship of Union Agriculture Minister.

Technology Mission for Integrated Development of Horticulture in North Eastern States, J&K, Himachal Pradesh and Uttaranchal (TMHNER)

10. TMHNER comprising four Mini Missions was set up with an objective to achieve Convergence and Synergy among numerous ongoing governmental programmes, timely and concurrent attention to all links in the production, and maximizing economic, ecological and social benefits and to promote product diversification and skilled employment.

11. A total of Rs. 453.36 crores were allocated for the Mission since inception in 2001 with more than 90% accounted for area expansion and creation of market infrastructure. So far the Mission has achieved limited success in area expansion, setting up of marketing infrastructure and a few processing units.

12. A review of the Mission activities shows a large gap between original concept and actual implementation in the field. Each MM is working independent of the other under the control of their respective administrative agencies. Linkages among the four MMs are weak both at the planning and implementation stages. The Five ICAR Institutes / Centres involved in implementing the R&D programmes of Mini Mission I in the region have
failed to provide assistance in need based research. The States in turn had not consulted the ICAR for the varieties/hybrids recommended for area expansion under MM-II suggesting weak linkage between MM-I and MM-II.

13. Allocations under MM-II for expansion of area under horticulture should have been made with an agro-ecological/comparative advantage approach. Besides the Mission should have disbursed subsidies with greater attention to choice of varieties, quality and sufficiency of planting material, field monitoring etc. Assistance for costly and highly technical units like tissue culture labs should have been provided after careful need assessment. Under MM-III, Infrastructure for Post Harvest Management (PHM) including marketing and processing need greater attention.

14. So far, only 9 units have been set up under MM-IV out of which two are upgradation ventures. Besides raw material shortages, the food processing sector faces a host of problems like poor infrastructure, credit, institutional factors like land tenure and inhospitable terrain etc retarding its development. This may lead to a serious mismatch between MM-II and MM-IV.

15. While the Technology Mission may not be flawed in conception, greater attention is needed for coordination and backward and forward linkages amongst participating departments and various stakeholders in the public and private sector at the Central, State and lower levels to achieve Mission objectives.

16. Several remedial measures have been suggested to bring the Mission activities on track which include: creation of adequate mother plant resources, specialization based on agro climatic zones, training and demonstration for beneficiaries, provisions of coupons for input purchase instead of cash subsidy and greater attention to marketing including border trade.

**Technology Mission on Coconut**

17. Technology Mission on Coconut was established in 2002 as a part of the Coconut Development Board’s ongoing programmes with diversification of coconut derived products, value addition and remedy for severe pests and debilitating diseases as its focus, thereby helping the marginal farmers to optimize their income from coconut. It appears that significant departures have been made from the original concept of a Technology
Mission in the case of Coconut. The Technology Missions in other commodities have envisaged an end-to-end approach, including development and introduction of high yielding varieties and technologies, expansion of area, marketing and processing. Here, however, the entire focus is on disease control and product diversification. These issues may be having merit of their own in the context of coconut but use of Mission vehicle to achieve these objectives is debatable. Technology transfer, motivation and capacity building at farmers’ level through a participatory approach involving farmers’ field school, coconut growers group etc. and linkages to market information would be necessary. Micro-credit with promotion of farm level processing leading to large scale processing through public-private partnership can lead to a more competitive coconut industry and more profitable share holding of farmers’ groups.

**National Horticulture Mission**

18. National Horticulture Mission (2005) addresses the issues of production, post harvest management and marketing. With area under horticulture already growing and responding to demand, focus should have been on infusion of technology to improve yield and quality and on post-harvest management, infrastructure and processing. It is observed that the National Horticulture Mission somehow misses out the term “Technology” in its name. Adequate attention should be paid to address low productivity, tremendous post harvest losses and insignificant presence in the world horticulture markets. A business as usual approach will not help. Instead, highest priority should be given to the prevention of post harvest losses, processing, value addition, quality and marketing. From the very beginning, synergistic and holistic approach should be adopted to integrate production, quality, post-harvest management, processing, value addition, pricing, marketing, sustainability, profitability and equity. All these could be done with the help of small farmers horticultural estates, packing houses, stress on capacity building and adequate provision of seed and services.

19. The Food for Work and Employment Guarantee Scheme should be used for expansion of area under horticulture. In order to achieve nutritional goals and also for price stability, domestic consumption of horticulture products should be increased. There should be a full time Mission Director. A separate Mission on Medicinal and Aromatic
Plants should be set up. National Horticulture Board (NHB) should run on the lines of National Dairy Development Board (NDDB).

**Recommendations**

Considering the original concept of the Technology Missions and the experience gained in formulating and operating the various Missions, the following recommendations are made:

20. Technology Missions should avoid becoming subsidy rich and technology poor. They should be characterized by well defined outcome indicators and monitoring tools. There should be a defined and end-to-end approach covering all subjects in the cultivation-consumption-commerce chain. Mission should be a stand alone autonomous entity with its own full time dynamic Mission Director who should be an achiever and accountable and have a supporting core group of multi-disciplinary posts, which should also be filled up on contract for five years not only from departments but from public/private sector/NGOs. Support staff must not have additional responsibilities in departments. Recognizing the role of Biotechnology, efforts of ICAR should be supplemented with those from other science departments like Department of Biotechnology and CSIR. Research should bear the cost return factor in mind in order to encourage easy adoption with minimal extension efforts and enhance the incomes of resource poor farmers. Research should also be gender sensitive and promote reduction of drudgery for women in Agriculture. Trade policies should not work at cross-purpose with Mission objectives, even though international trade environment and requirements of foreign policies may become pressing in the contemporary context. A Mini Mission on Trade Strategy should be added to every Technology Mission in view of its importance for incomes of farmers. There should be greater focus on marketing efficiency and price signals in attention to infusion of technologies. Excessive reporting should be avoided. Frequent inspection by small multi-disciplinary team of retired officials, scientists, NGOs, farmers etc should be encouraged. Concurrent evaluation for mid course correction would be critical and the agencies should be more broad based and independent. Specialized financial release procedure should be revised to ensure timely release of funds to States and above all release to field agencies. Farmers should be associated with all levels at decision making and monitoring. Watershed or irrigation
command area should be the point of convergence and integration of all relevant Technology Missions. All Missions should be integrated under an umbrella to be called **National Federation of Farm Technology Missions** to be chaired by a practicing farmer. Focus of the Technology Missions should not only be an enhancement in productivity but an increase in income levels of farmers. Village Knowledge Centres should work as front line delivery system for speedier and cost effective dissemination of technology. Centrality of Panchayati Raj Institutions must be built in while formulating the Technology Missions.

21. To sum up, the Technology Mission is an efficient tool for programme design and implementation for achieving well defined production goals on a time bound and cost effective basis. For its success, the following important ingredient identified by late Shri Rajiv Gandhi is fundamental – “We would like to put one person in charge of such a Mission with full funding and with no restriction on him whether bureaucratic or otherwise. The only limits will be certain achievements, which must come within a certain timeframe”. NCF recommends that the existing organizational and managerial structures, in the case of the Technology Missions in Cotton and Horticulture be reviewed in the above context. **Authority, Accountability, and Achievement**, should be the basic management principles underpinning Technology Missions.
Annexure - 1

Field visit of the team of NCF under Prof. M.S. Swaminathan, to Patiala, Sangrur, Mansa and Bhatinda Districts in Punjab during 16-18 October 2005.

A brief summary of observations and suggestions is as under:

1. Professor M S Swaminathan (Chairman), Shri Y C Nanda (Member), Shri Atul Sinha (Member Secretary) and Ms. R V Bhavani (Officer on Special Duty) visited a number of farmers’ fields in cotton, rice and other crops in several districts of the Punjab and held discussions with farmers. We also visited the Sunam Grain Market and the Cotton Mandi at Mansa. In addition, visits were made to seed production plots, fish ponds, a soybean processing plant, Young Farmers’ Association, crop diversification fields (tomato, capsicum, Jatropha etc.), breeding plots of Kohinoor Seed Fields India Pvt Ltd., and Preet Agro-industries Pvt Ltd at Nabha and saw some new agricultural implements. In addition to discussion with farmers and officials at every place, discussions were held with District Commissioners at Bathinda and Sangrur.

2. We had the privilege of being accompanied throughout by Dr. G S Kalkat, Chairman, Punjab State Farmers’ Commission, Er. B S Sidhu, Director of Agriculture, Mr. S S Randhawa, General Manager, Punjab Mandi Board, Dr. Dhawan of PAU, several senior officers of the Government connected with marketing and input supply and scientists of the Punjab Agricultural University. Based on a wide range of discussions held with the principal stakeholders, the following observations and suggestions are made for appropriate follow-up action by the Central and State Governments.

A. Technology

1. There is need for extensive trials by PAU of the best available hybrids of Bt cotton and rice. The most suitable hybrids together with appropriate agronomic practices will have to be recommended for each agro-ecological zone. Bt cotton
hybrids should be introduced alongwith an Integrated Pest Management (IPM) system, so that the resistance does not breakdown within a few years.

2. Cotton varieties with the Bt gene and *arboreum* hybrids need to be developed.

3. There should be research backup for the crop diversification programme. **Diversification will succeed only if there are backward linkages with research and forward linkages with market.** Also, since soybean cultivation is likely to expand, a soybean processing plant should be established.

4. Research on the breeding of potato varieties with red skin for export and trials with pigeon pea (*arhar*) hybrids need to be taken up.

5. In order to take advantage of the potential for fish production, including fresh and brackish water prawns, there is need for research on fish seed and feed production. There is scope for introducing the culture and marketing of air-breathing and ornamental fishes. This will be particularly helpful to landless labour families.

6. In order to improve income and work security for farm families, farming systems research should be promoted (crop-livestock-fish-agro-forestry).

7. There is need for better quality control of seeds and pesticides. Credible certification procedures will have to be introduced.

B. **Conservation and enhancement of the ecological foundations essential for sustainable agriculture**

8. Farmers should be issued with **Soil Health Cards** containing information on the chemistry (macro and micro nutrients), physics and microbiology of the soil. Such Soil Health Cards should be updated annually.

9. Guidelines for the sustainable use of ground water should be developed on a priority basis. In several places, the static component of the aquifer is being exploited. **Water harvesting and recharge of the aquifer should be made mandatory.** Farmers repeatedly emphasized the need for steps to recharge the aquifer. Water quality should also be monitored, particularly for pesticide residues.
10. **The State Land Use Board** should be revitalized and restructured. It should be managed professionally and should have the technical capacity to extend **proactive advice** to farmers based on meteorological and marketing factors. Matching cropping pattern with irrigation water requirements will have to be done by the Land Use Board. **This is an area where collaboration with the US under the Prime Minister’s Indo-US agricultural science collaboration programme will be very useful.** Our farmers urgently need advice on Land Use, based on considerations of both ecology and economics.

11. **Energy Security:** With the rising cost of diesel, farmers need electricity. They need **reliable electric power supply**, more than free power. The Bio-diesel programme involving *Jatropha* cultivation needs considerable scientific underpinning and good quality planting material.

C. **Economics**

12. The cost-risk—return structure of farming is becoming adverse to farmers. Farmers are getting increasingly indebted and frustrated. Under these conditions, the younger generation may not take to farming. Urgent steps are needed to convert despair into hope on the farm front.

13. Input prices are going up (particularly diesel prices), while output prices are not keeping up with the rise in cost of production. **The Minimum Support Price (MSP) should not only be continued, but should be linked with the Wholesale Price Index**, as is done in the case of the salaries and allowances of government employees.

14. Interest Rates for farm loans should be brought down to the level of consumables like automobiles. **In China, the interest rate for loans to farmers is zero.**

15. **A Centre-State Contributory Price Stabilizations Fund** should be established, to insulate farmers from a significant fall in prices, either due to domestic factors or due to global trade factors (WTO regulations)

16. The quantum of NABARD loans should have flexibility in relation to the technologies adopted, such as Bt cotton and hybrid rice. The Policy relating to a uniform scale of finance needs review.
17. A special awareness programme should be started to impart insurance literacy among farmers, with reference to available crop, animal, weather, health and other insurance programmes relevant to farm families.

18. A National Calamities Fund should be established to insulate farmers from severe losses due to natural calamities.

19. Agricultural progress should be measured by the annual rate of growth in farmers’ income, and not just by figures relating to production and productivity. For example, in China, the growth in the income of farmers during 2004-05 was 6%. In India, it will be on the whole negative, as indicated by the increasing debt burden faced by farm families.

D. Market Reform

20. The State has already amended the APMC Act, thereby facilitating the growth of pro-farmer markets. The transition from existing trade channels like Arthias should be brought about with care, so as to ensure that the new systems of farmers-purchaser linkages are both beneficial and sustainable. Opportunities for assured and remunerative marketing hold the key for Punjab’s agricultural future.

21. Development of state of the art market infrastructure should become a part of the Bharat Nirman programme. Since the well-being of over 60% of India’s population depends upon income security from farm enterprises (crop and animal husbandry, fisheries, forestry and agro-forestry and agro-processing)

22. Market modernization should include facilities for electronic weighing, grading and assessment of the quality parameters used for price fixation. Classification of cotton, rice, wheat and other crops for determining prices should be done on transparent and well-defined criteria, so that farmers do not get the feeling of discrimination in the market. Good facilities are now being developed under the Cotton Technology Mission Project. Similar facilities should be set up for fruits, vegetables and flowers under the National Horticulture Mission.

23. In the case of cotton, ICAR may be requested to set up a Regional Centre of the Cotton Technology Research Laboratory, Mumbai, to serve the needs of
Punjab, Haryana and the Ganganagar district of Rajasthan. The State Government may provide land and other facilities for the establishment of such a Centre at Bathinda – The Regional Cotton Technology Centre should have DNA finger printing facilities so that disputes relating to spurious Bt cottonseeds can be settled scientifically. At the moment, farmers have no way of knowing whether they are being cheated in relation to Bt seeds.

24. There is need for establishing a **Market Knowledge Centre**, at each of the major markets and mandis, with facilities for Internet connection and for operating a community radio station. This will help to spread market and trade literacy and also to link with Futures Markets. Such Centres can be established with support from NABARD under the RIDF (the Union Finance Minister has provided Rs.100 crores in the Union Budget for 2005-06 for establishing Village Knowledge Centres)

25. FCI should develop a system of traceability of the material sold, so that farmers are not cheated by the rice millers.

26. The infrastructure at Mandis and Markets should include facilities for farmers like canteen, drinking water, rest house etc.

27. To augment farmers’ income, there is need for multiple sources of income. Dairy and poultry farming can provide additional avenues of nutrition and income, particularly for women. There is need for greater R&D efforts in the areas of green fodder and feed production. Fodder and Feed Banks can be established to assist landless labour families, a large proportion of whom are Dalits, to take to stall-fed animal husbandry and backyard poultry farming. Market tie-up will be essential to ensure fair return and avoid risks. Micro-finance should be supported with appropriate backup services, so that it becomes **Livelihood Finance**.

28. There is need for a **well-defined Code of Conduct for Contract Farming**, so that producers and purchasers experience a win-win situation.

29. **Farmer to Farmer Learning** – NCF has recommended the establishment of **Farm Schools** in the fields of farmer-achievers. This will be appropriate particularly in the areas of horticulture and new technologies like Biotechnology.
and Information Technology. The State Farmers’ Commission can identify the fields of farmers where Farm Schools can be located.

30. Punjab agriculture is at the crossroads – economically and ecologically. There is need for once again introducing a symphony approach involving mutually reinforcing package of technology services and public policies in input and output pricing and investment in infrastructure. Punjab was the leader in the Green Revolution achievement. **It should now become the flagship of the Evergreen Revolution movement.**
Annexure - 2

Field visit of the team of NCF under Prof. M.S. Swaminathan to the Vidarbha Region of Maharashtra during 19-21 October 2005.

A brief summary of Observations and suggestions is as under:

1. Prof. M S Swaminathan, Chairman, NCF, Shri. Y C Nanda, Member, Shri. Atul Sinha, Member-Secretary and Ms. R V Bhavani, (OSD), visited farmers’ fields as well as the homes of four farmers who had committed suicide, on 19th – 20th October and held discussions with farmers, officials, entrepreneurs, scientists and media personnel. We also visited two APMCs and discussed marketing problems in cotton and soybean. We had the benefit of listening to the widows and children of farmers who took the extreme step of taking their lives.

2. We were accompanied throughout by Hon. Rana Jagjit Singh Padam Sinh Patil, Minister of State for Agriculture and Employment, Dr. S K Goel, Commissioner (Agriculture), Shri. Vijay Jawandhiya, Farm Leader and Shri. P Sainath, a leading media analyst of farmers’ distress.

3. We had the great privilege of visiting the Maharogi Sewa Samiti, Anandwan, Warora, and calling on Pujya Baba Amte. We were shown the remarkable transformation which has taken place in the lives of leprosy victims. The message of hope represented by Anandwan is the need of the hour. Dr. Vikas Amte showed us around Anandwan, where the concept “wealth from waste” has become a reality.

4. We are deeply indebted to the Hon. Chief Minister of Mahashtra Shri Vilasrao Deshmukh, Hon. Rana Jagjit Singh Padam Sinh Patil, Minister of State for Agriculture and Employment, Dr. S K Goel and the many government officers, and farm families of Vidarbha, for their extraordinary kindness and efforts to make every minute of our visit an educational experience of immense value to our work.

5. We were deeply moved by the courage shown by the widows and children of the following four families we were privileged to visit, to express our condolence and solidarity with them in their hour of sorrow.

- Late Shri. Prabhakar Shamrao Khatale, Asthi Village, Wardha District
Late Shri. Ratilal Bapurao Rathod, Bandar Village, Yavatmal District
Late Shri Maruti Mahadev Rasse, Pisgaon Village, Yavatmal District
Late Shri Vilas Ramlu Ranganeniwar, Chalbardi Village, Wardha District

5.1 It was clear from these visits that there is an urgent need for action on both eliminating the circumstances under which farmers are forced to take such an extreme step of ending their lives, and initiating steps to provide livelihood security to the widows and educational opportunities for the young children.

5.2 Based on our visits and discussions, we would like to offer a few suggestions, for the consideration of the State and Central Governments. It will be an understatement if we say that there is a serious crisis developing in the health of our agriculture, which is the backbone of our food, livelihood and environmental security systems. For every problem, there is also an affordable and implementable solution. We should identify both short-term and long-term remedies both in public policy and technology development and dissemination. Water, credit, farmer-friendly services and technologies, and opportunities for assured and remunerative marketing are the basic needs of farm families.

6. **Agrarian Crisis – Maladies and Remedies**

6.1 The maladies affecting the farmers of Vidarbha and the potential remedies have been articulated clearly by both the State Government and the media. Print and electronic media have played a particularly valuable role in highlighting the quantitative and qualitative dimensions of the agrarian crisis. The most important among them relate to meteorological and marketing factors and the private and public credit and input supply systems. Some of these are following:

- Damage caused by unseasonal rain, to soybean, cotton and Jowar.
- High cost of inputs and unremunerative output prices; diesel and transport costs are rising continuously. The economics of farming as measured by its cost-risk-return structure is adverse to farmers.
- Farmers are facing high income insecurity. MSP for cotton is low and the payment is in installments and also highly irregular.
- Irrigation facilities are very limited. Water table is going down due to the unsustainable exploitation of the aquifer.
• Spurious inputs including seeds of Bt cotton are adding to the distress of farmers. There is no proper certification agency and often moneylenders are also merchants both for the sale of inputs and the purchase of the output. There is exploitation at every step in the Cultivation-Commerce chain.

• The famous Nagpur oranges are affected by Phytophthora and other diseases. There is no effective extension advice.

• Credit is the major problem. Interest rates are high. Those who are unable to repay loans to commercial banks due to crop failure are left with no option except to go to money lenders, who may charge 120% interest.

• There is no farmer-friendly insurance scheme. The insurance premium for agriculture is 16%, while it is 1% for non-agricultural enterprises.

• Wild animals are causing much damage in some areas.

• The economics of Bt cotton is adverse. Aphids, jassids and sucking insects cause much harm to the Bt cotton crop. Bt cotton cultivation can be taken up mainly by well to do farmers with irrigation facilities. Also several companies are selling Bt seeds and there is no clear advice to farmers on what to grow.

• Prompt payment in markets is rare. Payment in installments forces farmers to go to moneylenders for their immediate financial needs.

• Factor productivity is going down, since soil health maintenance is poor, particularly with reference to micronutrients.

• Modernization of market yard with reliable facilities for electronic weighing, grading, pricing etc. is an urgent need. Also, such market yards should provide facilities to farmers for lodging and boarding, since they come from long distances and generally have to stay for a couple of days.

• Availability of electricity is erratic. Diesel prices are constantly going up.

• Yield has gone up but income has come down due to adverse input-output price ratio.

• Animal husbandry is expensive due to high cost of fodder and feed. Fodder and Feed Banks have not been set up.

• Organic agriculture is spreading particularly among cotton farmers. Research support in the areas of soil health enhancement and plant protection is weak.
Also, there is no proper National Certification Agency and arrangements for getting premium prices in the home market.

- Cotton Corporation of India emulates the examples of traders, rather than serving as a friend of farmers. It needs to be made a farmer-centric organization.
- Farmers are not organized. Hence, they lack a collective voice in the shaping of Government policies in areas like pricing and marketing.
- The present crisis should serve as a walk-up-call. Delay in helping farm families to achieve income and work security will spell disaster to peace and national well being.
- Farmers need urgent help for saving them from usurious credit and unfair trade. The trading and Diwali seasons are around the corner. There is no time to relax on the action front.

7. Remedies

The following measures are urgently needed:

- Set up a Center-State Contributory Price Stabilization Fund.
- The Minimum Support Price (MSP) should not only be continued, but should be linked with the Wholesale Price Index, as is done in the case of salaries and allowances of government employees.
- Restructure and retool and State Land Use Board for giving proactive advice to farmers on land and water planning based on meteorological and marketing forecasts.
- Develop and introduce a farmer-friendly Insurance Policy, taking into consideration the suggestions of the Maharashtra Government.
- Introduce a pro-farmer Code of Conduct for Contract Farming.
- Without a huge infusion of credit, there is no hope. It should be remembered that much of what is called an increase in credit doesn’t even restore it to status quo ante, i.e. to what it was before the crisis began. Interest rates for farm loans should be brought down to the level of consumables like automobiles. In China, the interest rate for loans to farmers is zero.
• The number of rural branches of banks has declined in both absolute numbers and percentage terms since 1991. Rural credit has to be the top priority along with renewed and increased investment in agriculture.

• The Cotton Federation should revert to paying cash and should pay the amount, at one time not in installments. It should leave the issue of the bank dues to the banks and pay the advance bonus in this crisis year. Farmers must have the assurance that the Federation will buy their output at a fair and decent price.

• The Government needs to – (i) revise the import duty on cotton upwards, and (ii) check the dumping, so as to prevent distress sales.

• The Government is taking up the issue of price distorting subsidies by nations like the USA and EU that are harmful to Indian cotton. The MSP should thus reflect what the international price would be if these price-distorting subsidies were not there, like what is done in the case of sugar.

• A far better monitoring mechanism for Bt cotton needs to be set up than that which presently exists, using the technologies developed at CICR. A proper regulatory framework is a must to ensure that farmers do not suffer on this count. The legal framework has to be developed that makes quality control more rigorous.

• Vidarbha needs a huge investment and effort on the irrigation front. It is also important that the projects be of a manageable size and sustainable in nature. Water harvesting should be made mandatory.

• The State must articulate that it will never allow a system of water control that is harmful to farmers. A study needs to be made of the rainfall patterns to see if any long-term shifts are occurring. Since the headquarters of the Meteorology Department for the whole region is located in Nagpur, they could undertake this at once.

• Some control has to be exercised over racketeering and trading in distress. The Government must intervene far more strongly in this sector.

• Development of state of the art market infrastructure should become a part of the Bharat Nirman programme.

• The State has to help create a viable insurance programme for the farmers.
• Some ethical code is a must in the rendering of advice to farm communities. It also needs to be studied how existing technologies can be upgraded, apart from ensuring that new ones of an appropriate nature are introduced. No hybrid of a private company must be allowed in the market without a trial period of 3-5 years on the plots of Agricultural Universities. Only on strict verification of performance can these be allowed into the market.

8. **Immediate Action**

• Health indebtedness is increasing. The Government of India’s Rural Health Mission should operate immediately in the Farmers’ Suicide Hotspots.

• Agricultural progress should be measured by the rate of growth in farmers’ income.

• The Ministry of Agriculture, Government of India should be redesignated as **Ministry of Agriculture and Farmers’ Welfare**.

• An Employment/Livelihood Impact Analysis should be made with reference to both capital-intensive technologies and agriculture imports.

• The following livelihood security package should be introduced for the wives and children of farmers who have taken their lives:
  i) A source of steady income to widows, through viable on-farm / non-farm enterprises.
  ii) An education programme upto 12\textsuperscript{th} standard for young children, which covers expenses relating to clothing, nutrition and education.

• The **Every Village a Knowledge Centre Programme** should be introduced in distress hotspots.

• A study should be made on “**What can we learn from Anandwan?**” in terms of integrating humanism in the treatment of HIV/AIDS, Tuberculosis etc.

• The criteria now used for deterring eligibility for government support to the widows of farmers who have committed suicide are the following:
  a) Should have been a farmer
  b) Should have taken loan from a financial institution
  c) Received Notice of compulsory recovery
  d) Instance of Crop failure

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8.1 This set of criteria need review, particularly from the point of view of the support being restricted to loans from financial institutions only. Non-institutional credit for moneylenders is the major problem and it will not be proper to ignore this reality.
Annexure - 3

Salient Points with Policy Implications Emerging from the Consultation with Farmers on Draft National Biotechnology Policy, organised by the National Commission on Farmers on 22.09.2005.

**Biotechnologies can offer new hope for increased productivity, sustainability and profitability, if the research priorities are right.** Tissue culture in banana and Bt cotton hybrid are the most widely adopted agricultural biotechnologies in India. Area under Bt cotton is expanding, having doubled from the last year acreage to over one million ha (under legally released Bt cotton hybrids) during 2005. Some participating farmers, cultivating Bt cotton for the last three years, reported additional net profit of at least about Rs.12,000 per ha, and about 40 to 50 per cent savings in the pesticide use and in the numbers of sprayings, while others reported failure due to drought and multiple pest epidemics. Moreover, the Bt hybrids were early maturing, thus enabling double cropping in otherwise single-cropped areas.

2. Awareness about biotechnology, especially transgenics/GMOs, varied from as low as 2% to as high as 80% in different cotton growing areas. However, genetic literacy was generally low as most of the Bt cotton farmers grew no **refugia** and did not provide recommended isolation distances needed for preventing cross-pollination between Bt and non-Bt strains so as to reduce the chances for the breakdown of resistance to bollworm in Bt cotton varieties. A general misgiving prevails, maybe partly due to aggressive advertisement by seed companies, that the Bt cottons need no pesticide application, forgetting that the Bt provides protection (often not 100 percent) only against bollworms. For controlling other pests, which at times assume serious proportions, such as aphids and white fly, pesticides will need to be applied as per recommendations. In fact, **IPM in Bt cotton fields is essential for durability of the resistance of the varieties.**

3. Although none of the Bt cotton farmers reported of any health, food or environmentally negative effects associated with Bt cotton, some of the farmers’ leaders questioned the efficacy of Bt technology and expressed deep concern about possible risks, whereas several of them emphasised the need a cautious approach while exploiting...
the technology and asked for a science-based pre- and post-release testing and monitoring system. Given the biodiversity richness of the country, the Consultation particularly emphasised that biotechnology should in no case be allowed to reduce naturally occurring biodiversity, instead it should be used to enrich and conserve indigenous biodiversity.

4. Inadequate testing under the major cotton growing agro-climatic conditions is a serious problem. Atleast three years testing should be done by ICAR to gather information on genotype x environment interaction as well as on isolation distances under a special All India Coordinated GM Crop Testing Project as recommended by the Swaminathan Committee. Special National Demonstrations and Lab-to-Land programme should be organised for such varieties.

5. Awareness on biotechnology and genetic literacy should be enhanced. While the private sector is active in popularising its products, the public sector is not doing enough to disseminate integrated information on various aspects of biotechnology. This gap should be bridged and the public sector should give high priority to increase the awareness of all stakeholders - farmers, private sector, extension agents, consumers, civil society and NGOs so that only science-based true information reaches all concerned, confusions are avoided and informed and well-considered decisions are taken at various levels. All biotech products, especially those derived from GMOs, should be labelled. The precautionary principle should guide our policy. Village Knowledge Centres, along with other information and communication channels, can play an important role in this regard.

6. “Illegal” Bt cotton is occupying almost as much area as occupied by “legal” Bt cotton varieties. With no quality assurance, no after-sale support and no answerability, this malady is bound to hurt all parties. Farmers must be educated of the consequences and must shun the temptation of quick profit and should buy only certified seed. Clear guidelines for risk assessment and transparent and unbiased testing procedures and approval of GMOs are sine qua non for rational development and utilization of the technology. Unofficial release of transgenics must be prevented.
7. The public sector, especially the ICAR and SAUs, have so far not been able to give any hardcore (based on r-DNA) crop biotech product in the hands of farmers. The system should respond to this serious gap and streamline and prioritise its biotechnology research and product development to serve the farmers as well as consumers. Due to a sort of monopoly, the hybrid Bt cotton varieties seed are priced highly, and are generally economically out of reach of resource poor farmers. **The public sector must come up with competitive Bt cotton hybrids so as to lower the seed cost and benefit resource poor farmers.** Further, **non-hybrid Bt cotton varieties should be developed** not only to further reduce seed prices, but also to enable the farmer to retain his own seed and to share it with other farmers. The Farmers’ Rights provisions of the Protection of Plant Varieties and Farmers’ Rights Act (2001) should be enforced without further delay.

8. The farmers identified the following areas for priority application of biotechnology: (i) tolerance to drought and other abiotic stresses, (ii) tolerance to saline conditions, (iii) nutritional enrichment, (iv) diagnostic kits, (v) resistance to diseases and pests, (vi) development of efficient bioagents - biofertilizers and biopesticides, (vii) in vitro culture for micropropogation and (viii) germplasm conservation and enhancement.

9. The extension system and Central-State linkages have generally been indifferent to biotechnology-led agricultural development. Extension personnel, particularly in those areas where commercialisation of biotech products, especially transgenics, is being promoted, should be adequately trained. **In Krishi Vigyan Kendras, a section on training in biotechnology should be introduced** to ensure safe and effective transfer of the technologies/products.

10. In congruence with CBD, Gene Treaty, National Plant Variety Act, Farmers’ Rights, the proposed Seed Bill and the Food Safety Bill, the Biotechnology Policy must seek harmonization of the concerned standards and guidelines, especially of sanitary and phytosanitary measures and codex alimentarius provisions. **Farmer friendly IPR provisions and trade and legal literacy should be promoted.** Syngenta’s efforts to patent the rice genome and other such moves should be resisted.

11. Since GM seeds are costly and the risk taking capacity of the majority small farmers is low, **insurance should be introduced alongwith GM seed sale, as recommended by the Swaminathan Committee.** Further, in order to curb production
and distribution of spurious seed, if the crop fails due to poor quality and genetic infidelity of the seed, the company must compensate the losses incurred by the farmer.

12. The Consultation strongly endorsed the establishment of an autonomous National Biotechnology Regulatory Authority as recommended by the M.S. Swaminathan Committee on Agricultural Biotechnology. The Authority, steered by an Advisory Committee comprising scientists, representatives of public and private sectors, industry, CSOs, NGOs and farmers, should combine both advisory and regulatory responsibilities and coordinate and harmonise the various development aspects, including IPR, SPS and bioethical and biosafety norms.

13. Farmers in industrialized countries are supported by capital, technology and subsidy. In contrast, Indian farmers, a majority of whom cultivate 1 or 2 hectares or less are handicapped by a very unfavourable cost-risk-return structure in farming. Interest rates are high, drought is frequent and markets are not pro-small farmers. Hence, farmers can take to new technologies like biotechnology only if they are supported by appropriate packages of services and public policies. In a globalised world, we have to enhance our agricultural competitiveness through productivity and quality revolutions. Biotechnology can help, but only if it is pro-poor, pro-women and pro-environment.
Annexure- 4

November 25, 2005

Dear,

Sub: Mission 2007 : Every Village a Knowledge Centre

You are aware that in his budget speech delivered on 28th February, 2005 the Finance Minister announced the decision of the Government of India to accept a recommendation made by the National Commission on Farmers last year that we should achieve knowledge connectivity throughout rural India by August 15, 2007, which marks the 60th anniversary of India’s ‘tryst with destiny’. During this year, several important steps have been taken to take the benefits of the Information and Knowledge age to rural families. Some of these are:

- Establishment of 100,000 ICT based Community Service Centres (CSC) by August 15, 2007, by the Department of Information Technology, Government of India. Leveraging SWAN (State Wide Area Network) infrastructure, CSCs will provide reliable broadband connectivity to remote villages.

- Decision of the Ministry of Panchayati Raj to establish internet connected ICT centres in all the 240,000 Panchayats/local bodies in the country by 15th August 2007. This will help to provide a public space for VKCs, characterized by access to all sections of the rural society.

- The Rural Information Society Initiative (RISI) of Bharat Sanchar Nigam Ltd (BSNL) which will aim to set up 100,000 VKCs each covering a population of 2000 or more.

- Support by NABARD through the Rural Infrastructure Development Fund to State Governments to organize ICT – Self Help Groups to establish and manage VKCs

- Promotion of e-governance as a key component of the National Common Minimum Programme and the proposal to include Knowledge Connectivity as an essential component of the Bharat Nirman Programme.

- Setting up of Public Tele Information Centres (PTICs) through the Universal Service Obligation Fund.
• Setting up Village Resource Centres (VRCs) at the Block level by the Indian Space Research Organisation (ISRO) in collaboration with appropriate public and civil society institutions to provide a wide range of services including teleconferencing facilities.

• Inclusion of e-health facilities under the National Rural Health Mission by the Ministry of Health and Family Welfare.

2. There are many other initiatives by both Central (eg. DST, CAPART, etc.) and State Governments. In addition both private industry and academic and civil society organizations are actively involved in bridging the urban-rural digital divide and in assisting rural families to have access to the information they need in relation to health, livelihood, food, water and income security. An International Support Group has also been formed to harness global support for Mission 2007.

3. I enclose two publications which will provide an idea of the current status of Mission 2007; Every Village a Knowledge Centre. It is obvious that if we can achieve convergence and synergy among the numerous on-going as well as emerging programmes, the goal of achieving a Rural Knowledge Revolution by 15th August 2007, can become a reality. While the green revolution helped us to improve the productivity and production of rice, wheat and other crops, the knowledge revolution will help to enhance human productivity and entrepreneurship in every sphere of human activity.

4. An urgent need is training and capacity building in ICT. The Jamsetji Tata National Virtual Academy for Rural Prosperity will be happy to assist in the area of capacity building. The training has to be in the local language. To promote the spread of local language computing in the country, software tools were recently released in Tamil and Hindi in Chennai and Delhi.

5. I am glad to inform you that at the World Summit on Information Society (WSIS) held at Tunis recently, Mission 2007 was highlighted as an outstanding example of the power of partnership in achieving the goal of “Connect the World by 2015”. The whole world is looking up to us in spreading the digital revolution on the principles of social inclusion, gender equity, reaching the unreached and voicing the voiceless. The provisions of the Right to Information Act (2005) can be implemented effectively if the ‘Every Village a Knowledge Centre’ movement gains momentum.
6. The Tunis World Summit on Information Society demonstrated the enormous progress made in technology development since the WSIS held at Geneva in 2003. The world is thus witnessing two opposite trends. The explosive progress in science and technology is providing uncommon opportunities for health, food, water, work, energy and literacy for all. On the other hand, a considerable proportion of humankind living under conditions of poverty, hunger and deprivation feels a sense of social exclusion and injustice. Consequently, there is a growing violence in the human heart. While WSIS was in progress in the midst of a feeling of a brave new world of technological breakthroughs, the main news in the media every day was the loss of innocent lives caused by bomb explosions in different parts of the world. The extensive co-existence of unsustainable life styles and unacceptable poverty is not conducive to either harmony with nature or with each other. This is why the success of “Mission 2007: Every Village a Knowledge Centre” is so important for human security and well-being in our country. We should ensure that Government initiatives like CSCs of DIT, RISI of BSNL, etc. are pro-poor, pro-women and pro-livelihood in both their design and implementation.

7. I shall be grateful if you would kindly set up a small group of concerned Ministers and officials under your Chairmanship to monitor progress in achieving the goal of taking the benefits of the digital revolution to every village in your State by 15th August, 2007.

With warm regards,

Yours sincerely,

-Sd-

(M.S. Swaminathan)

Addressed to All Chief Ministers
29th October, 2005

The Eighteenth Meeting of the National Advisory Council (NAC) was chaired by Smt. Sonia Gandhi in New Delhi today and was attended by ten Members of the Council.

2. The National Commission of Farmers made a Presentation on the First and Second Reports of the Commission, in the backdrop of the problems arising in the Farm Sector leading to sub-optimal growth rate in Agriculture and distress amongst farmers. The NAC expressed deep appreciation of the work done by the Commission to formulate a comprehensive blueprint for the development of Indian Agriculture. Amongst other subjects, the following were discussed:-

i) There needs to be a paradigm shift from micro finance to livelihood finance and technology empowerment as well as market reforms in order to promote the concept of livelihood security in areas characterized by farmers’ distress,

ii) An integrated “Parivar Bima Policy” may be introduced for the rural poor for providing hospitalization expenses, life cover for death/disability and cover for the dwelling units. This could be linked to Self-Help Groups (SHGs) and largely funded by Members’ contributions,

iii) A Gram Panchayat Mahila Fund could be set up with earmarked outlays for group activities and common amenities for women for on-farm and other gender specific needs. Legal land titles and allotment of surplus lands, including State Farm lands, to women SHGs should be ensured for the empowerment of farm women,

iv) Mission 2007 involving the establishment of Village knowledge Centres may be considered for early implementation to promote Knowledge Empowerment and Capacity Building in the areas of agriculture and animal husbandry, fisheries, forestry, agro-processing, marketing and genetic literacy. Steps may be initiated to establish cotton
estates, horticulture estates, organic agriculture estates and aquaculture estates for small holders,

v) The Essential Commodities Act and other legal instruments relating to marketing, storage and processing of agricultural produce need to be reviewed in order to meet the requirements of modern agriculture. The Land Use Boards at the Centre and in the States may be restructured and supported by Teams of Experts to reach pro-active advice to the farmers based on meteorological, marketing and managerial information and to help in providing early warning on possible surpluses (and shortages) on farm commodities,

vi) A Technology Mission on sugarcane may be organized jointly with the Sugarcane Growers’ Organizations, Cooperatives and the Sugar Factories with focus on research, technology transfer and optimization of productivity and quality of sugarcane,

vii) Institutional strengthening through the setting up of such bodies as a Livestock Feed Corporation and a National Fisheries Development Board may be expeditiously examined,

viii) Farm schools may be established to promote farmer-to-farmer learning and Farmers’ Markets revamped to meet the needs, particularly, of small producers.
Annexure – 6

Gist of the communication regarding Revitalization of Indian Agriculture sent by the National Advisory Council (NAC) to the Government.

Recently, the National Commission on Farmers (NCF) have made a Presentation on the comprehensive blueprint that they have drawn up to revitalize Indian Agriculture. The Government would agree that such a blueprint needs to be implemented on priority and with a great sense of purpose and determination. Four decades ago, the political, scientific and administrative leadership had combined and interacted in a remarkably effective manner to take the country forward towards self-reliance in foodgrains. It is that spirit which needs to be recaptured to provide a New Deal to our farmers and their families. This is, in fact, the cornerstone of the National Common Minimum Programme which, among other priorities, stresses vastly increased public investment in agriculture and vastly expanded supply of agricultural credit to small and marginal farmers.

2. NAC is aware that a separate Meeting of the Planning Commission has been held to review the policies and programmes in the agriculture sector. Reforms to strengthen credit cooperatives are also on the anvil and the budgetary allocations for the Indian Council of Agricultural Research (ICAR) have gone up substantially. At the same time, Bharat Nirman would impart new momentum to the expansion of Irrigation.

3. It is felt that the Government have now to give serious thought as to how best the various Recommendations of the NCF can be implemented and operationalized by the Central and State Governments. The NAC is of the view that while implementation would have to be the direct responsibility of the Government Agencies and other Institutions, there would still be need for an Independent Expert Body with credibility and expertise (like the NCF) to monitor and evaluate this process closely.

4. An Empowered Group of Ministers could, perhaps, be of help in reaching conclusions expeditiously. The real challenge is to launch the implementation phase in a coordinated and systematic manner and to underline high-level public visibility for and accountability of our agricultural revival programmes. It will be necessary to break away from the bureaucratic mould in order to achieve this vital objective.
Annexure-7

Subject: Constitution of the Agriculture Coordination Committee.

Government had earlier decided, vide O.M. of even number dated 19.10.2005, to constitute an Agriculture Coordination Committee. In partial modification of the O.M. under reference, it has been decided that the revised composition of the Agriculture Coordination Committee would be as follows:-

i) Prime Minister : Chairman

ii) Minister for Agriculture & Food &
Civil Supplies & Consumer Affairs

iii) Minister for Fertilizers & Chemicals

iv) Minister of Finance

v) Minister of Commerce & Industry

vi) Minister of Water Resources

vii) Minister of Rural Development

viii) Minister of Panchayati Raj

ix) Minister of State for Food Processing

x) Minister of State for Science & Technology

xi) Deputy Chairman, Planning Commission

xii) Chairman, Economic Advisory Council

xiii) Chairman, National Commission on Farmers

xiv) Member (Agriculture), Planning Commission

xv) Principal Secretary to PM : Convenor

2) Secretaries of the Ministries/Departments concerned would be permanent invitees.

3) The Chairman could invite any Minister/Officer depending upon the context.

4) The Committee may commission specialized studies depending upon the requirements, which arise from time to time and could engage in the following tasks:
a) Identify key areas that require fresh policy initiatives, particularly those of an inter-sectoral nature.
b) Outline the follow-up action that needs to be taken to implement identified policy initiatives.
c) Identify institutional mechanisms to implement policies and programmes
d) Monitor key policy initiatives
e) To oversee and coordinate the integrated implementation of those recommendations of the National Commission on Farmers that are accepted by the Government

Sd/-
(T.K.A. Nair)
Principal Secretary to PM
Annexure- 8(a)

Consultation on “Empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water”.

1. The terms of National Commission on Farmers inter-alia provide “Suggest methods of Empowering male and female members of elected local bodies to discharge effectively their role in conserving and empowering the ecological foundation for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water”.

2. Section 243G of the Constitution 73rd Amendment Act, 1992 empowers state legislature to endow the panchayats with such powers and authority as may be necessary to enable them to function as institutions of self-government and such law may contain provisions for the devolution of powers and responsibilities upon Panchayats at the appropriate level, subject to such conditions as may be specified therein with respect to-
   (a) The preparation of plans for economic development and social justice.
   (b) The implementation of schemes for economic development and social justice as may be entrusted to them including those in relation to the matter listed in the Eleventh Schedule.

3. It is however; well known that in spite of efforts at various levels, Panchayati Raj has still not been achieved commensurate with the letter and spirit of the constitution 73rd Amendment Act, 1992. A task force on devolution of power and function upon Panchayati Raj Institutions was set up and its Report(2001) had made several Recommendations. A comparison of snapshot captured in 2001 and now shows that the situation does not appear to have substantially changed. The Consultation was convened to discuss the various issues related to the empowering of the elected Members of the Local Bodies. It was attended by renowned subject experts, civil servants, civil society representatives and NGOs.
4. Important issues expected to be covered in the Consultation included:-
   (a) Issues regarding devolution of exercisable powers along with administrative and financial support to the members of Panchayati Raj Institutions particularly its female members for the conservation and improvement of ecological and financial sustainable agriculture including priority attention to irrigation waters.
   (b) Adequate monitoring mechanism with “teeth” for the implementation of the 73rd Constitutional Amendment Act, 1992 and the recommendations of the Seven Round Tables of Ministers In-Charge Panchayati Raj between July-December, 2004.
   (c) Activity mapping for these Recommendations.
   (d) Equipping the Members of elected local bodies through training and re-training to discharge their responsibilities. This is particularly important in view of the reservation available for women in the Panchayati Raj system. The specific solutions to the problems of training of elected women members may be discussed.
   (e) Considering the ground realities of politics in the rural areas and the trend towards populism at the cost of ecological well being, the reconciliation of democracy with sustainable development may also be discussed.
   (f) Lessons learnt from Success stories including those in the Ministry’s website at www.panchayati.nic.in as well as the large areas of darkness, even throwing up the informal institution of “Sarpanch Pati”.
   (g) Roadmap for further work of NCF on the subject mentioned in its terms of reference.

Observations & Suggestions

5. The salient observations and recommendations that emerged on diverse issues related to empowering male and female members of elected local bodies are summarized below:
   (i) Meeting should be convened with the state ministers to address the issue of devolution of exercisable powers. Most of the states do not have a separate ministry of Panchayati Raj. It is generally MoRD, which also handles Panchayati Raj. At present the principal sources of Panchayat funds are from GOI. Under the 12th Finance
Commission, Rs.20, 000/- crores will be made available to Panchayats through the state consolidated fund. States have to release this fund within 15 days of sanction; otherwise they will have to pay interest on it. For efficient functioning disbursed amount to the States will be displayed on the website on the Ministry of Panchayati Raj.

(ii) Holding of elections is mandatory for the transfer of the funds to Panchayats. Panchayats will also monitor the transfer and proper utilization of the disbursed fund. Although a Panchayat empowerment incentivisation fund is being framed, to get things done, persuasion is more important than financial incentives.

(iii) Functioning of parallel agencies must be stopped and there must be one central agency to look after all the schemes run by these parallel agencies in order to check duplication of schemes and wastage of resources. The various schemes should be routed through a single agency and decision makers should be Panchayats.

(iv) There is also a need to check the bypassing of the Panchayats in flow of funds. A case in point is recent success the MoPR had in bringing about changes in Secton 13, 15, and 16 of the recently passed NREG Act, 2005. Under Section 13, the principle implementation agency will now be the Panchayat, at the district, intermediate and village level. Under Section 15, in every Panchayat there will be a programme Officer of the rank of BDO to assist the Panchayat. Under Section 16, the Programme Officer will allocate at least 50% of the work to the Gram Panchayat.

(v) The weakest link at present is the Gram Sabha. The Gram Sabha has to formulate and approve the Panchayat plan. The MoPR is now insisting that every Gram Sabha have a Mahila Sabha which must also meet regularly and contribute to discussion. The Gram Sabha should develop as an instrument for social audit.

(vi) Official reluctance to work with the Panchayat leaders is undesirable. The Panchayat system needs to be protected from the corruption especially from the lower level.

(vii) The Committee headed by Mr. P. Ramachandran had recommended that in the 11th FYP, there should be state plan, district plan and panchayat plan. District Plan Committees (DPCs) are crucial for the success of Panchayati Raj. And at least 4/5 of the members of the District Planning Committee should be Panchayat members. At present DPCs exist only in a few states.
(viii) Panchayats must be answerable and accountable for activity mapping. Ideally, consolidated plan must be prepared at the level of Gram Panchayat and fed into the district plan.

(ix) There is a need to develop a village level database as the data below the district is not available in almost all the states. The Village Knowledge Centre (VKC) could be the focal point for maintaining this database. GIS maps are needed for micro level planning.

(x) There is a need to develop the plans based on the local problems by the Panchayats themselves rather than DPC. The plan made by Panchayat should be approved by the Gram Sabha.

(xi) There is a need to develop micro plan for preserving ecology, biodiversity and sustainability of agriculture. Micro plan development by the Gram Sabha can bring to the forefront the link between democracy and development.

(xii) For every plan there should be a link with technological backup and we can have services of retired persons as well as scientists of the SAUs/ICAR to assist in making a complete action plan for the villages to address their problems keeping in mind the available resources.

(xiii) Awareness, training and capacity building are crucial for the successful Panchayati Raj. There is a need to systemize training and capacity building of Panchayat members and awareness of rights and duties of members of Gram Sabha should go together.

(xiv) Access to information is also very important. Village Knowledge Centers (VKCs) can become an important link in the training and capacity building exercise. Every Panchayats should have a VKC. Access to information and awareness should be linked with mission 2007 “Every Village a Knowledge Center”.

(xv) There is a need to adopt of flexible technology for training of women by SIRD & NIRD. The modules should be gender sensitive which help to women open up. A gender sensitization module has been developed by MSSRF but the same has not been adapted by Agricultural Universities.

(xvi) Advisory research in training and research for training will be helpful for preparation of modules on gender specific issues. There is a need to intensify the efforts
for the states like UP, Bihar, Rajasthan and Orissa where the solution of the problem of the training to women is crucial and there is a need to establish to and fro feedback to the arrangements on the training.

(xvii) Women need information on how to discharge their roles as most of the women are involved in multifarious activities.

(xviii) Training is important not only for the representatives of their panchayats but also for the govt. officials at the block and district level working with them. A change in mindset is needed among officials.

(xix) Leadership training is crucial. Experience has shown that good leaders can do a lot to bring about positive changes.

(xx) Training is not one time exercise, follow up is needed. The training module and format has to be suited to local needs. Training has to be at the Gram Sabha level.

(xxi) Institutions like ICRISAT should work at the grassroots level with KVKs which provide technical support under the programmes like the NREG. Rs. 100 cr should be recommended for KVKs to play proactive role in capacity building and training.

(xxii) There is a need to discuss developmental issues rather than just political issues on the public platform. There is a need to pass orders that no body can supercede the elected male and female members of the local. Self-Help Groups (SHGs) becoming parallel structures was discussed and it was felt that SHG promotion if felt necessary, may be through Panchayats.

(xxiii). There is a need to highlight the success stories and exchange information about them.
Consultation on “Hindu Succession (Amendment) Act, 2005 and its Impact on Rights to Land Ownership for Women in the Context of Increasing Feminization of Agriculture” held on 21st September, 2005

1. It is heartening to note that the Parliament has passed the Hindu Succession Amendment Bill, 2005 and the Act has come into effect from the 6th September 2005. This in turn is of great relevance in the context of NCF terms of reference which inter-alia cover “Recommendation to be made for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership”.

2. In the First Report accelerated programme activity were recommended to be taken up for (i) Existing policy pronouncements and directives of direct transfer of land to women (ii) Improving inheritance rights of women to land by bringing changes in laws and working towards better implementation (iii) Enabling women to buy land from the market. In the interest of social justice as well as well-being of the families, enhancement of women’s rights and entitlement to lands deserves to be the first priority on the agricultural agenda.

3. The Hindu Succession Amendment Bill, 2005 addresses access to private land through inheritance. One of the most significant Amendment in the 2005 Act is deleting the gender discriminatory section 4(2) of the Hindu Succession Act (HSA), 1956. Section 4(2) exempted from the purview of the HSA significant interests in agricultural land, the inheritance of which was subject to the devolution rules specified in state level tenurial laws. But in several states the tenurial laws specify inheritance rules that are highly gender unequal. The 2005 Act brings all agricultural land on par with other property and makes Hindu Women’s inheritance rights in land legally equal to men’s across states overriding in consistent state laws. Secondly it provides daughters including married daughters birth right in Joint family property. If implemented in letter and spirit the act will have widespread ramifications for women’s access to agricultural land.
4. The consultation was convened to discuss the implementation of the HSA amendment Act, 2005 in particular and women’s access to land in general. It was attended by renowned subject expert, civil servants, civil society representatives and NGOs. It was expected that the consultation would focus on:

a) The adequacy of the provision of the Hindu Succession (Amendment) Act, 2005 for land rights for women.

b) The steps required for effective implementation of the provision of the Act by the States.

c) Difficulties foreseen in the implementation of its provisions both in letter and spirit.

d) States requiring special attention.

e) Issues relating to supportive services like credit, technology, knowledge and skills for farm women.

f) Any other issue relevant for converting conferment of land rights into an effective tool for empowerment of women in agriculture in rural areas particularly for on-farm/ off-farm income generation.

Observations & Suggestions

5. The salient observations and recommendations that emerged on diverse issues related to women’s land rights issues are summarized below:

i) There cannot be a unique model for solution of the problems prevalent in different areas. Different models are needed for different areas.

ii) The voluntary transfer of land rights of women should be there. Often a woman wants to give land to her daughter, but she is restrained from doing so because of mafia/ criminal pressures who simply grab her land.

iii) In most villages women get married within 7-8 km distance and they can take care of the land of their parents. Institutional mechanism to implement the law bypassing the obstructions should be thought out. Without protective mechanisms, it will be difficult to implement the Act.
iv) It is essential that similar rights for cultivation be provided to married and unmarried women. Right to cultivation should be determined by being a resident of the village. If a married woman comes back for some reason she should get access to land.

v) The Hindu Succession Act should be renamed Indian Succession Act and be available to any citizen of India on demand. The option should be available to women from minority communities also to appeal under the act.

vi) Bureaucratic will is needed to address gender inequality. Creating a conducive environment to implement the act honestly is also necessary. The initiative of local officials in the implementation of the act should be publicized for greater adoption by others.

vii) MPs/MLAs should set an example by applying the act to themselves. It should be also a part of the service condition of IAS/Central Government employees, Panchayat members etc. Government should also provide incentives to local officers to proactively implement the act. This will promote acceptance by the citizen at large.

viii) With the Hindu Succession (Amendment) Act now in place, it is necessary that the government fixes a time frame for its implementation.

ix) A change in mind set is needed to address the issues facing women. There have been instances that the training has been provided to men folk to write their will so that no land is left intestate (without a valid written will), enabling women to demand their rights. Training for writing of will that benefit women folk should be provided.

x) Ceiling law and definition of the family must be made uniform across the country. The importance of the act when the male members of the family migrate was emphasized.

xi) In the case of surplus land transfers, steps should be taken to avoid poor women getting poor quality of land.

xii) The cost of land registration should be waived or reduced when the land is registered in the name of women or a group of women.
xiii) There should be a control on leasing out practice because if the land is leased out to women farmers or group farmers then they do hard work to develop the land and get better productivity out of it only to find the owners wanting to take back his land. The lease agreement should be such that it can be upheld in a court of law.

xiv) There is an order from the State Government that the wasteland should be distributed to women’s groups by the Panchayats but the order is not having the desired effect.

xv) There is a need to start registration for land with joint pattas and it will be good if men will go for registration. State Govt. should document the wasteland, which is distributed under joint pattas. A wide campaigning is needed to promote joint pattas.

xvi) The ceiling surplus land should be provided to women first, then in joint pattas and remaining land could go to men.

xvii) At present data on ceiling surplus land, land acquired by the govt. and land distributed buy the govt. land under litigation is available for ten states only. There are no records available on how much land is registered in the name of men and women in agriculture. There is need to collect and computerize the data regarding this aspect and without any bias. There is need to continue consultation with state governments and try to get data in women farmers at Tehsil levels. Data should be gathered to capture the fragmentation of land holdings.

xviii) There is a need to go for Cadastral survey in the North East especially Meghalaya.

xix) There is a need to operationalise the law with greater awareness and opportunities to take maximum benefit of it.

xx) There is an urgent need for legal literacy to women in particular and farmers in general about the act. There is a strong need to strategies how this can be done and start legal literacy from school level. Legal aid should be available to the women. Small NGO group exist that are working in this area. Farmer’s organizations, bankers and panchayats should play a proactive role
in the awareness and implementation of the Act. VKCs can also play an important role in this.

xxi) Groups of women should be formed to access land accompanied by support services to improve the economies of scale because it is difficult to manage the land by individual women as she cannot access the services therefore, often sells the land. There is a need to develop village fund for women’s groups to purchase land for agriculture and other developmental activities.

xxii) 80% of the SHGs are women SHGs but virtually none of them are land based. Necessary action should be taken to promote land based women SHGs.

xxiii) There is a need for crop diversification and a consolidated approach for off-farm and on-farm activity to enhance the income and productivity of the farm as well as assurance of livelihood and nutrition security at household level.

xxiv) Lack of access to finance is a major issue in rural areas. Inability of land banks to provide credit in spite of legislation to the effect in place should be addressed. Loans should be provided at concessional rates where land is in the name of women. Need for changes in collateral system of banking have also to be examined.

xxv) A holistic approach towards allotment of land to women should be adopted. The govt. should also help in developing the land, other basic facilities and soft loans (e.g. Malaysia).

xxvi) There is a need for strengthening training for farm women and engendering of training institutions. Training on entrepreneurship development should be made a part of the Agricultural University curriculum.

6. Some other Suggestion in this regard would be:

(i) Ensure the recording of women’s inheritance shares by the patwaries, in all land records and in cases where women own land (via any means), ensure that their names are entered in the corresponding land record.
(ii) Promote schemes which fostered women owned group assets, including but not restricted to, village commons lands and village forests.

(iii) Provide insurance coverage to farmers for crop failure caused by lack of rain, drought, and damage by wild life and land slides.

(iv) Through media raise awareness of relevant legislation on women’s right to land and resources.

(v) To ensure the institutionalization and codification of inheritance laws for tribal communities.
Women in Agriculture – What next?

1. A two-day workshop was organized by the M S Swaminathan Research Foundation (MSSRF), Chennai, on November 11 and 12, 2005, on the theme: Women in Agriculture in India: What Next? The aim of the workshop was to discuss the status and problems of women in agriculture in India ten years after the Fourth World Women’s Conference held in Beijing in 1995, in the light of the commitments made by the Government of India at the Beijing conference and later in the Common Minimum Programme of the UPA Government. About 25 participants drawn from government, academia and civil society, including Chairman, NCF and Member Secretary, NCF participated.

2. The workshop benefited greatly from a review paper presented by Ms. C.P. Sujaya, IAS (Retd.) and Visiting Fellow in Gender and Development for 2005 at the MSSRF, who had earlier been commissioned to undertake such a review. In her paper entitled Beijing + 10: Women in Agriculture in India, Ms. Sujaya dwelt on the three major themes of growing feminisation of work, of agriculture and of poverty in the last decade, the problems in women’s access to land and other assets, and the lacunae in policies and schemes, supported by data and case studies. She also summed up, in conclusion, the policy changes required to address these issues effectively. A succinct presentation by Prof. M.S. Swaminathan, Chairman, National Commission on Farmers and Chairman, MSSRF, provided guidance to the workshop participants on areas where concrete recommendations could be made.

DISCUSSIONS

3. The consensus that emerged, noted that issues concerning Indian women ten years after the Beijing Conference of 1995 must be seen in the background of the consequences of the implementation of neoliberal macroeconomic policies since 1991, as well as the overall path of economic development since Independence. The structure of the economy inherited at the time of Independence and the nature of policies followed since then by successive governments at the Centre and in most States had, by and large, failed to address adequately the deeply entrenched inequalities of class, caste and gender. Often,
they had contributed to the widening of inequalities. The status of women in India even before the neoliberal reforms began therefore left a lot to be desired.

4. The reforms, which consisted, in the main, of policies of liberalization, privatization and globalization (LPG for short), were highly deflationary, and especially disastrous for agriculture and the rural economy, as also for key social sector areas such as health and education. Rural women, engaged mostly in agriculture, primarily as labourers and to a lesser extent as cultivators, were especially badly hit. While the reforms have been lauded by some as having ushered in an era of 6% annual growth rate of GDP, these figures provided poor consolation to rural workers, as the rate of employment fell sharply between 1993-94 and 1999-2000 as compared to the period 1987-88 to 1993-94. Agriculture and the rural economy bore the brunt of neoliberal policies of removal of all quantitative restrictions on imports, steep lowering of import duties on agricultural produce, slashing of input subsidies, collapse of institutional credit, near-absence of public investment, reduction in rural development expenditures, weakening of the public distribution system and decline in allocations for agricultural research and extension. The rate of growth of agricultural output in the post-reform period stands at less than 2% per annum, while the rate of growth of foodgrains output has fallen below the rate of growth of population for the first time since Independence during this period. These trends have been well-documented elsewhere and taken note of in the earlier Reports of the National Commission on Farmers.

5. It is against this disastrous performance of agriculture and the rural economy that the problems facing women in agriculture have to be understood and discussed. Women have been negatively impacted upon by these policies which have added to the problems women already face in a deeply patriarchal social milieu with structured gender inequality along economic, social, political and cultural dimensions. The collapse of rural and agricultural employment under neoliberal policies has led to large-scale migration, often (though not always) sex-linked. The migration of male earners has led to a certain degree of feminization of agriculture, as well as to a significant proportion of female-headed households. This in turn has meant that a disproportionate share of the agricultural crisis is borne by women. In many States of India, property and inheritance laws have traditionally discriminated against women, and despite some steps taken in
recent years to redress the situation, women are still mostly to be found recorded as agricultural labourers rather than as cultivators. The traditional patterns of community land and forest management in many tribal areas (Schedule 5) and especially in the hill States of north-eastern India (Schedule 6 and other areas) have entirely different property and inheritance laws, and here too the brunt is borne by the women. This is of course partly also due to the non-recognition of the work women do on their family farms.

6. The decline of institutional credit for agriculture and the onerous terms on which farmers are having to borrow are major factors contributing to rural distress. At the same time, during the last decade, there has been a highly visible micro-credit initiative, directed mostly through SHGs of women. The growth and experience of SHGs across the country is highly variable and region specific. While in some parts of the country, there has been a phenomenal disbursement of funds to women in rural areas, and some capacity building, via the intermediation of NGOs State agencies, line departments etc., which has enabled them to meet some pressing consumption needs it is far less clear to what extent this has enabled access to improved technology, higher productivity and profitable enterprise. SHGs in themselves can and certainly do provide women a new and legitimate social space where they can come together and explore avenues of collective action, but such instances have been only part of the story.

7. On the one hand, there is evidence that already overburdened rural women have now to shoulder even more responsibility and work, while the withdrawal of the State in crucial areas of rural infrastructure and welfare is justified in the name of empowering women and reducing the dependency culture. On the other hand, in some places, where the agriculture sector has been depressed and offering limited opportunities for work, the SHG movement has provided some diversification, off-farm employment and greater awareness of technological inputs. The conclusion that emerged recognized the value of SHGs as a space for women’s agency, but also noted that a great deal of capacity building of women in SHGs was still required to enable them to truly empower themselves. It was also pointed out that the promotion of SHGs and the provision of micro credit can only be a supplement to direct measures which provide women land and other productive assets, individually or in groups, that can serve as collateral for larger-scale, productive loans.
8. The conditions of existence of women in rural areas have been further worsened by the withdrawal of the state from education and health. Women now have to manage even more stringent family budget constraints in the face of increasing costs of health care and education. Evidence of greater violence against women in various forms points to the impact of the rural economic crisis in a context of embedded patriarchy as well as the rampant consumerism promoted by the forces of globalization.

9. The emergence of an active land market, dominated by speculators, especially in rural areas adjoining urban centers has led to encroachment on, or outright destruction of, common property resources, where again poor and dalit rural women are among the worst sufferers. They are now not only having to trek longer distances to fetch water, fuel and fodder and to attend to their ablutions, but also find their productive activities adversely affected.

10. While neoliberal policies had caused great distress to the rural economy in general and rural women in particular, this period has had some positive developments as well. Important among these were the emergence of Panchyati Raj Institutions (PRIs) and peoples’ movements of various kinds, including the SHG movement and wider movements questioning the logic of LPG policies and seeking a more people-centred policy frame. The workshop participants felt that both PRIs and SHGs needed considerable resource support for capacity building and that the processes of capacity building should be strongly engendered to strengthen and empower rural women. A stronger and more effective interface is needed between PRIs at all levels, particularly their women members and the SHGs and their federations, wherever they exist.

11. The issues of land reforms and land rights for women were both important, and the State should play a crucial role in the gendered implementation of land reforms, wherever relevant, since in almost all of the north-east hill States it is not the State but the village communities that control land. Preventing the erosion of the few traditional systems wherever these continue to exist where authority and agricultural decision-making is shared by women and men, is also a goal to be kept in mind.

12. The question of land lease is tricky, but lease arrangements that empower poor rural women without allowing land grabbing by more powerful forces including corporates
should be the desirable approach. In this context, it is noteworthy that the Common
Minimum Programme (CMP) of the UPA Government provides:
i) “The UPA government should ensure that at least one-third of all funds flowing into
panchayats should be earmarked for programmes for the development of women and
children. Village women and their associations should be encouraged to assume
responsibility for all development schemes relating to drinking water, sanitation, primary
education, health and nutrition”.

ii) “Complete legal equality for women in all spheres should be made a practical reality,
especially by removing discriminatory legislation and by enacting new legislation that
gives women, for instance, equal rights of ownership of assets like houses and land”.

13. Apart from removing discriminatory legislation and new legislation, legal and civil
society supports are required to ensure that new rights are not inherently biased against
community group rights and against non-land holding individuals - women, dalits, and
the poor.

14. The recommendations that were made at the meeting are presented under the
following heads: Land and Productive Assets, Labour and Employment Generation,
Common Property Resources and NRM, Support Services, Self Help Groups, Data
Gathering, Women in Technology and Research

RECOMMENDATIONS

15. Land and other productive assets: Ideally, both men and women should be
recognized as heads of the household, and all property be jointly held, though provision
would have to be made for equal sharing of all property in the event of cessation of
marriage. While this may be a long-term goal, in the present context, it is necessary to
urgently take steps to reduce the burdens and disadvantages faced by women due to lack
of title to property, especially land, which excludes them from access to resources and
inputs, particularly land. This is particularly true with reference to the banking system
and its structural limitations, which require proof of title as collateral. Hence it is
recommended that:

i. From a gender perspective, because of women’s multiple productive roles, it
is necessary that agricultural policy and programmes adopt a farming
systems approach that integrates agriculture, livestock, fish, forestry and water resources, instead of treating these as separate sectors as at present.

ii. All NEW assets which have accrued to the household (before a specified cut-off date) by any means (purchase, transfer, grant etc) should be registered in the name of both husband and wife, applicable to all assets such as land, houses, trees, animals, equipment etc.

iii. The above should also apply to membership of groups/categories which are prerequisites for access to resources, e.g. water users’ associations.

iv. Banks should be asked to accept spousal ownership/membership as collateral for loans and extend Kisan Credit Card to women.

v. The distribution of land mandated by Government of India in the 1980s with regard to surplus land, wasteland, and ceiling surplus land should be monitored and recorded and up to date records prepared within a specified time limit

vi. Lands, particularly wastelands, vested with government should be transferred to women’s groups (including SHGs) for productive use and appropriate economic activity.

vii. The implementation of land reforms in a gender-sensitive framework should be closely monitored and up to date records prepared, keeping in mind recent legislation (Amendment to Hindu Succession Act 1956). The issue of community-held land has to be separately addressed.

viii. Given the failure of successive attempts to ban swidden (jhum, podu) cultivation in which women are especially involved, it is necessary to develop and diversify swidden with multiple species and high value crops (medicinal, aromatic plants) to increase diversity, enhance food security and perhaps improve women’s income.

ix. Resource support, value addition and market linkages for the traditional crafts in which farming women are involved, either full time or as supplementary activities, need special attention.
16. Labour and employment generation: Wage employment is still and will continue to remain the most important source of income for the rural poor, especially women, and hence the primary need is to revive and strengthen capital investment in agriculture and rural infrastructure, which will generate farm and non-farm employment. In this context, the NREG Act as well as six major schemes - National Horticulture Mission, Bharat Nirman (New Deal for Rural India), National Rural Health Mission, *Krishi Vigyan Kendras* in all districts (ideally to be re-designed as *Krishi aur Udyog Vigyan Kendras*), setting up of SHG Capacity Building and Mentoring Centres (as recommended by the NCF), and establishing women-managed Community Food, Water, Fodder and Feed Banks – provide immense scope for employment of poor rural women. Equally important, the new policy arrived at after a series of Round Tables of State Ministers and Secretaries for Panchayati Raj have arrived at new modalities for disbursement of funds to Panchayats, and for the planning process, which is now to be initiated at the level of Gram Panchayat and built up from below. Major Central schemes are now to be channeled directly to Panchayats. Safeguards have been built in to ensure that the funds are not delayed in payment.

It is hence recommended that:

i. There should be adequate representation of women in all bodies at Gram Panchayat, Block and District levels in all bodies concerned with generating, planning, designing and implementing employment. For example, a) Standing Committee on Planning of the Panchayats at village, Block and District level b) Technical Support groups set up at each level c) All Standing Committees at the three levels. In the Sixth Schedule areas where the 73rd Amendment does not apply, the engendering of traditional institutions at the village level should be encouraged and supported.

ii. There should be similar adequate representation of women in all bodies concerned with training and capacity building at village, Block and District levels – a) in setting up of raining and capacity building institutions and b) in planning the content and methodology of training.

iii. Forty per cent of all employment generated through new schemes should be reserved for women.
iv. Similar reservation should be made for the support services arising out of new employment opportunities for women to ensure not only that women’s services are utilized, but that their labour is recognized and their knowledge and skills built up.

v. Increased emphasis should be placed on implementation of Minimum Wages, Equal Remuneration and other existing laws.

17. Common Property Resources and NRM: Increasing illegal encroachment on common property resources (village grazing lands, ponds etc) with the approval of the local authorities, PRIs and traditional community authorities, who are often governed by patriarchal values and may not be gender sensitive, has severe consequences for the poorest and most marginalized, especially women, who depend on CPRs for livelihood. So does disposal of wastelands to commercial interest. In order to prioritise livelihoods of the poor/women over commercialisation it is recommended that:

i. 17.1 To discourage local authorities, Gram Panchayats or equivalent body from commercial disposal of village CPR and wastelands, they should be required to place such issues before the Gram Sabha for decision, in order to ensure that voices of marginalized sections (women, dalits and poor) are not excluded.

ii. 17.2 Awareness generation should be enhanced at all levels, and especially among the bureaucracy and local level traditional and elected bodies, to support poor women/marginalized groups in their struggle to protect their existing use rights over CPR.

iii. 17.3 Institutional and funding support for the formation of women producers’ associations to process, transport and market farm produce, milk, fish, crops etc. should be provided.

iv. 17.4 Commercial interests/companies should be banned from acquisition of wastelands for purposes of direct cultivation. CBOs (women’s groups, Dalit groups, tribal groups, SHGs) should be given priority for acquisition, lease, or grant of wastelands for cultivation.
v. 17.5 Since submergence of ecologically important watersheds, pastures and agricultural lands through hydro-electric schemes in the hills has a far-reaching impact on women’s livelihoods in both the upland and downstream areas, run-of-the-river schemes should be preferred to reduce displacement of people and erosion of agrobiodiversity.

vi. 17.6 Monopolies in the NTFP trade in different States and for different produce should be reduced with a view to their ultimate elimination and to ensure fair prices to the producers.

vii. 17.7 Different kinds of social networks of women producers (or of women and men) that already exist should be strengthened to enhance their ability to negotiate with traders and others.

viii. 17.8 The question of individual vis-a-vis common property resources needs to be carefully studied and addressed, so that public policies do not erode systems of common access and use even as they ensure individual rights, both of which are important.

18. Support services - The various social services provided by the State and community groups, such as health services, child care services, early childhood education, midday meals, ration shops are generally perceived, both by the concerned departments and the public at large as welfare measures. Their role as support services for poor women is less understood, and hence close linkages are not established, nor at the programmes adequately structured to be flexible in addressing these needs in a context-specific manner. Hence, it is recommended that:

i. ICDS should be redesigned to become more context and gender sensitive to the needs of poor working women, especially in the rural areas, by a) its decentralization and management by PRIs and b) enabling local managements to modify the timings, location, provision for care of younger children, child: worker ratio to suit local needs c) providing additional funds from sources such as NREG/ powers to raise additional funds to meet such context-specific needs.
ii. Innovative proposals to provide crèches for young children (below three) and cooked meals on site for women labour should be worked out in the case of NREG work-sites, which can be adapted elsewhere.

iii. Identity cards for migrant women workers should be provided to enable them to access PDS, secure admission to primary school/anganwadi/ etc for their children.

iv. The social security provisions in the two Acts before Parliament relating to unorganized workers should specifically include all categories of women workers in the agricultural and rural sector.

v. Common facility (meeting place/workshed) for women should be provided from the Gram Panchayat Mahila Kosh, (as already proposed in the First Report of NCF, Chapter IV on New Deal for Women in Agriculture).

19. Self-Help Groups - The tremendous expansion and visibility of SHGs in the last decade and a half has brought many gains, both social and economic, to poor rural women, though there are marked regional differences. There is debate about the extent and nature of gains, as increasing burden of work and responsibility on women, increased domestic violence, limited economic advancement, continuing social and caste oppression, and constraints to decision making in the home have also been observed. While recognizing the tremendous employment potential of SHGs, the continuing dependence of poor women on multiple sources of livelihoods implies that there are no panaceas, and multiple solutions have to be sought. At the same time, empowerment of women at the political, community, family and social levels is emerging as a precondition for further gain. It is hence recommended that:

i. Critical and region-specific studies of the SHGs drawing on available studies and data should be taken up to look into the financial, economic-productive, social-community, political, family-household, and personal levels of women’s empowerment.

ii. Based on such studies, a more detailed understanding of the place of SHGs in women’s multiple livelihoods may be built up, as well as mapping the location of women in the rural and agricultural sector.
iii. The banking system should be urged and enabled to develop a broad structure of varied financial services to support the multiple livelihoods of rural poor women, using the SHGs as the basic organisational structure.

iv. A network of capacity building institutions should be set up to strengthen and develop SHGs to undertake the various functions into which they are expanding, including ToT, and to nurture and mentor them during the process.

v. A series of training modules should be developed and delivered through various mechanisms including AIR and mass media, distance education providers, Village Knowledge Centres with the help of ICT.

vi. Awareness creation through mass media, people’s organisations, and networks should be used to create visibility, not only for SHGs and their achievements, but for the role of women in the economy.

6. Data-gathering and use - The importance of gender-disaggregated data in all fields and areas cannot be over-emphasised, not only in order to create visibility for the role of women in the economy, society and polity, but also as a tool for planning, monitoring and evaluation. It is equally important that in future all records and documentation of all types are gendered, for the same purposes. The endeavour should be to make the process of data-gathering participatory and to include qualitative measures of development and poor women’s lives and livelihoods. Measures of gender equality including the gender disaggregated data collected and collated through the different recommendations above, should not be an academic exercise but be incorporated into agricultural and related development policies. Hence, it is recommended that:

i. Time use studies should be extended to all the States, and should be repeated at regular intervals. These will strengthen the process of creating visibility for women’s unpaid labour and domestic work.

ii. Discussions with the national data-gathering agencies should be initiated by the concerned Ministries (Ministry of Agriculture) to continue and strengthen the process of gender-disaggregated collection of basic information through the decennial Census, the National Sample Surveys, and other occasional and regular data collection surveys of all Departments.
iii. Gender-disaggregated data on vital statistics should be collected through District level surveys, which would enable estimates of district level IMR, U5MR, MMR, JSR, and other important development indicators.

iv. The next Agricultural Census should collect gender-disaggregated data on operational holdings.

v. To begin the process of estimating women’s contribution to GDP, pilot studies at district level should be initiated to work out the methodology for such calculation.

vi. The responsibility for collecting gender-disaggregated information on vital statistics should gradually be shifted to PRIs, after ensuring that a) the elected leaders as well as the concerned functionaries are sensitized to its importance and the methods needed and b) that the necessary funds and facilities are transferred to them.

vii. Institutions must be sensitized to the need to maintain records of the representation of women in all committees.

7. Skill Empowerment and Technology for Women

7.1 Technology for women requires special attention and the impact of major on-going schemes (and any future schemes) on the knowledge and skills of poor, rural women engaged in farming and allied activities needs to be systematically studied. The lack of tools designed with women in mind is yet another area of concern. With the objective of empowering women in all fields of environmental management, including water harvesting, wasteland development, sustainable agriculture and livestock development, biodiversity conservation and its sustainable and equitable use, ongoing schemes should be “engendered” on priority basis. The National Commission on Farmers was requested to develop a strategy and set up mechanisms to advise on “engendering” four major programmes where women’s concerns should receive attention. These are:

- National Horticulture Mission
- Bharat Nirman Programme
- Capacity Building and Mentoring Centres for SHGs
- Revitalisation of Krishi Vigyan Kendras
7.2 All of these programmes need to be assessed in order to see firstly, how the present design impacts on poor women and secondly, whether and how these could be used to strengthen women’s capacities. Skill development of women will be a major focus, and the engendering of these programmes can offer a guideline for the inclusion of women in other technology-based or technology-rich programme areas.

8. Research - The NCF chairman’s suggestion to set up a national level action and policy research network to carry out longitudinal studies of women’s roles in agriculture and rural livelihoods in the various agro-ecological regions of the country was strongly endorsed. The network can be on the lines of a Hub and Spokes model, with the hub centre performing servicing, facilitating and integrating roles, and mobilising the power of partnership for women’s empowerment in agricultural and rural development.
ACKNOWLEDGEMENT

National Commission on Farmers acknowledges the valuable technical contributions of Ms. R.V. Bhavani, OSD to Chairman, NCF and Research Officers: Dr. (Ms.) Laxmi Joshi, Dr. Deepak Rathi, Dr. Pavan Kumar Singh, Dr. Ramesh Singh and the sincere work of Research Assistant, Dr. Prabhu Dayal Chaudhary and the secretarial staff of the Commission for the preparation of the Third Report.
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TERMS OF REFERENCE
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- Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.

- Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

- Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

- Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

- Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

- Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of
vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

- Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.

- Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

- Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

- Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.

The Commission is to submit a medium term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as soon as practicable and in any case on or before 13th October, 2006. The Commission, however is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

[Ministry of Agriculture Resolution No.8-2/2003-Policy(ES) dated 18th November, 2004]
COMPOSITION OF THE
NATIONAL COMMISSION ON FARMERS

The composition of the reconstituted National Commission on Farmers is as under:-

Chairman

Prof. M.S. Swaminathan

Full-time Members

Dr. Ram Badan Singh
Shri Y.C. Nanda

Part-time Members

Dr. R.L. Pitale
Shri Jagadish Pradhan
Ms. Chanda Nimbkar
Shri Atul Kumar Anjan

Member Secretary

Shri Atul Sinha

[Ministry of Agriculture Resolution No.8-2/2003-Policy (ES) dated 18th November, 2004]
CHAPTER 1

ENDING THE ERA OF FARMERS’ SUICIDES AND LOW AGRICULTURAL GROWTH RATE: SYNOPTIC ACCOUNT OF NCF RECOMMENDATIONS

1.1 Introduction

1.1.1 NCF has so far submitted three Reports to the Union Agriculture Minister - on 29 December 2004, 11 August 2005 and 29 December 2005 respectively. The Fourth Report, *inter alia* containing a Draft National Policy on Farmers is being submitted to the Union Agriculture Minister on Vaisakhi Day i.e. 13 April 2006.

1.1.2 2005 was a difficult year both for the nation and for farm and fisher families. Beginning with the titanic tsunami of 26 December 2004, and ending with the disastrous earthquake in Kashmir and floods in Tamil Nadu, our farm and fisher families have been subjected to the fury of nature in the form of drought, unseasonal and heavy rains (like the one which caused damage to the onion crop in Maharashtra) and floods. Institutional support to small farmers is weak. The same is true of post-harvest infrastructure. For example, even now paddy is being spread on the roads for drying in many places. The spoilage losses can be as high as 30% in the case of vegetables and fruits. Institutions, which are supposed to help farmers, such as research, extension, credit and input supply agencies, are by and large not pro-poor and pro-women. Mechanisms for risk mitigation are poor or absent. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance. There is no Agricultural Risk Fund. Both risk mitigation and price stabilization are receiving inadequate policy support. According to farmers, the cost of production is invariably higher than the Minimum Support Price, due to ever increasing prices of diesel and other inputs. Investment in agriculture has suffered a decline over the past two decades. Capital formation in agriculture and allied sectors in relation to GDP started declining in the 1980s and is only now being reversed. This has adversely affected irrigation and rural infrastructure development. Investment on
agriculture research has also suffered a decline. An unfortunate consequence of the constellation of hardships faced by small farm families is the growing number of suicides among farmers. The situation is particularly alarming in the Vidharbha region of Maharashtra and in Andhra Pradesh.

1.1.3 The cost-risk-return structure of farming is becoming adverse. Consequently, indebtedness is growing in rural areas. In Maharashtra over 55% of the State’s farm households are in debt. Average household size of farmers is 5.5 at the all-India level. In the low-income groups, the average size goes up to 6.9. According to NSSO-59th round, the average monthly per capita consumption expenditure of farm households across India was Rs. 503 in 2003. The all India average monthly income per farmer household during the same period was Rs.2115. (The figure was Rs.1062 for Orissa and Rs.1633 for UP). Endemic hunger (i.e., chronic undernutrition), is high both in families without assets like land or livestock, as well as in families with small land holdings without access to irrigation. Policy reform in agriculture is thus overdue. Such policy reform should be pro-small farmer and pro-women and pro-landless agricultural labour. If we do not attend to the problems of small farm and landless agricultural labour families with a sense of urgency and commitment, the “Indian Enigma” of the co-existence of enormous technological capability and entrepreneurship on the one hand, and extensive undernutrition, poverty and deprivation, on the other, will not only persist, but will lead to social disruption and violence and increasing human insecurity. Without peace and security, enduring economic progress will not be possible. NCF therefore recommends that the agricultural year 2006-07 be designated as the Year of Agricultural Renewal.

1.1.4 During this year an integrated package of measures should be introduced in every part of the country to increase farm productivity and profitability in perpetuity without associated ecological harm. The programmes should cover all our major agro-ecological regions-arid, semi-arid (i.e. dry-farming) hill, coastal and wet (i.e. irrigated or high rainfall) zones. The present agricultural crisis can then be converted into an opportunity for not only reversing the decline, but for taking the agricultural revolution forward by helping farm families to bridge the gap between potential and actual yields in all major
farming systems through mutually reinforcing packages of technology, services and public policies. The programmes initiated during the 2006-07: Year of Agricultural Renewal by Central and State Governments, Panchayati Raj institutions, Agricultural, Veterinary, Rural and Women’s Universities and IITs, Private and Public Sector Industries, Civil Society Organisations and Mass Media should be designed to foster productivity, quality, sustainability, profitability and employment revolutions in the farm sector in all the over 600,000 villages in the country. It should help to promote job-led economic growth in our villages.

1.1.5 It is felt that declaration of the year 2006-07 as the “Year of Agricultural Renewal” would be a positive step towards an Evergreen Revolution in Agriculture. The recommendations of the NCF contained in its three Reports would help in achieving a growth rate of 4 percent in agriculture, which in turn would help to raise the overall growth rate in GDP to over 8 percent.

1.2 Synopsis of Recommendations:

1.2.1 The major recommendations in the first three Reports of the NCF are summarized below under the heads of Land, Water, Credit and Insurance, Technology and Markets – the five core areas needing urgent attention to make farming a viable activity for farmers.

1.2.2 Land

There is an urgent need for a National Land Use Advisory Service, linked to State and Block Level Land Use Advisory Services on a hub and spokes model. These can be virtual organizations with the capacity to link land use decisions with ecological, meteorological and marketing factors on a location and season specific basis. The National Land Use Advisory Service can be linked to a virtual body – the Indian Trade Organisation (ITO) (discussed in details in the Third Report). It should have continuous contact with IMD, ISRO, Agricultural Universities and Departments, Commodity Exchanges and Futures Markets, APEDA, Commodity Boards and all credible national and international sources of information on domestic and international markets. The Land Use Advisory Service should cover crop and animal husbandry, horticulture, inland
fisheries, forestry and agro-forestry, and have the capacity to proactively assess potential surpluses and shortages of essential commodities. Revitalize and strengthen National and State Land Use Boards on the pattern of hub and spokes model, to give proactive advice to farmers on crops.

i. Commemorate 2006-07 as the year of **Soil Health Enhancement**. Soil Health Enhancement holds the key to improving the return from investment in other inputs like seeds and water. Dry farming areas need particular attention from the point of view of overcoming micro-and macronutrient deficiencies. As stressed by the Prime Minister, the second green revolution has to begin in dry farming areas

ii. Retool and rejuvenate soil-testing laboratories to address the problems of micronutrients deficiency in soil. **Establish a national network of 1000 sophisticated soil testing laboratories.**

iii. Issue **Soil Health Passbook to every farm family** based on an integrated analysis of the physical, chemical and microbiological properties of the soil.

iv. Organize **Travelling seminars** for farm men and women to learn the factors responsible for “agricultural bright spots”, with priority to horticulture. Another method of facilitating Farmer-to-Farmer learning is the establishment of **Farm Schools** in the fields of farmers-achievers.

### 1.2.3.1 Water

i. Have a **Policy of Water for Agriculture**. Converge all Technology Missions around a Watershed or Command Area

ii. Launch a Million Wells Recharge Programme, Rebuild water bodies and bring about greater integration between currently fragmented programs.

iii. Launch a Water Literacy Movement, training Water Masters in every Panchayat. **Increasing supply through rainwater harvesting and recharge of the aquifer should become mandatory**

iv. Set up National Rainfed Area Authority to help in converting scientific know-how into field level do-how through large-scale demonstrations. The Authority should also help to foster water conservation, Pani Panchayats, scientific land use planning and assured and remunerative marketing.
v. Promote seawater farming for coastal area prosperity – pilot projects covering about 50,000 ha in all coastal states to demonstrate conjunctive use of sea and fresh water and forestry and aquaculture.

vi. Establish a National Research Centre on Glacierology for collection, storage and dissemination of information on status of seasonal/perennial snow and ice

vii. Launch a National Challenge Programme for Coastal Systems Research (CSR), for concurrent attention to coastal agriculture, agro-forestry, culture and capture fisheries

1.2.3.2 Water – Fisheries

i. Set up National Agency and Protocol of Seed Certification for Fisheries

ii. Set up an interdisciplinary Task Force to address need for a comprehensive set of Aquarian Reforms in order to foster sustainable and equitable use of both coastal and inland waters for capture and culture fisheries.

iii. Organize centralized support services to support decentralized small scale production (e.g. Mother Ships based in Andaman & Nicobar and Lakshadweep Group of Islands), upgradation and construction of new minor fish harbours and fish landing centers, large wholesale markets for larger and more hygienic handling of catch and greater employment generation.

iv. Set up a Central Fishery Harbour Development Authority.

v. Set up a National Fisheries Development Board to provide technical and infrastructural support to fisher communities, particularly in the areas of fish processing and marketing as well as in fish seed and feed production and distribution.

vi. Hike subsistence allowance per fisher family from Rs. 300 to Rs. 1500 per month for better enforcement of close season. There should be a Contributory Provident Fund and Pension Scheme for fishers above 60 years of age.

vii. Establish ‘Fish for All Training Centres’, which will enhance the capacity of fisher women and men in all aspects of the capture to consumption chain.
1.2.4 **Credit and Insurance**

i. Introduce an integrated **Parivar Bima Policy** for the rural poor for providing hospitalization expenses, life cover for deaths/disabilities and cover for dwelling units. This should be linked to self-help groups and largely funded by the contribution of Members.

ii. Launch a drive for credit and insurance literacy amongst farmers. Set up a **Rural Insurance Development Fund** for promoting insurance coverage.

iii. **Keeping in view the decline in the profitability of agriculture, and increasing farmers’ distress and indebtedness**, the government may consider providing support to the banking system for reducing the rate of interest for crop loans to 4% during the Year of Agricultural Renewal.

iv. The outreach of the formal credit system has to expand to reach the really poor and needy.

v. There is an urgent need for a **paradigm shift from micro-finance to livelihood finance**, comprising a comprehensive package of support services including financial services, [including insurance for life, health, crops and livestock: infrastructure finance for roads, power, market, telecom etc and investment in human development], agriculture and business development services [including productivity enhancement, local value addition, alternate market linkages etc] and institutional development services [forming and strengthening various producers’ organisations, such as SHGs, water user associations, forest protection committees, credit & commodity cooperatives, empowering Panchayats through capacity building and knowledge centres etc.].

vi. **Need for an Agri-risk Fund:** There are areas in our country, which have recurrent and frequent drought/floods etc, which cripple the incomes of the farmers. These farmers become defaulters to the banks and thereby become “push-outs” of the credit system. Rescheduling and restructuring of their loans are not enough in the event of successive natural calamities. The Government of India may step in to create an Agriculture-Risk Fund to provide relief [waiver in full/part of loan and interest] to the farmers in the case of successive droughts, etc.
and also waiver of interest on loans in areas hit by droughts, floods, heavy pest infestation etc. This Fund should have contributions from the Central Government, State Governments and Banks in a predetermined fashion.

vii. **Distress ‘hot spots’ – moratorium on debt recovery:** There is a need for moratorium on debt recovery including loans from non-institutional sources in distress hotspots, till reasonable profit margins in agriculture operations are restored. The debt recovery may be staggered in easy installments. For this purpose, liquidity support may have to be provided to the localised banks like the RRBs/Cooperative Banks etc.

viii. **Issue of Kisan Credit Card (KCC) to women farmers:** Inspite of nearly 4.5 crore KCCs issued by the banks, very few cards have been issued to women farmers and no separate data are available in this regard. Keeping in view the fact that there are a very large number of women-headed farming families, particularly in the hills and NE Region, special effort is needed to issue KCC to these farmers. The banks may develop proper documentation systems to issue KCCs to women where the land is in the name of the menfolk who do not reside in the rural area [jobs in the cities/army etc] or face similar other situation and the land is cultivated by the wife.

ix. **Distress sale - need for pledge loans:** Distress sale by small/marginal farmers to square off their debts or for immediate consumption purposes soon after harvest is quite common. It is normal for a farmer to get 10-15% discounted price for spot payment for his produce. Pledge loans to farmers need to be liberalised and encouraged to help the farmers to overcome this problem. **The constraints in improving the negotiability of warehouse receipts also need to be removed.**

x. **Crop insurance** is covering only about 14% of the farmers. The need is to expand the cover to all farmers and all crops in a time bound manner. The scheme needs to be made more farmer-friendly and the premium reduced.

xi. Establish **Credit Counseling Centres** where severely indebted farmers can be provided with a **debt rescue package** of information in order to get them out of the debt trap, and thereby save them from committing suicide.
1.2.5 **Technology**

i. All ICAR institutions and Agricultural Universities may commemorate 2006–07 as the Agricultural Technology Year. The major aim of this year should be to strengthen participatory research and knowledge management with farming families and the organisation of about 60,000 Lab to Land programmes in the area of post-harvest technology, value addition to primary products and biomass utilization.

ii. A post-harvest technology wing should be added to every Krishi Vigyan Kendra and the help of other institutes like CFTRI and CSIR taken in designing the Lab to Land Programmes.

iii. Agricultural scientists should state the performance of new varieties and technologies in terms of **net income per hectare**, and not just in terms of yield per hectare.

iv. All programmes designed to foster access to technologies must be gender sensitive.

v. A cadre of Rural **Farm Science Managers** should be developed by training a couple of women and men members of every Panchayat/ local body in the management of new technologies, such as Biotechnology and information and Communication Technology. Under the 73rd Constitution Amendment, the responsibility of Panchayats includes agriculture and agriculture extension. **Therefore, a Scientist – Panchayat linkage is the need of the hour.** Genome Clubs may be organized in village schools and KVKs to spread genetic literacy.

vi. Develop Computerized Farm Advisory System; ICT should be effectively harnessed to empower rural men and women through the Every Village a Knowledge Centre Movement with farming system and season specific information as well as market and price information.

vii. Organize a National Federation of Farm Technology Missions headed by a farmer-achiever, which can help to bring to the watershed community the benefits of all other relevant Technology Missions like pulses, oilseeds, cotton, horticulture, dairy etc. Organize a Technology Mission on Sugarcane jointly
with sugarcane growers’ organizations and cooperatives and sugar factories on the basis of a seed-to-sugar approach. Set up National Mission on Medicinal and Aromatic Plants. The National Medicinal Plants Boards needs to be restructured and re-tooled, to enable it to function like NDDB.

viii. **Put in place a National Agricultural Biosecurity System** on a hub and spokes model - to help in preventing pandemics like Avian Flu (H5N1 viral strain)

ix. Provide greater research support for Organic farming. Research on soil fertility enhancement and plant health management has also to be strengthened.

x. Facilitate setting up of Agriculture and Aquaculture Service Centres, equipped with a laboratory, storage facilities for inputs and with communication facilities and run by trained managers who are available to the farmers to provide reliable technical advice, arrange for procurement of quality seed, feed, probiotics, provide information on the market and price fluctuations, should be set up with the active involvement of the farmers in different production areas.

### 1.2.6 Markets

i. **Amendment to Acts/legal instruments:** The Essential Commodities Act and other legal instruments including the State Agriculture Produce Marketing Committee Acts [APMC Acts] relating to marketing, storage and processing of agriculture produce need to be reviewed in order to meet the requirements of modern agriculture and attracting private capital in this sector.

ii. There is a need for focused attention for improving the **rural periodic markets**, which are the first contact point for the farmers and also for improving the infrastructure facilities at the regulated markets.

iii. The **role of the APMCs/ State Agriculture Marketing Boards** need to change from regulatory focus to promotion of grading, branding, packaging and development of distant and international markets for the local produce.

iv. **Commodity-based farmers’ organisations** like Small Cotton Farmers’ Estates, Small Farmers’ Horticulture Estates, Small Farmers’ Poultry Estates
and Small Farmers’ Medicinal Plants estates should be promoted to combine the advantages of decentralized production and centralized services, post harvest management, value addition and marketing, for leveraging institutional support and facilitate direct farmer-consumer linkage.

v. **Implementation of MSP** across the regions needs considerable improvement. Arrangements to protect the Minimum Support Price (MSP) needs to be put in place for crops other than paddy and wheat. These include coarse cereals like millets. Without MSP support or other effective need-based market intervention by the government, advice to farmers on crop diversification could lead to disastrous results. MSP should be adjusted according to the wholesale price index.

vi. The price behaviour of sensitive commodities needs to be closely watched particularly during the glut periods for need-based intervention under the ‘Market Intervention Scheme’ [MIS] of the Government of India.

vii. **Import tariffs** on farm products produced in resource poor regions deserve to be carefully monitored and maintained at such levels as to provide sufficient incentives to dryland farmers.

viii. **Pre–production Agreements to sell:** Pre-production agreements for sale (loosely referred to as ‘contract farming’), between the farmers and corporate houses/processing companies/others are being increasingly used in the case of certain vegetables/fruit/medicinal plants etc. The need is to develop a comprehensive, clean, equitable and farmer centric model agreement with special attention to clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and arbitration mechanism, so that the farmers do not get a raw deal. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/cooperatives to deal with the agribusiness unit on their behalf, one has to be rather cautious about these arrangements.

ix. Set up a **Livestock Feed Corporation of India** jointly with NDDB, SFAC and NABARD to provide support to local level SHGs engaged in the production of fodder and feed and in organizing Fodder and Feed Banks.
x. Identify **Organic farming zones**, to facilitate certification. In such zones, promote the formation of Small Farmers’ Organic Agriculture Estates: Develop Andaman & Nicobar Islands into Organic Farming Islands.

xi. Develop **an Indian Single Market** for agricultural produce for strengthening producer oriented marketing to give power of scale to small producers.

xii. Promote trade, patent, quality and genetic literacy

1.3 **Other Key Recommendations**

1.3.1 **Medium term strategy for Food and Nutrition Security** – Six Point Action Plan for Hunger Free India

a. Reform of the Delivery System based on a life cycle approach to food and nutrition security.

b. Community Food Security Systems – Community managed Gene-Seed-Grain-Water bank Continuum

c. Eradication of Hidden Hunger based on natural cum food fortification approaches

d. New Deal for the Self-Employed (Establish SHG Capacity Building and Mentoring Centres, Paradigm shift from Microfinance to Livelihood Finance)

e. Enhance the Productivity and Profitability of Small Holdings to increase marketable surplus

f. Introduce a National Food Guarantee Act combining the features of the National Rural Employment Guarantee Act and Food for Work Programme.

1.3.2 Introduce a **Farmers’ Livelihood Security Compact** comprising of the following integrated package of measures to step up credit and generate employment in suicide hotspots:

a) **Set up State level Farmers’ Commission** as has already been done by the Punjab Government for ensuring dynamic government response to farmers’ problems. Farm men and women should be represented in the Commission.

b) **Undertake a Census of Suicides** to have a proper understanding, assessment of reasons and count of suicides.
c) **Micro-finance policies should be restructured to serve as Livelihood Finance**

d) Initiate a **Debt survey** to take into account newer forms of credit and indebtedness and newer forms of bondage.

e) **Debt waiver** - The amount that is to be the cut-off point could be worked out in consultation with Panchayats and farmers’ representatives in the distress hotspot areas.

f) **Insurance revival:** There are provisions in the insurance laws that allow LIC to revive lapsed policies.

g) **Parivar Bima Policy:** The integrated family insurance policy recommended by NCF in its first report deserves to be examined and introduced to begin with, in dry farming areas.

h) **Policies for Irrigation Water:** Water conservation, equity and fairness and public good will have to be the basis of water policies. Irrigation policies need to be viewed in a holistic manner and made pro-poor.

i) **Revising import policies:** Some swift action on import duties of cotton for instance is a must in the light of large number of suicides by Vidharbha’s poor cotton farmers. Other crops need to be similarly protected.

j) **Access to affordable inputs is crucial:** The government must urgently intervene to ensure that quality seed and other inputs reach farmers at affordable costs and at the right time and place. Resource poor farm families should not be left to the mercy of input dealers who have emerged as the new moneylenders of the countryside. The maximum punishment for selling fake seed (except where new laws have been passed) is a meagre Rs. 500.

k) **Overhauling farmers’ markets:** Swift action is required to overhaul the **ryuthu bazaars** or farmers’ markets. Most of these are presently controlled not by farmers but by traders, from whose control they must be released. Amendments to APMA, as suggested by the Union Agriculture Ministry, need to be carried out by State Governments as soon as possible. There is also need for introducing focused **Market Intervention Schemes** (MIS) in the case of life-saving crops such as cumin in arid areas.
a. **Extension work:** The vital role of the Agriculture Extension Officer must be recognised and the system revived and strengthened. *Agricultural and Animal Sciences Universities could form Hope Generation Teams* (like NSS) of young male and female students who could stay in the distress villages during vacations and extend both technical and psychological support. The universities must be accountable to the farming community and not to private interests.

b. **Basic services:** The distress sweeping rural India flows from the gradual collapse of public services. For instance, almost all the suicide and otherwise crisis-hit households record high health expenditures. There is urgent need for both affordable health insurance, and the revitalization of primary healthcare centres.

c. **Knowledge Empowerment:** In addition to the above steps, there is need for establishing Village Knowledge Centres (VKCs) or *Gyan Chaupals* in the farmers’ distress hotspots. These VKCs could be linked to a Block level Village Resource Centre (VRC) with the help of the Indian Space Research Organisation (ISRO). This will enable tele-conferencing and thereby facilitate immediate attention to distress calls. The VRC-VKC grid could provide dynamic and demand driven information on all aspects of agricultural and non-farm livelihoods. These centres of hope in areas where rural families had lost hope, should be operated to the extent feasible by the wives or children of the farmers who had unfortunately taken their lives.

### 1.3.3 Policy for Women in Agriculture

a. Issue joint pattas to ensure land ownership rights to women

b. Set targets State-wise for at least 40% of government land distributed to SC/ST to go to the women of these communities.

c. Allocate land in State Farms (both Central and State) to women SHGs engaged in the production of seeds and planting material for horticultural crops including medicinal plants.
d. **A Gram Panchayat Mahila Fund** should be established to enable SHGs and other women’s groups to undertake community activities that help to meet essential gender specific needs.

1.3.4 **Set up a Heritage Gene Banks** to protect livestock heritage

1.3.5 Organize a separate **Department of Fisheries** in the Ministry of Agriculture.

1.3.6 **Rename Ministry of Agriculture as Ministry of Agriculture and Farmers’ Welfare**

1.4 Thus, the National Agricultural Renewal Year Programme of 2006-07, should deal concurrently with proactive advice to farmers on land use, soil health enhancement, augmentation of the area under irrigation coupled with efficiency and equity in water use, credit and insurance reform, technology up-gradation and dissemination, and farmer-centred marketing coupled with necessary policy and infrastructure support to address and redress the problems. Only such a human-centred approach to agricultural policies based on the strong foundations of the health and livelihood security of the majority of our farm population, which is also the largest consumer population in the country, will enable us to achieve an annual growth rate of 4% in agriculture on a long-term basis.
CHAPTER 2
JAI KISAN: DRAFT NATIONAL POLICY FOR FARMERS

(Draft for Comments, Public Debate and Consensus Building)

2.1 Why a National Policy for Farmers

2.1.1 At the time of our Independence, Jawaharlal Nehru said, “Everything else can wait, but not agriculture”. Unfortunately this profound truth is yet to be converted into concrete policies and action on an adequate scale. There have been several policy statements for agriculture during the last 59 years, including the comprehensive reports of the National Commission on Agriculture (1976). The last National Agricultural Policy was formulated in 2002. However, we are yet to place faces before figures and the problems of farm families as human beings and citizens of the country are yet to receive the attention they need and deserve. Agricultural growth has decelerated during the last decade. This has led to a decline in real per capita incomes in rural India, in comparison to the rapid growth in urban incomes. The present Draft Policy for Farmers is designed to fill this gap and to get the focus of our agricultural policies shifted to the women and men feeding the nation, thus moving away from an attitude which measures progress only in millions of tonnes of foodgrains and other farm commodities. Its main aim is to bring about a mindset change and a shift from an approach of patronage to partnership with farm and fisher families based on mutual respect. Progress in agriculture should be measured by the growth rate in the net income of farm families, if the human dimension is to be added to agricultural policies.

2.1.2 Farming is both a way of life and the principal means of livelihood for 65 per cent of India’s population of 110 crores. Our farm population is increasing annually by 1.84 per cent. The average farm size is becoming smaller each year and the cost-risk-return structure of farming is becoming adverse, with the result that farmers are getting increasingly indebted. Marketing infrastructure is generally poor, particularly in perishable commodities. No wonder, a recent NSSO survey revealed that nearly 40 per
cent of farmers would like to quit farming, if they have the option to do so. Unfortunately, there is little option for them except moving into urban slums.

2.1.3 The livelihoods of pastoralists and smallholder farmers are threatened by the progressive loss of grazing land for their animals, limitations to mobility, inadequate or inappropriate government policies, and lack of animal health and other services. These developments are also causing the progressive loss of the livestock breeds and species that provide rural livelihoods and life-style options.

2.1.4 The support systems needed by farmers, like research, extension, input supply and opportunities for assured and remunerative marketing are in need of review and reform. Small farmers are forced to borrow from moneylenders at high rates of interest, since only 51 per cent of the credit requirements of farmers are met by institutional sources. Only 27 per cent of all cultivator households receive institutional credit.

2.1.5 Farmers’ suicides are not only persisting but are tending to increase, particularly in the Vidharbha region of Maharashtra. The suicides are driven by several factors that include debt from private moneylenders at high rates of interest, soaring input costs, low output prices, need for funds for non-farm expenditure, particularly for healthcare and a complete loss of hope. The farmers of such regions need to be rescued from the pall of despair and doom. Unfortunately, the economic, ecological, technological and social problems facing small farmers are yet to receive the integrated attention they need, although the NCF had recommended in its Second Report submitted in August 2005, a life saving package, including the formation of “Hope Generation Teams” of students by Agricultural Universities, to visit suicide hotspots.

2.1.6 The social prestige and status accorded to farmers are also low. Farmers seldom receive recognition through Padma Awards on Republic Day - an index of the low recognition given to the contributions of 650 million farm women and men not only to food and livelihood security, but also to national sovereignty. Lal Bahadur
Shastri’s slogan “Jai Kisan” is yet to be converted into public policies which recognise the pivotal role of farming communities in national well-being and security.

2.1.7 Policies are needed for making the farming operators sub-marginal, marginal and small farmers economically viable and environmentally sustainable. Well-defined guidelines are needed for assisting such families with assured and remunerative marketing opportunities, particularly in the case of perishable commodities, and ‘orphan’ crops like a wide range of millets, tubers, pulses and oilseeds.

2.1.8 Technology has been a major factor in the rich-poor divide until now. We should now enlist technology as an ally in the movement for gender and social equity. This will call for a pro-poor, pro-women and pro-nature orientation to technology development and dissemination. Also, Intellectual Property Rights (IPR) policies should be such that there is social inclusion in access to technologies. This will call for a considerable stepping up of investment in public good research and an antyodaya approach to technology development and dissemination. There is no option except to produce more food and other commodities under conditions of diminishing per capita arable land and irrigation water resources. Hence, we must harness the best in frontier technologies and integrate them with traditional wisdom and thereby launch an ecotechnology movement.

2.1.9 Research should be tailored to the need for developing technologies which can help to add economic value to the time and labour of the poor, particularly women. Also, the advantage of the National Rural Employment Guarantee Programme (NREGP) should be taken for launching a massive adult and functional literacy programme using modern computer-aided joyful learning techniques. The poor are poor because they have no assets, neither land nor livestock nor fishpond. They are often illiterate also. Modern technologies can help to achieve a quantum jump in imparting literacy and market-driven skills. They should therefore be harnessed for the benefit of resource poor farm and
landless labour families living below the poverty line. Further, the NREGP should be used to create productive assets in rural areas.

2.1.10 Within a week after the launch of NREGP, 2.7 million applicants reportedly registered themselves for employment under this programme in 13 districts of Andhra Pradesh and a million registered in 12 districts of Maharashtra. The average wage under this programme is about Rs. 60 per day. While this will help them to get their daily bread, the programme cannot solve the challenge of pervasive poverty. Since NREGP represents employment of the last resort and caters only to unskilled work, the extent of despair and deprivation in rural India is obvious from the demand for placement in this programme.

2.1.11 Addressing the nutrition, healthcare and education needs of the poor, and particularly of agricultural labour, tribal women and men and fisher families should be given top priority. Nearly 75 per cent of children in the country are under-weight due to inadequate nutrition. India has the largest number of under-weight and low birth weight children and their prevalence is almost double that of Sub-Saharan Africa. Micronutrient deficiencies are widespread. More than 75 per cent of preschool children suffer from iron deficiency anaemia. About 57 per cent of preschool children have sub-clinical vitamin A deficiency. Many traditional food habits in rural and tribal areas included a wide range of millets, tubers and grain legumes. The revitalization of nutrition-centred farming systems is an urgent task. Both dying crops and dying wisdom should be saved and harnessed for local level community managed food security systems, like Community Food Banks.

2.1.12 While farm families are crying for additional investment in infrastructure and farm innovation, there has been a drop in government investment in the agriculture sector. The drop in government as well as private investment has significantly slowed down momentum in the entire rural economy. Public policies in the area of farm subsidies have led to distortions in land use and fertiliser consumption and have promoted the unsustainable exploitation of groundwater. The intensive wheat-rice
rotation in the Punjab-Haryana region has led to the depletion of groundwater and to soil salinisation in some areas. Balanced fertilisation has been affected by the heavy subsidy given to urea-based fertilisers, particularly in the context of a sharp rise in the prices of all chemical fertilisers. Soil micronutrient deficiencies are not being addressed. Consequently, factor productivity is going down, with a consequent adverse impact on the cost of production.

2.2 Silver Lining in the Dark Cloud

2.2.1 Fortunately, several significant initiatives have been taken during the last 2 years to reverse the downward trend in agricultural production and to find permanent solutions to the agrarian crisis. Some of the important new initiatives are:

- Bharat Nirman or a New Deal for Rural India.
- National Rural Employment Guarantee Programme.
- National Horticulture Mission.
- Expansion of agricultural credit and lowering of interest rates.
- National Rainfed Area Authority.
- National Fisheries Development Board.
- Changes in the Agriculture Produce Marketing Committee Act (APMC), to make them farmer-friendly.
- Integrated Food Law (currently the food processing industry is governed by 16 different laws).
- Warehouse Receipt Act, making warehouse receipts a negotiable instrument, thereby helping to prevent distress sales.
- Knowledge connectivity through the e-governance and Every Village a Knowledge Centre.

2.2.2 The time is therefore opportune for revitalising our agricultural progress by making agrarian prosperity the bottom line of government investment and agricultural and rural development policies.
2.2.3 Data and analysis relevant to the preparation of a Draft National Policy for Farmers are included in this chapter in order to provide the rationale underlying the recommendations. The conclusions of the Mid-term Appraisal of the Tenth Plan conducted by the Union Planning Commission are also included among the background documents (Annexure 1, Chapter 3.1), in order to emphasise the need to prevent a further fall in the productivity and economic viability of farming.

2.3 Next Steps

2.3.1 NCF is of the view that the process of preparation of a National Policy Statement is as important as the product. The present draft is the result of widespread consultations and field visits during the last 15 months. NCF proposes to provide a second draft in its fifth and final Report to be submitted to the Ministry of Agriculture on October 13, 2006, when the term of NCF ends. The second draft will be based on the views/comments on the present draft by Farmers’ and Fisher People’s Associations, as well as women’s organisations, State Governments, financial institutions, Self-help Groups (SHGs), Cooperative Federations, private and public sector companies, mass media and all other stakeholders. State Governments have a special responsibility, since agriculture is a State subject under our Constitution. NCF hopes that the Ministry of Agriculture will get the draft policy finalised by early 2007, so that the policy can be adopted by Parliament and the National Development Council on the occasion of the 60th Anniversary of our Independence.
2.4 Draft National Policy for Farmers

Box I

<table>
<thead>
<tr>
<th>Mission Statement</th>
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<tr>
<td>• To mainstream the human dimension in all farm policies and programmes and to give explicit attention to issues relating to women in agriculture.</td>
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<tr>
<td>• To end the era of farmers’ suicides and to restore pride and confidence in India’s agricultural capability.</td>
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<tr>
<td>• To complete the unfinished agenda in land reforms and to initiate comprehensive asset and aquarian reforms in rural India.</td>
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<tr>
<td>• To enhance the income, livelihood, nutrition and health security of farm, fisher, tribal, pastoral and agricultural labour families through mutually reinforcing packages of technology, techno-infrastructure, services and public policies.</td>
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<tr>
<td>• To protect and improve the land, water, biodiversity and climate resources essential for sustained advances in the productivity, profitability and stability of major farming systems, and thereby the livelihood security of nearly two-thirds of our population.</td>
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<tr>
<td>• To introduce measures which can help to attract and retain youth in farming and which can confer the power of scale to small and marginal farmers both in the production and post-harvest phases of farming, thereby enhancing their income and competitiveness.</td>
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<tr>
<td>• To strengthen the biosecurity of crops, farm animals, fishes and forest trees for safeguarding both the work and income security of farm and fisher families, and the health and trade security of the nation.</td>
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2.4.1 Definition

For the purpose of this Policy, the term “farmers” will include landless agricultural labourers, sharecroppers, tenants, small, marginal and sub-marginal cultivators, farmers with larger holdings, fishers, dairy, sheep, poultry and other farmers involved in animal husbandry, pastoralists, plantation workers, as well as those rural and tribal families engaged in a wide variety of farming related occupations such as sericulture and vermiculture. The term will include tribal families sometimes engaged in shifting cultivation and in the collection and use of non-timber forest products. In all cases, both men and women will receive equal attention. This Draft Policy aims to suggest methods of improving the income and work security of such citizens of the country who not only constitute the genuine majority of our population, but also represent the largest private sector enterprise of the country.

2.4.2 Ending the Era of Farmers’ Suicides

2.4.2.1 We live on this earth as guests of the green plants which convert sunlight into food, and of the farm women and men who toil in sun and rain to cultivate them. It is
therefore sad and shameful that the very farmers making life possible for others are forced to take their own lives. **Ending this chapter in our national history must be the first and foremost task of Government.** From its first Report, NCF has been giving both generic and location specific recommendations to end this sad chapter of our agricultural history. A ‘Livelihood Security Compact’, programme for instilling hope in the minds of those farmers who have lost all hope, and specific steps for solving the Vidharbha agrarian crisis have been proposed in the earlier Reports of NCF. The establishment of Village Knowledge Centres managed by the widows and/or sons and daughters of the farmers who have taken their lives will help to spread the right information, at the right time and to the right people, particularly in the areas of credit, insurance and trade literacy. Such a programme is being launched on May 1, 2006 (Maharashtra Day) at Nagpur. Also, the ‘Hope Generation Teams’ to be set up by Agricultural Universities should start functioning immediately, since the summer vacation will afford an opportunity to scholars and staff to stay in the ‘Suicide Hot Spots’ and spread a message of confidence in our agricultural future.

2.4.2.2 Ours is a nation of subsistence farmers, who constitute one fourth of the global farm population. There is little or no evidence that policy is being shaped by that reality. Farming is the largest people’s private sector and not a corporate domain. The immediate step Government must take is to implement the NCF recommendation for a Price Stabilisation Fund. While a multiplicity of factors is driving the farm suicides, the greatest worry of the farmers relates to the price he is likely to get for his produce at harvest time. This has proved true regardless whether the produce is cotton, onions, groundnut, sugarcane or pulses. **Assured and remunerative price for farm produce is the core issue. Farmers should be assured that there will be strong Government intervention to prevent distress sales.**

2.4.2.3 There are no conclusive figures on the number of farmers’ suicides. According to media reports, it appears that this number may be about 30,000 across six States. There is need for a proper “Suicides Census”. Gram Sabhas may be involved in this process. The review and overhaul of credit operations ought to be far more transparent and rigorous. The Indian Trade Organisation (ITO) should come into
existence soon as a watchdog body to safeguard farmers’ interests. The ITO could be supported by a Trade Advisory Body for Small Farmers. The objective would be to allow farmers to engage with decision makers in the formulation of appropriate policy responses to developments in agricultural markets.

2.4.2.4 Another area where the Central and State Governments can help is input costs. High quality inputs should be made available at affordable prices at the right time and place, along with credible extension advice. Today, the farmer depends on the input dealer who sells seeds, pesticides and fertilisers for technical advice. In many “Suicide Hot Spot” areas, the input dealer is also the moneylender, the scientist, agricultural expert, counselor and buyer all rolled into one.

2.4.2.5 NCF urges State Governments and all concerned not to place the underlying causes for the increasing number of farmers’ suicides under the carpet and delay action on its recommendations. Some immediate financial support to the bereaved families is important, but not adequate. Until such time we do not recognise the root causes of this sad chapter of our agricultural history, remedial actions will largely be cosmetic.

2.4.3 Asset Reform

2.4.3.1 The purpose of asset reform is to ensure that every man and woman in villages either possess or has access to a productive asset like land, livestock, fishpond, homestead farm or income through an enterprise, or a market driven skill, so that household nutrition security is safeguarded, and children are able to go to school. Child labour has to be rendered unnecessary by improving the economic wellbeing of the adults.

2.4.3.2 Land

2.4.3.2.1 The major assets available to farm families are land, water, livestock, biodiversity, fisheries and forestry. The ownership of land is highly skewed with over 60 per cent of the rural households owning less than one hectare. Farmers owning over one hectare comprise nearly 28 per cent of rural families. The landless population amounts to
11.24 per cent of rural households. These data relate to 1991-92 and it is obvious that by now there would have been further fragmentation of holdings leading to a much larger incidence of very small operational holdings. The slow growth of opportunities in the non-farm employment sector has led to the proliferation of tiny and economically non-viable holdings. **Increase in small farm productivity and creating multiple livelihood opportunities through crop-livestock integrated farming systems as well as agro-processing have become urgent tasks.** The first and foremost task of the National Policy for Farmers should be in the area of land reform with particular reference to tenancy laws, distribution of ceiling surplus land, attention to common property and wasteland resources and the consolidation of holdings. Following the conferment of land rights to women under the Hindu Succession Amendment Act (2005), the provision of appropriate support services to women farmers has become urgent. Joint Pattas are essential for women to get access to credit. Also, there should be stringent restrictions on the diversion of prime farmland for non-farm purposes.

2.4.3.2.2 Methods of providing the power of scale to small farmers will have to be developed and popularised on a win-win basis for all concerned. Such methods should include the following:

i. Cooperative Farming – This has by and large not been successful except in the case of the dairy industry. Marketing cooperatives are successful since members cooperate on the basis of enlightened self-interest. Other forms of service cooperatives are yet to emerge on a significant scale. For example there is scope for Irrigation Water Cooperatives which can operate community tubewells, lift irrigation etc. Cooperative farming will be ideal for small and marginal farmers since the cooperative can provide centralised services like tractors and other farm equipment as well as threshing and drying machines, to support small scale decentralised production. This will bring down the cost of production and enhance the quality of produce and thereby of income. Instead of denying small farmers the many opportunities provided by cooperatives, the emphasis should be on the introduction of appropriate reforms to make them small farmer-friendly and efficient. Cooperative credit institutions also need revamping and revitalisation.
ii. Group Farming by Self-Help Groups – So far, Self-Help Groups (SHGs) have been mainly organised for supporting micro-enterprises operated by women with the help of micro-credit. With the growing diminution in the size of operational holdings, it will be useful to promote SHGs at the production end of the farming enterprise involving men. This will be particularly helpful in the case of integrated pest management, integrated nutrient supply, scientific water management and improved post-harvest technology. SHGs will however become sustainable, only if they have backward linkages with technology and credit and forward linkages with processing and marketing organisations. Steps will have to be taken to convert micro-finance into livelihood finance through appropriate support systems. There is also need for establishing **SHG Capacity Building and Mentoring Centres**.

iii. Small Holders’ Estates – In its earlier reports, NCF has recommended the formation of Small Holders’ Cotton, Horticulture, Herbal, Poultry and Aquaculture Estates. The aim is to promote group cooperation among farmers living in a village or watershed or the command area of an irrigation project in improving productivity, reducing the cost of production and entering into marketing contracts with textile mills, food processing industries, pharmaceutical companies, fish marketing agencies etc. Such Small Farmers’ Estates can also manufacture products under brand names and enhance income security. Group insurance will then become feasible. Agri-clinics and Agribusiness Centres could be linked to such Estates.

iv. Contract Farming – Symbiotic contracts which confer benefits to both producers and purchasers will be ideal for ensuring assured and remunerative marketing opportunities. At the moment, the Central and State Governments through organisations like Food Corporation of India (FCI), NAFED, etc., ensure the operation of the Minimum Support Price (MSP) announced by Government. Contract cultivation based on a well-defined Code of Conduct will be helpful to small producers in getting good quality input, a fair price as well as prompt payment for their produce. A **Code of Conduct for Contract Farming** will have to be developed for major groups of farm commodities like vegetables, fruits, flowers, medicinal
plants, tuber crops, pulses, oilseeds, sugarcane, cereals, cotton etc. Both production
and marketing contracts are growing. **Available evidence indicates that direct contract between the producer and purchaser is more advantageous to small farmers than indirect contract through intermediary agencies.** A National Federation of Farmers entering into contract cultivation will be useful to identify the best pro-farmer practices that will ensure a win-win situation for both producers and purchasers.

v. Corporate Farming – The scope for corporate farming is rather limited except in cases relating to the restoration of degraded lands and cultivation of raw material for industries like paper, rayon, furniture, building materials, etc. The corporate sector could bring the best available technology for upgrading degraded lands and for getting high yields through improved technology. The cultivation of crops for biofuels also presents opportunities for corporate farming. However, care has to be taken to ensure that common property resources or grazing lands are not allotted to corporations, thereby leading to a shortage of vital grazing areas for sustainable livestock production.

vi. Company Farming – Private limited companies, registered under the Companies (Amendment) Act, 2002 are now coming into existence in the area of seed production and the production of biofertilisers, biopesticides and other forms of biological software essential for sustainable agriculture. Small farmers can then become shareholders in companies managed by them.

vii. Government State Farms – In the fifties, there was considerable emphasis on the development of large State farms on the model of the farms promoted by the former Soviet Union. Most such farms are now being used for purposes other than the production of food crops. The land available with State Farms could be made available to women self-help groups for the production of hybrid and improved seeds of crop plants, vegetables, fruits and flowers, as recommended by NCF in its First Report. Also, State Farms could be used for developing **Living Heritage Gene Banks** of the Germplasm of local breeds of cattle, sheep, poultry, etc. This will be
very helpful to preserve our animal genetic wealth. Where possible, they should be handed over to farmers’ organisations or NGOs for management. Such farms should be given the responsibility of assisting and encouraging community-based conservation of livestock breeds and species in the surrounding areas. They should be run on scientific lines and monitored by a committee consisting of local farmers’ representatives, scientists and NGOs.

2.4.3.2.3 To sum up, even the ownership of a small plot of land will help the family to improve household income and nutrition security. Wherever feasible, landless labour households should be provided with at least 10 cents per household which will give them space for kitchen gardens and animal rearing.

2.4.3.3 Livestock

2.4.3.3.1 According to the 17th Livestock Census released in January 2005, India has 57 per cent of the world’s buffalo population and 16 per cent of the cattle population. Also, we rank third in sheep wealth and second in goat population. The contribution of the livestock sector to agricultural GDP has increased from 18 per cent in 1981 to 26 per cent in 2004-05. It is clear that livestock and livelihoods are very intimately related in our country and that crop-livestock integrated farming is the pathway for farmers’ well being.

2.4.3.3.2 The ownership of livestock is much more egalitarian since resource poor farming families own a majority of cattle, buffalo, sheep and goats. The major constraints experienced by such families relate to fodder, feed and healthcare. There is an urgent need for establishing Livestock Feed and Fodder Corporations to assist SHGs to produce good quality animal feeds. Such a Corporation should be a facilitating body for providing seeds and planting material of improved varieties to SHGs for local level production. The productivity of our livestock is low and can be easily improved through better nutrition and healthcare. Agri-clinics operated by veterinary and farm science graduates will be very helpful to enhance the income of livestock owners through higher productivity. At the same time, crop-livestock mixed farming systems should be promoted since this will help to improve both income and household nutritional security.
2.4.3.3 The Union Finance Minister in the recent budget has announced that banks are being asked to provide a separate window for SHGs as well as for joint liability groups of tenant farmers. This window will provide an opportunity for achieving a fodder and feed revolution for enhancing the health and productivity of our unique livestock wealth. Livestock insurance also needs revamping and be made accessible to small livestock owners. Livestock rearing can be linked to organic farming, so that there is value addition to the produce from small farms.

2.4.3.4 Fisheries

2.4.3.4.1 Both coastal and inland fisheries provide employment and livelihoods to millions of families. There is considerable scope for improving the income of fisher families on an environmentally sustainable basis by introducing Integrated Coastal Zone Management and scientific fish rearing, harvesting and processing. In the area of public policy, there is need for well-planned Aquarian Reforms addressing the following issues:

- Conflicts between mechanised and artesenal fishing enterprises.
- Conflicts between aquaculturists and agriculturists as well as local population because of salt water entering into the aquifer, and pollution caused by intensive systems of aquaculture.
- Lack of well-defined policies for the allocation of ponds and reservoirs to landless labour and dalit families for practicing modern aquaculture based on composite fish farming.
- Concerns of environmentalists in the areas of seaweed farming and introduction of exotic carps and other alien invasive species.
2.4.3.4.2 Therefore, aquarian reforms should address issues in the areas of ecology and equity and should enable resource poor fisher and landless labour families to earn their livelihood from capture and culture fisheries in a sustainable manner. The other aspects of policy which need attention are fish seed and feed production, post-harvest technology and subsistence allowance for fisher families during the ‘close season’ period. The subsistence allowance per fisher family should be at least Rs.1500 per month during the ‘close season’. The establishment of a National Fisheries Development Board (NFDB) on the lines of the National Dairy Development Board is a welcome step. The guiding principles for NFDB should be ecology, economics, gender equity and employment generation. Such a Board should have representatives of fisher communities representing both the capture and culture aspects of fish farming. Also, the Board should establish “Fish for All Training and Capacity Building Centres” which can impart training to fisher families in all aspects of the capture/culture–consumption chain. Quality literacy is important to safeguard the harvested fish from salmonella and other infections capable of producing mycotoxins. Another area requiring attention is the standardisation of Low External Input Sustainable Aquaculture Techniques (LEISA) which will be environment friendly. The National Fisheries Development Board should also help those engaged in small scale ocean fisheries by providing Mother Ships which can ensure hygienic handling of catch in the mid-ocean. Other forms of centralised services to support the decentralised capture and culture fisheries sectors are also important. Special attention needs to be given to the training needs of fisher women who handle the harvested catch. The National Aquaculture Authority and the National Fisheries Development Board should work together, so that capture fisheries and aquaculture become mutually reinforcing in improving the economic well being of fisher families and the nutritional well-being of consumers.

2.4.3.4.3 Inland aquaculture including ornamental fish culture and air breathing fishes can provide additional income to resource poor families. This is why well-defined aquarian reforms are essential to provide fisher families, particularly women, with the necessary space in ponds and reservoirs. There are also opportunities for establishing artificial coral reefs to compensate for the loss of natural coral reefs. This will help to
revive the fish catch. The new Integrated Coastal Zone Management Policy should pay concurrent attention to the management of about 10 km of land surface and 10 km of sea surface from the shoreline. This will ensure that land-based occupations do not cause damage to ocean fisheries as a result of release of effluents and other pollutants. The coastal communities can also be enabled to raise bioshields comprising mangroves, casuarina, salicornia, atriplex and other halophytic plants. This will help to safeguard the lives and livelihoods of coastal fisher and farm families in the event of cyclonic storms and seawater inundation, as for example like the one caused by tsunami. Coastal Bioshields, Biovillages and Village Knowledge Centres would help all families living in coastal areas to earn sustainable and secure incomes.

2.4.3.4.4 There is also need for a dynamic policy for the management and economic use of the Exclusive Economics Zone (EEZ) extending to nearly 2 million km$^2$ of sea surface, which amounts to two-thirds of the land surface available to India. This can be a priority task of the National Fisheries Development Board since it can help to generate both new income and employment opportunities for coastal communities.

2.4.3.5 Water

2.4.3.5.1 Irrigation water at the right time and in adequate quantities is now becoming a serious constraint in achieving both higher productivity and stability of farming in many parts of the country. Jal Swaraj or self-sufficiency in irrigation water availability is the need of the hour. Though the total rainfall in our country is satisfactory, its distribution is highly skewed, with most of the rainfall occurring in 100 hours in a year. Therefore, rainwater harvesting and aquifer recharge have become essential for ensuring the stability of supply. They must be made mandatory. Water quality also needs attention since water often gets polluted at source with pesticide residues and toxic chemicals. There is also the problem of arsenic poisoning in groundwater. The problem of arsenic poisoning abounds because people residing in regions blessed with abundant surface water such as West Bengal increasingly depend on the groundwater for drinking and irrigation purposes. There is an urgent need to remove this dependency by making available other safe drinking water options—for instance, surface water, which is arsenic free. West
Bengal has 7000 cubic meter of available surface water per capita. Effective management of surface water including rivers, canals, water bodies, lakes, ponds and rainwater can reduce groundwater dependency in irrigation.

2.4.3.5.2 Besides problems relating to adequacy and quality, there are serious issues concerning equity in water distribution. Water is a public good and a social resource and not private property. The privatisation of water supply distribution is fraught with dangers and could lead to water wars in local communities. A nationally debated and accepted strategy for bringing 10 million hectares of new area under irrigation under the Bharat Nirman programme should be developed. The Polavaram Project to be built across the Godavari in Andhra Pradesh is a case in point. Different viewpoints can be reconciled only by dialogue and consensus building; Taking Prior Informed Consent of the community that will be affected by a project should be a precondition for approval of a project.

2.4.3.5.3 Further, increasing supply through rainwater harvesting and recharge of the aquifer should become mandatory. All existing wells and ponds should be renovated. Demand management through improved irrigation practices, including sprinkler and drip irrigation, should receive priority attention. A Water Literacy movement should be launched and regulations should be developed for the sustainable use of groundwater. Seawater farming should be promoted in coastal areas through the cultivation of mangroves, salicornia, casuarina and appropriate halophytic plants. The conjunctive use of rain, river, ground, sea, and treated sewage water should become the principal method for the effective use of available water resources. In water scarce areas, the land use system should place emphasis on the cultivation of high value–low water requiring crops, such as pulses and oilseeds. Pulses and oilseed villages can be promoted where all farmers work together in harvesting rainwater and sharing the water equitably for growing pulses and oilseeds. There is need for a Pani Panchayat in every village consisting of the Members of the Gram Sabha who could help in getting the available water distributed on an equitable basis. Where large scale dislocation of families living in the areas which will be submerged as a result of the construction of large dams or linking of rivers is likely, the Gram Sabhas of the affected villages should be
involved in the preparation of the rehabilitation plans. This should be done at the
time the large dam or other steps like the interlinking of rivers are in the drawing board.
Proactive consultations and consensus building will help to save both avoidable human
hardship and suffering and protracted litigation. Appropriate legislation should also be in
place to prevent further exploitation of groundwater in Dark Blocks by individual
farmers. Farmers also need technical advice in the selection of sites for borewells. A
farmer-friendly insurance cover should be in place for failed wells.

2.4.3.5.4 Land use decisions are also water use decisions. Hence, in areas characterised
by water scarcity, the cropping pattern should be designed in such a manner that low
water requiring, but high value crops like pulses are grown. Water Users’ Associations
are now being encouraged for maximising the benefits of the available water. The
National Rainfed Area Authority could help in promoting scientific water harvesting,
sustainable and equitable use and the introduction of efficient methods of water use like
drip irrigation. There should be symbiotic interaction between the National Rainfed Area
Authority, the National Horticulture Mission, the Technology Missions and the National
Rural Employment Guarantee Programme.

2.4.3.5.5 There are many schemes currently in progress with support from the Central
and State Governments to harness the following sources of water for agricultural,
industrial and domestic purposes.

- groundwater;
- rainwater;
- surface water including rivers and reservoirs;
- recycled water by treating effluents and sewage water; and
- sea water.

2.4.3.5.6 All the above sources of water can be utilised both in a conjunctive manner
and separately using the most efficient technologies available. For example, all along the
coast as well as in the Andaman and Nicobar Islands and Lakshadweep Group of Islands,
seawater farming could be promoted for coastal area prosperity. This will involve the
introduction of agro-forestry systems which combine the cultivation of mangroves, salicornia, casuarinas, coconut, cashewnut etc. along with prawn culture. Such agro-aqua farming systems will open up great opportunities for income and employment generation in coastal areas on a sustainable basis, provided they are based on sound ecological principles.

2.4.4 Biodiversity

2.4.4.1 The Government of India has already enacted a Plant Variety Protection and Farmers’ Rights Act (PVPFR), 2001 and Biodiversity Act, 2002. The implementation of both these Acts has also begun. The PVPFR Act recognises the multiple roles of farmers as cultivators, conservers and breeders. Detailed guidelines should be developed for ensuring that the rights of farmers in their various roles are protected. For example, most farmers who are cultivators are entitled to Plant Back Rights. This implies that they can keep their own seeds and also enter into limited exchange in their vicinity. Farmers as breeders have the same rights as professional breeders and they can enter their varieties for registration and protection. Farmers as conservers are entitled to recognition and reward from both the National Gene Fund and the National Biodiversity Fund. Quite often, the conserved material of great value could have been the contribution of a community and not an individual. Therefore, the procedures adopted should be such that community contributions can be recognised and suitably rewarded. Breeders should be required to indicate in the pedigree of the variety for which they are seeking protection, the names of the landraces and the areas from where they were collected, while submitting their application for registration. For example, Oryza nivara from Eastern UP was the major donor of tungro virus resistance in improved rice varieties like IR 36 which occupied over 10 million hectares in South and South East Asian countries.

2.4.4.2 The provisions in the Biodiversity Act, for prior informed consent and benefit sharing, are equally important for tribal and rural women and men. Invariably much of the conservation work has been done by women. Therefore, the recognition procedures should take into account gender roles in the conservation and enhancement of bioresources.
2.4.4.3 There is also need for assisting tribal and rural women and men in revitalising their in situ on-farm conservation traditions. Participatory breeding procedures, involving scientists and local conservers, would be particularly helpful in improving the productivity of landraces. Genetic engineers, working in public-good institutions should perform the role of pre-breeding, i.e., development of novel genetic combinations for important economic traits, such as resistance to biotic and abiotic stresses. They should then work with farmers in participatory breeding programmes, so that genetic efficiency and genetic diversity can be integrated in an effective manner. Genetic homogeneity enhances genetic vulnerability to pests and diseases. This is why the integration of pre-breeding and participatory breeding would help to insulate small farmers from the risks of pest epidemic.

2.4.4.4 There is also need for launching genetic and legal literacy movements in areas rich in agro biodiversity, such as the North East Region, Western and Eastern Ghats and the arid zone. Genome Clubs can be organised in rural schools for imparting an understanding of the importance of genetic resources conservation. Legal literacy would help tribal and rural families to understand the provisions in PVPFR and Biodiversity Acts with reference to their entitlements. If such steps are taken, we can prevent some of our genetic paradises becoming ‘hotspots’ from the point of view of threat to biodiversity. Farm and tribal families should be trained in methods of preventing gene erosion. Coastal biodiversity, including coral reefs and sea grass beds, are also in urgent need of conservation. Tribal, farm and fisher families can play a major role in this area provided they are involved as partners in the genetic conservation movement. Traditional methods of conservation like Sacred Groves need to be supported and encouraged.

2.4.4.5 Animal Genetic Resources

2.4.4.5.1 Apart from conserving genetic diversity and acknowledging the vital role of livestock keepers, there is need to document the indigenous knowledge of pastoral communities about animal maintenance and breeding. Community-based conservation and development of indigenous livestock breeds and species should be encouraged. There should be a special focus on both hot and cold arid and semi-arid areas where the genetic
diversity and associated indigenous knowledge are particularly well developed. Wastelands could be used to promote in situ conservation of animal breeds, even those that are amenable to ex situ conservation. A policy focus will need to be created, to conserve grazing lands, to enable the conservation of animal genetic resources. Documentation of special traits should be done in the context of the new biology and new nutritional needs or for other economic traits like hide/leather quality. There is need for offshore Genetic Resource Centres for screening germplasm for resistance to serious diseases like the H5N1 strain of avian influenza virus.

2.4.4.5.2 The burden of conservation cannot be allowed to fall on the largely impoverished communities that maintain animal genetic diversity. A system of rewards and incentives must be developed to enable and motivate people to conserve their breeds under the Biodiversity Act. The Biodiversity Fund should be used for such purposes. Livestock keepers’ inherent rights to continue to use and develop their own breeding stock and breeding practices should be acknowledged. The government must recognise these rights, acknowledge livestock keepers’ contribution to the national economy, and adapt its policies and legal frameworks accordingly. This is particularly important to pre-empt attempts to use the intellectual property system to obtain control over animal resources that are an important component of the country’s food and livelihood security systems.

2.4.4.6 Plant Genetic Resources

2.4.4.6.1 A nationwide programme needs to be launched for the ex situ and in situ conservation of plant genetic resources at the field/farmer level. Farmer level gene/seed banks need to be put up in areas where traditional varieties are saved. Some State governments, as for example Jharkhand is promoting a ‘Seed Exchange Programme’ under which farmers are given hybrid rice in exchange for their traditional rice varieties. There is need to ensure that in this process, the traditional rice gene pool is not lost. Participatory management of National Parks, Biosphere Reserves and Gene Sanctuaries should be promoted.
2.4.5 Climate Change

2.4.5.1 Climate change leading to adverse changes in temperature, precipitation and sea level is no longer just a theoretical possibility. Most experts agree that we are already beginning to experience the impact of global warming as evident from the melting of glaciers and Antarctic and Arctic ice caps. Coastal storms and cyclones are also increasing in frequency and intensity. Droughts and floods are likely to be more frequent. Although climate change is a product of the unsustainable consumption of non-renewable forms of energy by industrialised countries, the harmful impact of climate change will be felt more by poor nations and the poor in all nations due to their limited coping capacity. Steps will have to be taken to standardise proactive measures that can reduce the vulnerability to climate change. Based on computer simulation models, contingency plans and alternative land and water use strategies will have to be developed for each major agro-climatic zone. Protecting the livelihood security of farm and fisher women and men from adverse climatic changes has to become a priority task. In drought and flood prone areas, experienced farm women and men can be trained as ‘Climate Managers’.

2.4.6 Science and Technology

2.4.6.1 Science and Technology are the drivers of change in farm operations and output. New technologies which can help to enhance productivity per units of land and water are needed for overcoming the prevailing technology fatigue. Frontier technologies like biotechnology, information and communication technology, renewable energy technologies, space applications and nanotechnology provide uncommon opportunities for launching an ever-green revolution, capable of improving productivity in perpetuity without ecological harm. In order to ensure social inclusion in access to new technologies, public investment in socially relevant agricultural research should be stepped up under the umbrella of the National Agricultural Research System (NARS) which comprises large numbers of ICAR institutions, State Agricultural Universities, All India Coordinated Research Projects and National Bureaus. NGOs carrying out research should also be encompassed under the NARS umbrella.
2.4.6.2 The research strategy should be pro-nature and pro-small farmer oriented. For example, in the case of Bt Cotton, public good institutions should concentrate on developing varieties rather than hybrids, so that farmers can keep their own seeds. Even now 80 per cent of the seeds used in agriculture come from farmer-seed systems. These will have to be strengthened and supported through infrastructure for community managed Seed Villages and Seed Technology Training Centres. In order to spread scientific literacy and to remove inadequately informed apprehensions about the risks and benefits associated with biotechnology and other new technologies, at least one woman and one male member of every Panchayat should be trained as Farm Science Managers.

2.4.6.3 Among the other steps, which need urgent implementation are the addition of post-harvest technology wings to Krishi Vigyan Kendras, and the organisation of lab-to-land demonstrations in the area of post-harvest technology, agro-processing and value addition to primary products. This will be important for providing skilled jobs in villages to landless labour families. Also, there is need for establishing Farm Schools in the fields of outstanding farmers like Krishi and Udyan Pandits and awardees of nationally recognised awards for farmers like the Karshakhashree of Malayala Manorama and ASPEE Awards. Farmer-to-farmer learning can speed up the process of technological upgrading of crop and animal husbandry, fisheries and agro-forestry. Priority could also be given for the establishment of Farm Schools in the fields of eminent horticulturists including those, who are raising organic vegetables and fruits and tissue culture propagated planting material. Human resource development holds the key to breaking the stagnation in agricultural growth and productivity.

2.4.6.4 Organic farming requires greater scientific inputs than chemical farming. This area of research hence needs high level multidisciplinary attention. Certification procedures which are internationally recognised are also needed. Organic farming zones could be created in medicinal plants and other crops which are likely to be in demand in national and international markets. Science for the small farmers should be the motto since whatever new technologies are adopted by resource poor farmers will easily spread among large farmers. The reverse may not happen.
2.4.6.5 In intensive agriculture areas like the Punjab and Haryana, crop diversification may be beneficial from the point of view of ecology, economics and employment generation. **However, any advice on crop diversification must be accompanied by steps to ensure effective market support for the alternative crops.**

2.4.6.6 Agriculture is becoming knowledge intensive. Knowledge is often a substitute for land and water, since it helps farmers to produce more from the same plot of land and same quantity of water. This is why computer-aided and internet connected Village Knowledge Centres assume great importance in the movement for a technological upgradation of both farm operations and farming efficiency.

2.4.6.7 **IPR policies should make provision for compulsory licensing of rights in the cases of research products and processes of value to resource poor farming families. In all cases of health and food security, social inclusion should be the guiding factor in the development of IPR.**

2.4.6.8 **Agro-meteorology**

2.4.6.8.1 The national capacity in short-, medium- and long-term weather forecasting is quite considerable. What is now important is to convert generic information into location-specific land use advice, based on cropping patterns and water availability. The Agrometeorological Advisories issued by Indian Agromet Advisory Service Centre, Pune, can be used by **Panchayat Level Farm Science Managers**, trained to give appropriate land use suggestions. Also, the **National Land Use Advisory Service**, recommended by NCF in its Third Report, would help to make the information relevant to both farm and fisher families. In the case of marine fisheries, data on wave heights and location of fish shoals are now available. These will have to be transmitted to the fishermen before they move into the sea. An integrated internet – FM or HAM radio service would be very helpful to fishermen on the high seas.

2.4.6.8.2 Timely and dependable advice on weather conditions will be very helpful to farm families to plan their sowing and the other operations. The National Land Use Advisory Service in collaboration with Panchayat Level Farm Science Managers can help
to bring the benefits of the advances in agricultural meteorology to farm and fisher populations.

2.4.6.9  Agricultural Biosecurity

2.4.6.9.1  Agricultural Biosecurity covering crops, trees and farm and aquatic animals is of great importance since it relates to the work and income security of 70 per cent of the population, and food and trade security of the nation. There is need to develop a National Agricultural Biosecurity System (NABS) with the following aims:

- Safeguard the income and livelihood security of farm and fisher families as well as the food, health and trade security of the nation through effective and integrated surveillance, vigilance, prevention and control mechanisms designed to protect the productivity and safety of crops, farm animals, fishes and forest trees.

- Enhance national and local level capacity in initiating proactive measures in the areas of monitoring, early warning, education, research, control and international cooperation, and introduce an integrated biosecurity package comprising regulatory measures, education and social mobilisation.

- Organise a coordinated National Agricultural Biosecurity Programme on a hub and spokes model with effective home and regional quarantine facilities capable of insulating the major agro-ecological and farming systems zones of the country from invasive alien species of pests, pathogens and weeds.

2.4.6.9.2  The NABS should have the following three mutually reinforcing components:

i. National Agricultural Biosecurity Council (NABC) chaired by the Union Minister for Agriculture to serve as an apex policymaking and coordinating body.

ii. National Centre for Agricultural Biosecurity (NCAB) having four wings dealing with crops, farm animals, living aquatic resources and agriculturally important micro-organisms and dealing with the analysis, aversion and management of risks, as well as the operation of an early warning system. NCAB will provide the Secretariat for the National Agricultural Biosecurity Council.
iii. **National Agricultural Biosecurity Network (NABN):** NCAB will serve as the coordinating and facilitating centre for a National Agricultural Biosecurity Network designed to facilitate scientific partnerships among the many existing institutions in the public, private, academic and civil society sectors, engaged in biomonitoring, biosafety, quarantine, and other biosecurity programmes to help maximise the benefits from the already existing scientific expertise and institutional strengths.

2.4.6.9.3 The establishment of a National Biosecurity Council, National Centre for Agricultural Biosecurity and a National Agricultural Biosecurity Network will help us to strengthen considerably our ability to undertake pro-active measures to prevent the outbreak of pandemics and the introduction of invasive alien species. Such an Agricultural Biosecurity Compact is an urgent national need since prevention is always better than cure. The details on the structure and organization appear in chapter IV of this Report.

2.4.7 **Inputs**

i. **Seeds:** Good quality seeds and disease free planting material are essential for crop productivity and security. Hybrids are now becoming available in many crops. Seeds of such hybrids can be produced by women SHGs on contract with seed companies. Mutually beneficial farmer-seed company partnership can be fostered. In the case of new varieties, foundation seeds could be provided to SHGs. Proper technical guidance and training in seed technology will be necessary for SHGs to produce high quality seeds. This will be an ideal area for private sector–farmers’ association partnership.

ii. **Soil Health:** Pricing policies should be such that balanced fertilisation is promoted. As recommended in the First Report of NCF, every farm family should be issued with a Soil Health Passbook, which contains integrated information on the physics, chemistry and microbiology of the soils. In particular, more laboratories to detect micronutrient deficiencies are urgently needed. **Soil Health Enhancement holds**
the key to raising small farm productivity. There is also need for proper technical advice on the reclamation of wastelands and on improving their biological potential.

iii. Implements: Small farmers need implements which can enable them to sow the crop at the right time and manage weeds and adopt improved post-harvest technology. Women need implements which can reduce drudgery and enhance output.

iv. Vaccines and Sero-diagnostics: Major gaps in the facilities presently available will have to be filled in the case of important animal diseases. Biotechnology research in the area of vaccine development needs to be stepped up. Public-private partnerships should be encouraged in this area.

v. Fish Seed and Feed: Good quality and disease free fish seed holds the key to successful inland aquaculture. Suitable SHGs could be trained in induced breeding and fish seed production. Similarly, feed at affordable prices is another requirement. Fish farmers’ cooperatives could organise the production of feed and seed with technical assistance from the National Fisheries Development Board.

vi. Animal Feed: Inadequate nutrition is the primary cause of low milk yield in dairy animals. There is both under nutrition and malnutrition. Annual milk production can reach over hundred million tonnes if the nutritional requirements of cows and buffaloes can be met. Here, both conventional and non-conventional approaches are needed. Many of the celluleosic wastes can be converted into good animal feed through appropriate treatment and enrichment. Breeding of nutrition rich fodder plants should receive high priority. Established technologies such as baling and ensiling, need to be disseminated widely.

vii. Support Services: A few other essential support services needed for higher farm animal productivity are-establishing genetic evaluation systems for indigenous breeds as well as crosses so that selection can lead to genetic improvement of
production characteristics upgrading of breed through artificial insemination, cross breeding suited to the farmers’ resources and improved processing and marketing.

viii. There are other areas of input supply also which merit intensive attention. Some examples: bio-fertilisers and bio-pesticides, irrigation equipment, assured power supply, postharvest technology and infrastructure and rural godowns and warehouses.

2.4.8 Farmer Categories needing Special Attention

2.4.8.1 Landless Agricultural Labour

2.4.8.1.1 Agriculture accounted for 21 per cent of GDP in 2004-05. Employment in the farm sector however amounted to as much as 60 per cent in 1999-2000. This represents a decline of just 16 per cent since 1950-55. Parts of the non-agricultural economy are on a roll, while the agricultural economy is in a state of distress. Those most affected by the agrarian crisis are the ones without assets, particularly women. Men often migrate to towns and cities in search of jobs. The National Rural Employment Guarantee Programme should help to save the assetless poor from starvation. However, it cannot lift them out of poverty.

2.4.8.1.2 China has addressed the need for creating opportunities for skilled non-farm employment through a massive Township and Village Enterprises (TVE) movement. There were 21.15 million TVEs in China at the end of 2001, employing a total of 130 million workers. Their added value of 29356 billion Yuan (3669.5 billion US $) accounting for 31.1 per cent of the national total (He Kang, 2006, China’s Township and Village Enterprises, Foreign Language Press, Beijing)

2.4.8.1.3 Several programmes have been initiated by KVIC and NGOs for generating off- and non-farm employment. The SHG movement is helping women, particularly in South India to come out of the poverty trap. There is need for a counterpart to NREGP in the skilled employment sector. Initiatives like Small Farmers’ Agribusiness Consortium (SFAC), Agri-clinics and Agribusiness Centres, Food Parks etc., which could have provided substantial additional livelihood opportunities to the rural poor are yet to take
off. It would be useful to integrate all of them into one initiative like China’s TVEs and launch a Rural Non-farm Livelihood Initiative for families without land or other productive assets. The joyful learning programme through computer aided adult/functional literacy procedures should help to accelerate the progress of eradication of illiteracy. The Rural Non-farm Livelihood Initiative could have as its core the KVIC and restructured SFAC and bring all rural non-farm employment programmes together, in order to generate convergence and synergy among them. A Consortium approach could be adopted involving Central and State Governments, Academia, NGOs, public and private sector industry and financial institutions. The sooner we initiate a massive and market-driven rural non-farm livelihood programme, the greater will be the prospect for peace and security in rural India. Also, food security in India is best expressed in terms of million person years of jobs, rather than in million tonnes of foodgrains. Where there is work, there is money. Where there is money, there is food. There is therefore need for a restructuring and revamping of organisations like SFAC, KVIC, Agri-clinics and Agribusiness Centres.

2.4.8.2 Women Farmers and Farm Labour

2.4.8.2.1 Public policies in the field of agriculture are yet to be engendered. Women-headed farm households suffer many handicaps in the areas of access to technologies, inputs and extension advice. Absence of titles to land prevents many de-facto women farmers from eligibility to institutional credit. Kisan Credit Cards have been issued mostly to men. Small farm productivity will not go up unless there are serious efforts in the areas of knowledge and skill empowerment of women in all aspects of the farming system. Considering the critical role played by women in post-harvest handling, processing, storage and marketing, women farmers and farm labour should be actively involved in the 60,000 Lab-to-Land post-harvest technology and agro-processing demonstrations recommended by NCF in its Third Report.

2.4.8.2.2 Joint Pattas should be issued speedily, particularly in the areas where there is outmigration of men. Also, women farm workers require support services like crèches, healthcare and functional literacy courses. Nutritional requirements of pregnant and
nursing women need to be met. Women SHGs need Capacity Building and Mentoring Centres. They should also be given land in State Farms for seed production, animal genetic resources conservation, etc. Women perform multiple functions. The aim of agricultural research and extension should be bringing about a reduction in the number of hours of work and an increase in the income per each hour of work, i.e. value-addition to the time and labour of women in agriculture. Training in food safety and quality management is essential, since women handle many of the post-harvest operations. Legal literacy with reference to their entitlements is equally important.

2.4.8.2.3 Credit continues to be a big problem for women farmers and even more so for women tribal farmers. Even though the criteria have been made flexible to include tenant farmers, ownership of land pattas is still the norm for extending credit. This implies a problem for women farmers (who are generally not title-holders), and also small and marginal farmers, who may be cultivating more land than that for which they have pattas. **Institutional credit for agriculture needs to be delinked from land titles.**

2.4.8.2.4 Women are not allowed to participate in the traditional decision-making bodies. This is a major constraint and leaves them out of decision-making and planning processes, as say in the case of NREGP. The majority of representatives of the farmers’ union at the district level are men. The voices of women are not heard in such consultation bodies.

2.4.8.2.5 Without conscious effort to change this state of affairs and promotion of womens’ skill and technological empowerment, the productivity of small farms will remain low and post harvest losses will remain high.

**2.4.8.3 Tribal Farmers**

2.4.8.3.1 Scheduled Tribes account for 8.6 per cent of the total population of the country. A majority of tribal communities across the country are dependent on forests for their livelihoods. These include cultivation (shifting cultivation in many parts of East and North East India), collection of fuel, fodder and a range of non-timber forest produce.
Tribal farmers are among the poorest within the category of farmers. These communities have customary norms for ownership of the forest areas, and also have community based mechanisms for protection and rejuvenation. Since the colonial period and even in the subsequent years of independence, several policies have been enacted related to forests and rights of forest dwelling communities (mostly tribals).

2.4.8.3.2 At the same time, protection and conservation of forests areas, has been under the control and administration of the State Forest Departments. There has been no systematic effort to demarcate areas that are used and managed by forest dwelling communities, or to provide legal rights and titles to these communities. The relation between the Forest Department and forest dwelling communities has largely been one of conflict and confrontation, with forest dependant communities being labeled ‘encroachers’. Forest communities are often forced to eke out their livelihoods through a pattern of bribes and fines. Attempts towards Joint Forest Management have been successful in some States. These however are dispersed and have also not been gender sensitive.

2.4.8.3.3 Historically, large development projects including dams and mines have also encroached upon large tracts of forest areas, and displaced several thousand forest dwelling communities, who are still struggling to survive in the absence of human-centred rehabilitation efforts. In most instances, in the absence of land titles, their very existence is not acknowledged. According to the Ministry of Environment and Forests, close to 10 lakh hectares of forestland have been released for various projects such as mining and industrial development. This area is almost as large as the same Ministry’s estimate of the total forestland area under ‘encroachment’ (13.4 lakh hectares).

2.4.8.3.4 Efforts to manage forest areas in the country will have to balance the demands for ecological conservation as well as protecting the livelihoods of forest dwelling communities. The following steps will be helpful in this respect:
i. A clear statement of rights relating to what has traditionally been the domain of forest dwellers (both tribal and non-tribal) including lands traditionally occupied and resources traditionally used.

ii. A clear process by which legitimate right-holders can be identified and recorded, and conversely, by which recent encroachers, and others who have been taking advantage of forest dwellers for vested interest, can be identified and alienated.

iii. Explicit provisions to ensure conservation, including priority to provisions of wildlife/biodiversity/forest laws that are meant to ensure conservation, and special focus on protected areas and threatened species.

iv. Strengthening of or changes in institutional structures that would enable more participatory processes of decision-making, including in the management of protected areas.

v. Explicit provisions that enable forest-dwelling communities to say ‘no’ to, or seek changes in, ‘development’ projects that are impinging on their lands and resources.

vi. Provisions for regular and open processes of dialogue, consultation, sharing of information, etc, involving communities, NGOs, officials, and others.

vii. Clear monitoring provisions that enable a constant check on whether the rights are being honoured or not, as also whether the exercise of rights is respecting conservation parameters.

2.4.8.3.5 An important area of conflict between people and protected areas is the problem of compensation for damage caused to livestock, crop or life by animals. States must review the provisions and procedures for compensation for human life, livestock and crop damage. Compensation must be paid to families who continue to live within the reserves also. The joint forest management programme in the vicinity of the reserves must be revamped so that people living in the fringes can be given management decisions
and rights over the produce of forests; this will help to enhance the productivity of the resources as well.

2.4.8.3.6 Some of the generic problems of tribal farm families, also applicable in general terms for small and marginal farmers and women farmers across the board are the following:

i. Lack of inputs especially quality seeds and fertilisers.
ii. No mechanism for State purchase of output at Minimum Support Price.
iii. Lack of attention to soil and water conservation that could facilitate double cropping.
iv. Total lack of attention to livestock management especially fodder production. Free grazing of cattle during the rabi season is a major bottleneck for the taking of a second crop.
v. Vesting of land in the community, absence of alienable rights with the farmers and the problems in creation of charge/mortgage on land in certain tribal areas constrain flow of institutional credit. The need is to develop innovative methods of collateral substitution and documentation procedures to overcome the difficulties.
vi. Integrated farming projects based on plantations and inter-cropping (as granted under the Meso-area development programmes, or ITDP) again need to be delinked from land titles. At present, to gain sanction, a scheme of this nature requires the farmers to agree to provide at least 5 acres of land. In a hilly terrain and with continuous subdivision of plots over generations, this not only becomes difficult even for male farmers, but more so for women who lack titles. Yet, trees in particular are seen as women’s resource, with the output used both for family nutrition and sale.

vii. While KVKs and ATMA are now providing more of agriculture and resource-related training, the old home science model continues for women. Training for tribal women SHG group members is provided in candle-making, tomato sauce making and making bead necklaces—obviously a total waste of time and resources, unless market tie-ups for such products exist.
2.4.8.4 Pastoralists

The Draft Scheduled Tribes (Recognition of Forest Rights) Bill, 2005 envisages, “rights of uses or entitlements such as grazing in forests and traditional seasonal resource access of nomadic or pastoralist communities”. This Act is yet to be passed by Parliament. Many of the Joint Forest Management Committees are designed to provide opportunities to tribal families and pastoralists for access to non-timber forest products. The following steps are needed to ensure the right to livelihood of pastoralists:

i. Restoration of traditional grazing rights and camping rights in forest areas including wildlife sanctuaries and national parks, and also those areas earmarked for grazing purpose in village common lands.

ii. Formalising entitlements (including issue of permanent grazing cards) for the traditional pastoralists/herders maintaining native animal breeds and who depend upon them for their livelihood for enabling their free access to notified or demarcated grazing sites and migration routes.

iii. Whenever a tree planting programme is to be implemented, alternative grazing land and drinking water resources for animals should be allotted by the concerned authorities. It should be made mandatory for the implementing agency before initiating afforestation, to seek prior consent from forest dependent communities including pastoralists. Rotational system of grazing should be encouraged instead of complete closing of forest zone for tree plantation purpose.

iv. In-depth documentation, characterisation of indigenous livestock breeds should be carried out to recognise and protect intellectual property rights of the local communities / individuals, conserving these livestock breeds.

v. Pastoralists should be involved in all local natural resource management programmes, including village forest committees.
vi. Common land assigned to forest departments and unutilised or encroached land should be retrieved and brought under the control of village level committees or grassroots institutions for pasture development.

2.4.8.5 Plantation Labour

2.4.8.5.1 A large number of small farmers are engaged in the cultivation of plantation crops like tea, coffee, rubber, cardamom, pepper and vanilla. Price fluctuation and competition from products imported from abroad are among the major problems facing them. A Price Stabilisation Fund is essential to insulate them from the vagaries of the market. Similarly, plantation labour, many of whom are women, require support services like crèches and health and life insurance. The problems of plantation labour therefore need special attention.

2.4.8.6 Island Farmers

2.4.8.6.1 The farming and fisher families in Andaman and Nicobar Islands and the Lakshadweep group of Islands need special attention. Their needs cover the areas of technology, training, techno-infrastructure and trade. Island agriculture also has the problem of transport costs, particularly for commodities like fish which may have to be sold in the main land. There are several ancient tribes in the Andaman and Nicobar Islands who have rich traditional knowledge and wisdom. Steps should be taken to recognise and reward their indigenous knowledge in the areas of biodiversity conservation and traditional healthcare. The islands are also ideal for horticulture including coconut plantation. There are also special health problems. Therefore both the National Horticulture Mission and National Rural Health Mission should pay particular attention to the needs of Island farmers and fishermen. Proactive measures like the erection of mangrove and non-mangrove based bioshields should be initiated in order to safeguard the lives and livelihoods of island populations in the event of sea level rise due to global warming.
2.4.8.7  Urban Farmers

2.4.8.7.1  Urban home gardens could make a substantial contribution to improving nutrition security through the cultivation and consumption of vegetables and fruits. Home nutrition gardens could be designed in the case of low-income groups in such a manner that they can provide horticultural remedies to major nutritional maladies like deficiency of micronutrients in the diet. Urban backyard farming will require support services in the form of good seeds and planting material and safe plant protection techniques. Urban slums need particular attention from the point of view of combating malnutrition through nutrition gardens. The National Horticulture Mission could pay particular attention to enhancing the nutrition security of urban slum dwellers and low income groups through promoting the cultivation and consumption of appropriate vegetables and fruits.

2.4.8.8  Organic Farmers

2.4.8.8.1  The challenge to organic farmers lies in raising the organic carbon content in the soil to 1 per cent and total organic matter to about 10 per cent. The approximate cost of converting one hectare of wasteland to organic farming will be about Rs.30,000 per annum. Such expenditure will be needed for about three years, so that the soil fertility can be enhanced to sustain good yield. The organic farming movement in India suffers from a lack of institutional support in the areas of research, extension and marketing. Farmers feel the need for technological guidance, but research work based on careful field experiments is currently inadequate. Organic farming requires more scientific support than chemical farming. The Krishi Vigyan Kendras should be equipped to provide training in organic agriculture. Assured and remunerative marketing opportunities are yet to develop. Internationally accepted certification procedures also need strengthening. Organic farming zones could be identified, like some of the hill areas and islands where currently chemical fertiliser use is very low. A National Federation of Organic Farmers’ Association could be formed to develop common brand names both for the home and external markets. Food safety and quality specifications should conform to the codex alimentarius standards, since there are
occasional reports of heavy metals being present in organic foods. Certification procedures should be made farmer-friendly and affordable. When subsidies or loans are given to farmers to buy fertilisers, there should be no insistence on the purchase of only chemical fertilisers. Farmers should be able to spend the money on organic fertilisers and bio-pesticides.

2.4.8.8.2 Farm men and women thus belong to different categories and require differential support. However, there are many generic problems affecting the farming community as a whole. Therefore, the Central and State Governments should assist the growth of Farmers’ Associations which can empower the voiceless. Voicing the voiceless and reaching the unreached should be major goals of public policies relating to the agrarian population.

2.4.9 Credit and Insurance

2.4.9.1 The need is to improve the outreach and efficiency of the rural banking system. The financial services must reach all its users effectively; the credit must be in time, in required quantities and at appropriate interest rate. NCF had recommended an interest rate of 4 per cent per annum and the Government of India had met this recommendation partly, by announcing credit availability to farmers at 7 per cent up to Rs. 1 lakh. It should be possible to bring about a considerable reduction in transaction cost by eliminating all forms of ostentation in the operation of the banking system. The inefficiencies of delivery system should not be loaded on borrowers. The delivery system has to be proactive and should respond to the needs of the financial services in the rural areas in an efficient manner. The banking system needs to explore the large unmet credit potential for raising agriculture to higher thresholds, growth of rural and agri-business enterprises and employment. There is also need for considering a credit cycle of 4 to 5 years in chronically drought prone areas, so that farmers will be able to repay the loans when there is a good monsoon leading to a good crop.
2.4.9.2 The State has a responsibility in improving the credit absorptive capacity of the farmers and to support the banking system by creating favourable environment for expanding and deepening of financial services by the banks.

2.4.9.3 NABARD as the leader of agriculture and rural credit should ensure convergence among credit availability, credit absorptive capacity of the farmers and other rural borrowers and an efficient credit delivery system, by providing financial and technical assistance to the banking system and necessary inputs to the State. As a development bank, NABARD should actively involve in institution building and provide back up support through research and development initiatives.

2.4.9.4 The Reserve Bank and Government of India have to broadly assign the role and responsibilities to different agencies in the multi agency system and ensure implementation of their policies and programmes.

2.4.9.5 Agriculture is a high risk economic activity. The farmers need user friendly insurance instruments covering production right from sowing to post harvest operations and also the market risks for all crops throughout the country for insulating them from financial distress and in the process making agriculture financially viable. There is need for both credit and insurance literacy in villages.

2.4.9.6 Since part of the debt incurred by small and marginal farmers and landless labour is for healthcare, priority should be given in extending the benefits of the National Rural Health Mission to areas affected by agrarian distress.

2.4.10 Cooperatives

2.4.10.1 The cooperatives have an important role to play particularly in banking, marketing, agro-processing and other agri-businesses to protect the farmers from the vagaries of existing imperfections in the supply of inputs, production, value addition and marketing etc. and also in the process improve their welfare. The cooperatives are basically economic enterprises (not an extended arm of the State) and require entrepreneurial approach. They should not only gather competitive edge through suitable
enterprise focus on the traditional primary value creating activities, but also in secondary value creation activities through suitable strategic alliances with private and public sector units. The need is to identify means and measures by which the farmers could gain power of scale and economies, which they otherwise do not have, obtain greater control of the market channels and improve their chances of being profitable.

2.4.10.2 For achieving the above objectives, the policy and legal framework under which the cooperatives are functioning would require to be reviewed, so as to create enabling environment for them, to attain autonomy to run their operations in business like fashion, without rigid controls and regulations imposed by the State laws. To succeed and serve the farmers to their full potential, the cooperatives need to function as voluntary, member driven, autonomous and largely self-regulating organisations, working on the principles of self-help. The management of the cooperatives needs to be professionalised with clear demarcation of functions of the elected members and the professional managers. The audit and accounting systems also has to be improved, so as to give greater confidence to all those who are associated with them.

2.4.10.3 With economic liberalisation and market competitiveness, the cooperatives would require much larger capital and other financial resources to be successful. However, the changes in legal framework, regulatory system and constraints in liberal State support would necessitate identification of new ways and means, as also instruments to gain greater access for the cooperatives to capital/financial resources and removal of impediments due to law and regulations in capital formation, which prevent the members from obtaining the benefits of surplus retention in the business. Opportunities to increase non-members financing, consistent with the objectives of cooperation will also have to be explored.

2.4.11 Assured and Remunerative Marketing Opportunities

2.4.11.1 Assured and remunerative marketing opportunities hold the key to continued progress in enhancing farm productivity and profitability. Already, several significant market reforms have been initiated by the Union Ministry of Agriculture. The State
Governments will have to undertake such reforms speedily in order to provide more options to the farmers for selling their produce, allowing the private sector including the cooperatives to develop markets, promote direct sale to the consumers and removing bottlenecks and scope for corruption and harassment. What farmers seek is greater protection from market fluctuations. The Minimum Support Price (MSP) has to be protected more effectively across the country. Of late, the farmers have been feeling that the MSP of crops have not kept pace with the rising input costs. Likewise, the Market Intervention Scheme (MIS) should respond speedily to exigencies, especially in the case of sensitive crops in the rainfed areas. Similarly, the establishment of Community Foodgrain Banks would help in the marketing of underutilised crops and thereby generate an economic stake in the conservation of agro-biodiversity. Indian farmers can produce a wide range of health foods and herbal medicines and market them under strict quality control and certification procedures. The Public Distribution System (PDS) can also be encouraged to store and sell nutritious millets with appropriate price support to farmers.

2.4.11.2 Farmers require authentic advice based on meteorological, marketing and management information for land use decisions/investments etc. Restructured Land Use Boards supported by a team of technical experts/agencies could render this service. Infrastructure support has to be put in place to minimise post harvest losses and enable agro-processing and value addition at the village level itself to promote livelihoods. The collective strength of farmers has to be built up by encouraging farmers’ organisations and other entities like cooperatives and small farmers’ estates, so that they can get a fair deal and enjoy the economies and power of scale. The farmers, particularly the small and marginal farmers need pledge loans to be able to avoid distress sale and sell their produce when the price is favourable. Constraints in improving the negotiability of warehouse receipts also need to be removed.

2.4.11.3 NCF had recommended in its Third Report the establishment of an Indian Trade Organisation (ITO), which will safeguard the interests of farm and fisher families by providing a Livelihood Security Box to ensure fair trade. The Livelihood Security
Box should have provision to impose quantitative restrictions on imports and or/increases in import tariffs, under conditions where imports of certain commodities will be detrimental to the work and income security of large numbers of farming families. It should be emphasised that **there is no level playing field between the capital, subsidy and technology driven mass production agriculture** of the industrialised countries, and the ‘production by masses’ agriculture of India characterised by weak support services, heavy debt and ‘resource and technology poverty’. The steps recommended by NCF for promoting an **Indian Single Market** need to be examined and implemented. The bottom line of our trade policies in agriculture should be the economic well being and livelihood security of agricultural families. Nothing should be done which will destroy job opportunities in rural India.

2.4.11.4 Quality and trade literacy programmes have to be launched across the country. In relation to commodities which are exported, it will be essential to conform to WTO regulations. At present, such commodities constitute about 7 per cent of total agricultural production in the country. Farmers’ Associations and SHGs should be helped to export on competitive terms by spreading awareness of the opportunities available for external agricultural trade. In such cases, cost, quality and reliability of supply will determine long-term trade relationships. The agri-export zones should be further strengthened and should become places where farmers will get the best possible price for their produce.

2.4.11.5 The consumption capacity has to be increased within the country through the infusion of more purchasing power in the hands of families currently caught in the poverty trap. Farmers, who are also the largest consumer group, will produce more, if there is greater consumption and consequently greater demand for farm produce and products. **The Food Guarantee Act** recommended in the Second Report of NCF would help to make food serve the role of currency. Such a procedure will help to improve household nutrition security as well as farmers’ income. The future of Indian agriculture will depend upon the efficiency and seriousness with which pro-farmer marketing systems are put in place.
2.4.12 Public Policies for Sustainable Livelihoods

2.4.12.1 The cost-risk-return structure of farming is getting adverse, leading to increasing rural indebtedness. In addition to those already mentioned, the following steps will help to ensure that the well-being and livelihood security of all included under the category of “farmers” in this policy statement become the bottom line of public policies.

i. The scope of the Minimum Support Price (MSP) programme should be expanded to cover all crops of importance to food and income security for small farmers. Arrangements should be made to ensure MSP at the right time and at the right place, particularly in the areas coming within the scope of the National Rainfed Area Authority. 

   **Also, advice to farmers on crop diversification should be linked to the assurance of MSP. Small farm families should not be exposed to administrative and academic experiments and gambles in the market.**

ii. A Market **Risk Stabilization Fund** should be established jointly by Central and State Governments and financial institutions to protect farmers during periods of violent fluctuations in prices, as for example, in the case of perishable commodities like onion, potato, tomato, etc.

iii. There is also need for an **Agriculture Risk Fund** to insulate farmers from risks arising due to recurrent droughts and other weather aberrations.

iv. The scope of Agricultural Insurance Policies should become wider and there should also be coverage for health insurance, as envisaged under the **Parivar Bima Policy** recommended by NCF in its First Report. There should also be insurance provided by Seed Companies in the case of GM crops, so that farmers who pay high prices for the seeds for such crops do not suffer in case of crop failure.

v. Nutrition support to rural families affected by HIV/AIDS, tuberculosis, malaria and leprosy is needed to assist in recovery and restoration to a productive life. There is evidence to suggest that a pure drug based approach alone, is not
adequate to help economically underprivileged rural women and men recover from diseases involving prolonged treatment. In addition to health insurance, about 2 million tonnes of foodgrains may be earmarked for launching a Nutrition-cum-Drug Based Approach to getting farm families restored to normal health. A basic requisite for enhancing small farm productivity is the health of the farm worker. This is particularly true in the case of women suffering from a multiple burden on their time. The food grains allotted to such a programme can be distributed through the normal channels on the production of a Food Coupon issued by the appropriate government agencies. For example in the case of HIV/AIDS, the National AIDS Control Organisation (NACO) would be the appropriate agency for the issue of food coupon to the children, women and men affected by this debilitating and killing disease. The Food-cum-Drug based approach to healthcare should become an integral part of the National Rural Health Mission.

vi. An **Indian Trade Organisation** (ITO) and an **Agro-ecological Land Use Advisory Service** should be established on the lines recommended by NCF in its Third Report. The ITO should help Government to operate a Livelihood Security Box.

vii. Since agriculture is a State subject, every State Government should set up a **State Farmers’ Commission** with an eminent farmer as Chairperson. The Membership of the Commission should include all the principal stakeholders in the farming enterprise. Such Commissions should submit an Annual Report for being placed before the respective State Legislature for discussion and decision.

viii. Agricultural progress should be measured by the growth in the net income of farm families. Along with production growth rates, income growth rates should also be measured and published by the Economics and Statistics Directorate of the Union Ministry of Agriculture.
ix. Article 243 G of the 11th Schedule of the Constitution (73rd Amendment) Act, 1992 entrusts Panchayats with responsibility for agriculture including agricultural extension. In addition, Panchayats will also have to attend to:

- Land improvement, implementation of land reforms, land consolidation and conservation.
- Minor irrigation, water management and watershed development.
- Animal husbandry, dairying and poultry.
- Fisheries.
- Social forestry and farm forestry.
- Minor forest produce.
- Small scale industries, including food processing industries.

2.4.12.2 At the moment there are about 2,25,000 panchayats in the country. The problems facing Indian Farmers are generally dealt with in an aggregated manner – i.e., taking into consideration the problems of over 100 million farming families as a whole. They then appear formidable. **However, if such problems are disaggregated and dealt with by Gram Sabhas and Panchayats, location-specific problems can be attended to speedily and effectively.** The extreme distress faced by farmers in certain regions of the country can then be dealt with promptly. Therefore, it is time that the provisions of Article 243 G are implemented, both in letter and spirit. NCF in its earlier reports had recommended that Panchayats should be involved in water conservation and management as well as in the resettlement of those who will be displaced by big dams through Gram Sabhas serving as Pani Panchayats. Also, one woman and one male member of the panchayat should be trained to serve as Farm Science Managers. In the areas prone to drought, floods and cyclones, one male and one female member could also be trained to serve as Climate Managers. Panchayats could also be the location for the Village Knowledge Centres. They can then play a very important role in agricultural renewal and renaissance.

2.4.12.3 In addition to the resources being made available by the Government of India, State Governments should show their commitments to farmers’ livelihood through greater allocation of resources in the State budgets.
2.4.12.4 Finally, the name of the Ministry of Agriculture both in the Centre and States should be changed to Ministry of Agriculture and Farmers’ Welfare in order to highlight the critical role of these Government Departments in ensuring the income and work security of over 600 million members of India’s population.

2.4.13 No Time to Relax

2.4.13.1 The consequences of inaction in addressing the prevailing agrarian distress will be disastrous. Mentioning three of them would be adequate to highlight the serious implications of neglecting the “Jai Kisan” commitment.

- Expansion of threats to internal peace and security (e.g. spread of Naxalite Movement)
- Reverting to a ship-to-mouth existence, thereby diluting national sovereignty and enlarging the rural-urban divide in economic growth
- Jobless or even job-loss economic growth resulting in joyless growth for nearly half of our population.

If agriculture goes wrong, nothing else will have a chance to go right. If conversely agriculture goes right, the vision of a hunger and poverty free India can become a reality sooner than the timeframe set under the UN Millennium Development Goals.

2.4.14 Avoiding a Mismatch between National Policy and Agro-climatic, Socio-economic and Socio-cultural Diversity

2.4.14.1 Indian agriculture is rich in diversity of soils, climate, farming communities and systems, and resource endowments. Hence, a broad national policy will have to be tailored to suit different agro-climatic, socio-economic and socio-cultural factors, by the local stakeholders. The framework for a National Policy for Farmers presented in this Report will have to be suitably adapted and elaborated to suit local realities in different parts of the country, particularly with reference to priorities in action points.
2.4.15 Way Forward

2.4.15.1 NCF will hold regional consultations with State Governments, Farmers’ organisations including Women’s organisations, all other stakeholders and mass media between May - August, 2006. On the basis of the inputs and advice received, the draft National Policy for Farmers will be revised and a second draft will be included in the final Report to be presented on October 13, 2006, when the term of NCF ends.

2.4.15.2 NCF requests the Ministry of Agriculture to get this draft policy considered by the NDC Committee on Agriculture, the Agriculture Coordination Committee chaired by the Prime Minister, Consultative Committee of Parliament and other appropriate bodies.

2.4.15.3 The Final draft could be put up by the Ministry to Cabinet, NDC and Parliament early in 2007 so that a National Policy for Farmers can be launched for the first time in 10,000 years of India’s agricultural history on 15th August, 2007. Suitable financial provision may be made in the budget for 2007-08 for making the Policy operational.
CHAPTER 3.1
GUIDING PRINCIPLES UNDERLYING THE DRAFT
NATIONAL POLICY FOR FARMERS

BACKGROUND

3.1.1 Agriculture plays an important role in the overall economic and social well
being in the country. Though the share of the agriculture sector in the GDP is declining,
it still accounts for nearly 21% and remains the biggest sector after services. The
contribution of manufacturing sector in GDP is nearly 38% lower than that of agriculture.
Incidentally, the farm production sector is the most privatized sector in India, decision on
what, how much, when, how to produce and sell are taken by individual farmers. More
than half of the work force in India is engaged in agriculture or activities allied to
agriculture. It is the agriculture, which provides food and nutrition to the population and
raw material to a large number of industries. Nearly one-sixth of the total export earnings
are from agriculture.

3.1.2 There is no doubt that Indian agriculture has made significant progress in the
post independence period particularly in the wake of the Green Revolution. The
foodgrain production increased to a level of 212.1 million ton in 2003-04 [Mid-Term
Appraisal of the Tenth Five Year Plan] as against only 89.36 million ton in 1964-65. The
production of oil seeds, sugarcane, cotton, fruits/vegetables, milk and poultry meat/eggs
also increased appreciably. The main factors for growth of agriculture have been increase
in net area sown, expansion in irrigational facilities particularly tubewells, land reforms
especially consolidation of holdings, introduction of the high yielding seeds, increased
use of fertilisers, expansion of institutional credit in the rural area after the nationalization
of private sector banks, farm mechanisation, price policy based on MSP and the
procurement operations and improvement in rural infrastructure particularly roads/ rural
electrification etc. With the result, over the years, India has moved from food shortages
to self-sufficiency, at least in terms of physical quantities of grains and now exports a
variety of food items. The sector has enabled the country to reach food security at the national level and in the process maintain national security.

3.1.3 However, the absolute numbers of agriculture production, cover up many harsh realities in regard to our agriculture development and the economic welfare of the farmers. For a developing country like ours striving to achieve a higher growth path, it is important to look at agriculture as just not a means of providing food to the population but as sustaining incomes of those producing it and linked to it. Livelihood of nearly two-third of India’s population is dependent on agriculture and the objectives of a welfare state cannot be met unless their incomes are adequate and growing in a sustainable manner. This would require a relook at our policies and planning for this sector with farmer at the centre stage. In any case, farming ultimately is a business activity and like any other business, the bottom line is crucial. The current agricultural scenario based on the assessment of the Planning Commission, Government of India is given at Annexure I. The assessment is disturbing to say the least. Not giving sufficient importance either to the man behind the business or the bottom line could only be disastrous. Some of the issues impacting the farmers are discussed in the following paragraphs:

3.1.4 The low average yield is a major issue. According to the Government of India data, the average yield of foodgrains [covering over 65% of the gross cropped area] was 1.74 ton per hectare in 2001-02. However, in 57% of the area, the average yield was less than 1.5 ton per hectare and only in 8.54% area; the yield was above 2.5 ton per hectare. Another worrisome issue is that even in Punjab and Haryana [the only States with average yield was above 2.5 ton per hectare] the yields of wheat and rice are plateauing in absence of newer technological advances. The yield growth of these crops [covering 58% of the area under foodgrains] decelerated throughout the 1990s to about 1% per annum from 3% during the 1980s indicating a potentially serious exhaustion of technological progress1.

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1 Mid Term Evaluation of the Tenth Five Year Plan.
3.1.5 Together with low yields, the other serious handicap faced by our farmers is the small and scattered operational holdings. The average holding size has come down from 2.67 hectare in 1960-61 to 1.34 hectare in 1990-91. The number of operational holdings has increased by above 82% [from 51 million in 1960-61 to 93 million in 1991-92] in three decades. The land distribution in India is very skewed as shown below:

Table 1: Distribution of Ownership Holdings in Rural India -1991-92

<table>
<thead>
<tr>
<th>Land Holding</th>
<th>Percentage of Rural Households</th>
<th>Percentage of Land Held</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Less</td>
<td>11.24</td>
<td>-</td>
</tr>
<tr>
<td>0.01 to 0.99 Acre</td>
<td>40.11</td>
<td>3.80</td>
</tr>
<tr>
<td>1.00 to 2.49 Acre</td>
<td>20.52</td>
<td>13.13</td>
</tr>
<tr>
<td>2.50 to 4.99 Acre</td>
<td>13.42</td>
<td>18.59</td>
</tr>
<tr>
<td>5.00 to 14.99 Acre</td>
<td>12.09</td>
<td>37.81</td>
</tr>
<tr>
<td>15.00 and Above</td>
<td>2.62</td>
<td>26.67</td>
</tr>
<tr>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>


3.1.6 The landless, sub-marginal [upto one acre] and marginal [1 acre to 2.49 acre] farmers formed 71.87% of the rural households and held only 16.93% of the land. The small farmers [2.50 acre to 4.99 acre] formed another 13.42% of the rural households and owned 18.59% of the land. The landless, marginal and small farmers formed 85.29% of the total rural households in 1991-92 which increased to 88.9% in 1999-2000. The pressure on land and lack of alternative employment opportunities has led to proliferation of small and economically non-viable holdings. The percentage of holdings of less than 5 acre has increased from 61.69% in 1960-61 to 78.2% in 1990-91 and to 80.3% in 1995-96 [Agriculture Statistics at a Glance – 2005, Ministry of Agriculture, Government of India]. An average size of operational holding declined from 1.57 hectare in 1990-91 to 1.41 hectare in 1995-96. The average holding was divided into 2.7 parcels. As land continues to be the most prized possession and single most important determinant of the socio economic status of the people in rural India [also provides collateral for credit and

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2 NSS Report No. 458 – Report on Employment and Unemployment Situation in India

3 According to the NSSO Report No 500- Household Assets and liabilities in India [as on 30th June, 2002], as much as 63.2% of the total assets of rural households were in the form of land & 23.5% in the form of building.
security in the event of natural hazard or life contingencies] and tenancy laws prohibiting/strongly discouraging leasing of land, the fast growth of the rural population, the succession laws and absence of alternative employment opportunities means that the average ownership/operational holding sizes would continue to decline even further. Increasing small farm productivity and improving small crop-livestock integrated production systems and multiple livelihood opportunities through agro processing and bio mass utilization, are essential both to meet food production targets and also reducing hunger, poverty and rural unemployment. Development of animal husbandry could play an important role in augmenting income of the small/marginal farmers. The share of these farmers in dairy farming is quite substantial. They form the core of the milk production sector. Taken together [small and marginal farmers] accounted for 71% of the in –milk bovine stock in 2002-03. The marginal farmers, who had only 20% of the in-milk bovine stock in 1970-71, increased it to 31% in 1981-82, to44% in 1990-91 and to 52% in 2002-03.

3.1.7 The tenancy laws are an important issue. These laws, which aimed at ensuring security to tenants and firming fair land rents were enacted against the background of exploitation of tenants. Kerala and J&K have completely banned leasing out of agricultural land, while in Telangana in A. P., Karnataka, H. P., M. P. and U. P. leasing out agricultural land is allowed only in case of certain disabled persons like widows, minors, personnel of armed forces etc. Punjab, Gujarat, Haryana, Maharashtra and Assam have not banned leasing out agricultural land but the tenant acquires a right to purchase the leased in land within a specified period of tenancy. In A. P. [other than Telangana], Orissa, Rajasthan, Tamilnadu, and West Bengal there are no restrictions on land leasing excepting that in West Bengal only sharecropper leases are allowed. In the tribal areas of A. P., Bihar, Orissa, M. P. and Maharashtra, only competent authority can permit the transfer of tribal land to non-tribal. However, the various loopholes and difficulties in actual implementation has meant that leasing of agricultural land continues to be done [around 10.36 million hectare was leased during 1991-92 which formed 8.2% of the total cultivated area] but in many places in a concealed manner with all its attendant evils, [including formal credit exclusion] which could be more
exploitative to the leases particularly the land less, marginal or small farmers. Incidentally, the small/marginal farmers are major players in the land lease market. Increasing cost of cultivation, falling returns, non-availability of irrigation and problems in accessing institutional credit are some of the factors leading to leasing out land by small/marginal farmers. In certain States the fall out of existing tenancy laws is that some of the farmers opt to keep land follow in the event of their moving to the town/ cities for employment. This not only adversely affects production but also leads to deterioration in the quality of land. This phenomenon is more widespread in UP, Karnataka, Kerala, H.P., Jammu and Kashmir and A. P. where leasing out agricultural land is either completely banned or is allowed only in the case of certain disabled categories like widows, minors, armed forces personnel etc.

3.1.8 The tenancy laws have to be such as to encourage all sections of rural population to participate in the land lease market depending upon their resources, availability of off farm/ non farm employment opportunities, the wage rate, cropping pattern and income possibilities from use of land in agricultural and activities allied to agriculture. However, there should be no fear of loss of land leased out to others. In areas where agriculture is well developed, wages are high and non-farm employment opportunities broad based, it may be an attractive alternative for small/marginal farmers to lease out their land and take up wage employment/start-an independent tiny/ micro enterprise if the law assures that they would not be deprived of their land. The medium/big farmers could improve scale economies by leasing in land. On the other hand, in States where agriculture is relatively backward, wages low and alternative employment opportunities limited, the small/ marginal farmers could lease in land from medium to big farmers who may like to migrate to urban areas for non-land based employment/ business opportunities. Some of the safeguards in developing land lease markets could be (a) The lessees should be able to resume the land for self cultivation after expiring of lease term. (b) In case of land leased out by small/marginal farmers, the ownership rights should not be conferred on the tenants. (c) The medium and larger farmers should not be allowed to purchase leased in land from small/ marginal farmers.
3.1.9 Low intensity of cultivation is another issue. Due to concentration of rains in a few months in one season [that too in few days] and limitations in development of irrigation, the cropping intensity has not gone beyond 1.37 for the country as a whole, though theoretically it is possible to grow three corps in a year in a large part of our country. The average decadal growth in cropping intensity has been around 1.25% per annum. Large part of our country had cropping intensity of less than 1.30. The cropping intensity across States during 1996-97 is shown in Table 2.

Table 2: Cropping Intensity across the States - 1996 - 97

<table>
<thead>
<tr>
<th>Cropping intensity</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 1.15</td>
<td>Mizoram, Meghalaya, Nagaland, Gujarat</td>
</tr>
<tr>
<td>between 1.15 to 1.30</td>
<td>Karnataka, Tamil Nadu, Maharashtra, AP, MP, Arunachal Pradesh, Rajasthan</td>
</tr>
<tr>
<td>between 1.30 to 1.45</td>
<td>Kerala, Orissa, Bihar</td>
</tr>
<tr>
<td>between 1.45 to 1.60</td>
<td>Manipur, Assam, J&amp;K, U.P.</td>
</tr>
<tr>
<td>above 1.6</td>
<td>Punjab, Haryana, Tripura, West Bengal &amp; Himachal Pradesh</td>
</tr>
</tbody>
</table>

Source: State of the Indian Farmer: A Millennium Study – Land Resources

3.1.10 While other than China, the irrigation system in no other country is as extensive as in India; still only 35.9% of the operated area in 1991-92 was irrigated. However, it is this irrigation system, which has fuelled India’s growth in agriculture production. Irrigation has acquired additional importance since the Green Revolution, which is characterized by the use of high-yielding seed varieties, intensive use of fertilizers and other inputs. These inputs are more effective if used alongwith regular and adequate supply of water. This system of agriculture is often seen as the face of Indian agriculture attracting most of the attention of the policy makers and the input delivery system. The risk factor in rainfed agriculture, constraints the farmer from intensive usage of inputs and this farming is generally associated with low yield, low income farming carried on by those who are staying on in agriculture for want of other alternatives.

3.1.11 There are large inter State variation in the extent of irrigation. In Punjab and Haryana nearly 73% area was irrigated followed by U. P. [67.06%], Tamil Nadu [47.46%], West Bengal [44.87%] and Bihar [41.09%]. While the Gangetic plains and the Eastern coast has achieved a relatively enhanced stage of irrigation development the arid
region and the high rainfall receiving areas have a low level of achievement. The results of excessive irrigation are also becoming evident in some developed areas in the form of rapid depletion of ground water, deterioration in ground water quality and the problem of water logging. The tubewells were the major source of irrigation accounting for 36.37% of the irrigated area, followed by canals [26.04%], wells [18.11%], tanks [3.84%], other sources [7.2%] and for the balance 8.44% the source of irrigation was not reported. In Punjab 83.66%, Uttar Pradesh 66.94%, Bihar 51% and Haryana 42.22% of the irrigated area was irrigated by tubewells. Canals were the major source of irrigation in Orissa [54.17%], Haryana [49.75%] and Rajasthan [34.17%]. Tanks were largely used in A. P. Tamil Nadu, Karnataka and Orissa. Wells were the primary source of irrigation in Maharashtra [54.85%], Tamil Nadu [41.49%], Gujarat [44.9%], Madhya Pradesh [33.10%] and Kerala [32.33%]. The major problems concerning irrigation are the falling investments in development of irrigation in public sector, poor maintenance of canals/other water bodies, the issue of water charges, the actual irrigation developed being much below the potential created, depletion of ground water in many areas [large number of blocks coming in the ‘dark’ category where further ground water development is not supported by institutional finance], falling water table, energisation of tubewells, poor quality of power supply and need for much greater use of water saving devices/practices, micro irrigation systems etc.

3.1.12 The trends of changes in the net irrigated area to the net sown area across various classes of farmers show that the percentage of net irrigated area to net sown area was consistently much higher in the case of farmers upto 5 acre holdings [throughout 1970-71 to 1990-91] than the medium and large farmers. In 1990-91, 43.6% and 35.7% of the net area sown by marginal and small farmers respectively was irrigated whereas the percentage in respect of the medium and large farmers was only 29.7 and 22.5 respectively. However, the annual compound rate of growth of irrigation between 1970-71 & 1990-91 was highest in the case of big farmers [2.78%] followed by medium farmers [1.90%] and was lower in the case of Semi-Medium farmers [1.33%], small farmers [1.24%] and marginal farmers [1.28%]. With declining public sector investment,
the small/marginal farmers and areas with lower irrigation development need special focus and dispensation for irrigation development.

3.1.13 Another important aspect is that the Indian farm economy is largely crop based. Nearly 79.2% of the holdings in 1991-92 were used mainly for raising crops, 8.2% for livestock, 1.5% for poultry, 3.9% for plantation/horticulture and the balance of 7.1% for other purposes. Food grains are the main crops. However, some changes are taking place in the cropping pattern. In 1980-81 nearly 80.35% area was under foodgrains, which came down to 75.38% in 1990-91. The decline has been across all the size classes i.e. marginal/small, medium and big farmers. However, the decline is slightly sharper in the case of medium and big farmers. Among the cereal, the decline in so called ‘coarse cereals’ is heavy. The area under coarse cereals came down from a high of 45.95 million hectare in 1970-71 to only 30.80 million hectare in 1999-2000, though the production level marginally increased from 30.55 million ton to 32 million ton during the above period. The area under pulses has also declined during 1970-71 to 1990-91 across all size classes of farmers. [From 13.36% to 11.35%]. The area under oilseeds increased continuously from 1950-51 to 1990-91 [from 10.73 million hectare to 24.10 hectare] but remained more or less constant by 1999-2000 at around 24 million hectare. The percentage area under sugarcane, fruits/vegetables & spices has shown increases between 1980-81 and 1990-91. The area under jute/mesta and cotton together has remained more or less constant during 1980-81 and 1990-91.

3.1.14 The cropping pattern changes also show some movement towards international trade oriented crops and improvement in farmers’ price response and net income. It would also appear that cropping pattern changes are first led by medium farmers and followed by the large and small/marginal farmers.

3.1.15 Marketing is becoming a major issue with the farmers all over the country as they are shifting from the subsistence farming. The Karnataka study referred to in Second Report of the National Commission on Farmers [Serving Farmers and Saving Farming-Crises to Confidence] indicated that 71% of the sample farmers [sample size of 3408 farmers] in Karnataka chose not to sell their produce at the Regulated Markets. The
institutional rigidities have made the Regulated Markets imperfect and less responsive to market fundamentals and reduce the economic benefit to the farmers bringing their produce for sale. Farmers using the Regulated Markets complain of under weighing, unauthorized deductions, harassment by Collies/Hamals etc, inadequate infrastructure, long distance and lack of transparency in auctions etc. Further, very little efforts have so far been made in developing village periodic markets [Haats etc], which are the first contact point for the small farmers. In absence of comprehensive price and market support, small/ marginal farmers resort to distress sale of their produce where the buyer may pay 10-15% discounted price for spot payment and also cheat on them by under weighment and other deductions etc.

3.1.16 The existing minimum support price [MSP] policy coupled with procurement operations has benefited mainly the farmers growing rice and wheat and that too in a few States only. Though the MSP is announced for 25 commodities accounting for nearly 75% of the value of output and nearly 80% of the gross cropped area, the prices often remain lower than MSP in most of the markets in the country. Further, there are huge variations in the prices received by farmers in the same district or town leave alone the State. The farmers believe that of late the MSP have not kept pace with the increase in prices of inputs. **Further, the need for a much stronger protection of MSP in different regions of the country for all commodities cannot be over emphasized.**

Exploitation by traders/middlemen, less than satisfactory performance of the Agriculture Produce Marketing Committees, large supply chain, absence of grading, post harvest losses and lack of value addition means that the farmer gets much less than what he could get for his produce. Coupled with uncertainty of prices, the distress sales add to the farmers’ problems. As pointed out in the Second Report of the National Commission on Farmers referred to in the previous paragraph, micro level studies show that 50% of the small farmers’ produce is sold in distress. The need is for several policy level changes, increased investments and creation of more effective instruments, systems and structures to remedy the situation, including mitigation of market risks. Development of a farmer centric contract farming system deserves a high priority in this regard.
3.1.17 The terms of trade between the agriculture and non-agriculture is another issue. The latest series of index of term of trade [ITT] between agriculture and non-agriculture sectors with triennium ending 1990-91 as base shows that while the ITT moved continuously in favour of agriculture during 1981-82 and 1991-92, when index moved from 88.7 to 106.6 during 1992-93 to 1997-98 it fluctuated with peak reached in 1994-95 at 106.6. **Thereafter, the ITT has been moving downward with some fluctuations in between. The ITT was as low as 102.7 during 1999-2000 and only 101.2 during 2000-01.** The mid-term review of the Tenth Five Year Plan has observed under paragraph 5.9 that during 1997-2002, agricultural prices declined relative to prices not only of inputs but also non-food consumer goods. As a result, the purchasing power of agricultural incomes [current price GDP divided by consumer expenditure deflator] decelerated more than GDP at constant prices. Real farm incomes defined in this way not only show no per capita growth after 1997, but also exhibit increased variability.

3.1.18 The total factor productivity and the profitability in agriculture has declined in real terms in recent years. With the yields stagnating or growing very slowly, the prices of agricultural commodities remaining depressed in both national and international markets, the farmers have very little incentive for making investments in agriculture. The yields of crops like cotton, sugarcane, tobacco, soybean among important crops have shown negative growth during the last few years. As a matter of fact, low profitability and high risk are threatening the viability and sustainability of agriculture. The NSS data reveals that given the choice, about 40% of the farmers may like to quit agriculture. Farming no longer is able to attract or retain youth. Dr. Y.K. Alagh in the ‘State of Indian Farmer: A Millennium Study-An Overview’ has observed that the agriculture profitability has fallen by 14.2% during 1990-91 and 2000-2001. The margins deteriorated for cotton and for almost all coarse cereals and oil seeds. There has also been a deceleration in input use mainly because of inadequate expansion of public infrastructure and less favourable input prices during the 1990s. However, it needs to be remembered that for modernization of Indian agriculture the non-land based inputs would increasingly become more important and the farmers would have to rely more on purchased inputs. The deceleration in the growth of input use after 1996-97, to about 2%
per annum from over 2.5% per annum during 1980-97 is a matter of concern. This occurred mainly because the output prices had begun to fall relative to input prices from 1997-98 [Mid – Term Appraisal of Xth Plan – Paragraph 5.9]

3.1.19 ‘Improving farmers’ access to new technologies and coverage of more crops in research and development efforts rather than concentrating on few crops is important for productivity growth, cost effectiveness and profitability and income of the farmers at large. The crucial issue is to decide the role that needs to be assigned to agriculture research and extension and the direction in which it should proceed in future. There is a need for paradigm shift in research methodology and allocation of research efforts towards crops and condition of resource poor and rainfed agriculture.

**Farmers Income - Crucial Issue**

3.1.20 The welfare of the farmers is primarily linked to the level and trends in farm incomes. The income of the farming household depends not only on price-cost ratios, crop yields, cropping patterns and relative movement of farm prices to cost of living but also on farm size and cropping intensity. A very small average operational holding and low cropping intensity means that an average Indian farmer operates on very low-income levels. With continuous decline in average farm size as a result of faster growth of farm population than the cropped area, the outcomes per cultivator – are less favourable than the outcomes per hectare. This is a serious matter and often in the midst of overall agricultural growth figures [the aggregates], the fact that the average farming household does not gain as much escapes attention.

3.1.21 According to census data, the number of cultivators grew at 1.83% per annum during the Eighties and at 1.44% per annum during the Nineties. However, the land use statistics reveal that the growth of cropped area during the Eighties and the Nineties was only 0.40% per annum and 0.45% per annum respectively meaning thereby the constant reduction of cropped area per farming household. With productivity growth slowing down in the Nineties at 1.3% per annum as against 2.56 % per annum in the Eighties, the farm business income per farmer declined in some areas. The data suggests
that the real business income from farming per household declined in Andhra Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Orissa and Rajasthan during the nineties.

3.1.22 The total farm income from average farm size in Andhra Pradesh, Gujarat, Haryana, Punjab, Madhya Pradesh, Rajasthan and West Bengal during the late Nineties was not adequate to keep the family above the poverty line.

3.1.23 Prof. Abhijit Sen [presently Member, Planning Commission] has estimated that the average farm business income per hectare [return over cost i.e., all actual expenses in cash and kind incurred in production by owner operator plus rent paid for leased in land] for all states/crops during 1999-2000 was Rs 9252 which along with contribution of livestock was estimated at Rs 12,027 per hectare of cropped area. With average size of holding at about 1.42 hectare and all India cropping intensity at 135 per cent, the cropped area per farm works out be 1.92 hectare which could yield an income of Rs 23092 per annum. With average family size of 5.6, the per capita income worked out to only Rs 4124, which is hardly sufficient to provide the essentials of life with per day amount of only Rs 11.30. With productivity and income levels much lower than the All India average in States like Assam, Bihar, Madhya Pradesh, Karnataka, Maharashtra and Orissa the income would be much lower particularly where the average size of holding and cropping intensity is lower. Ensuring viability and sustainability of this vast rural population is a major challenge to our planners and policy makers. The problem is deep rooted and cancerous, which could destroy our entire social system if major shifts, and changes in policy, planning and resource allocation are not brought about quickly.

Farmers’ Suicides

3.1.24 Farmers’ suicides are not only persisting but are tending to increase and spread over wider area. The fundamental cause of the deterioration in rural economy is less than satisfactory performance of the agriculture sector. The low growth in agriculture per capita income and increasing disparity between per capita farm and non

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4 Share of livestock in the gross value of agriculture has increased from 16% in 1970-71 to 26% in 1995-96.
farm income has been caused by both fast growth of rural population and relatively slow growth of agricultural and rural output as compared to other sectors of the economy. The disparity would further worsen unless there is a major shift in our policies and the farmer is brought to the centre stage of all our planning exercises.

3.1.25 In the wake of commercialisation of Indian agriculture, many small/ marginal farmers enter the high-risk commercial farming from a position of extreme vulnerability due to meagre asset base and lack of knowledge of technology and familiarity/ support for handling the market forces. The cyclical nature of farming with occasional blessings encourages them to take risks much beyond their capacity. When these expectations are not met due to natural factors or human greed [supply of spurious seeds, pesticides and credit from money lenders at exorbitant rates etc.], these farmers suffer a great deal. The farmers are generally in a position to manage one cycle of drought or other distress but are most likely to succumb to it if the cycle was repeated. It is the successive droughts, loss of crops, illness, high expenses on social events/ obligations, collapse of market, a major loss of asset or earning system/ capacity, which causes severe unbearable distress among the rural people. The crumbling of kin-social net working, support systems and institutional system has compounded the problem causing great distress sometime leading to the greatest disaster to the family in the form of suicide by the breadwinner. Effective and farm reaching efforts are required to eliminate these distress factors and convert the hot spots of agriculture into bright spots.

3.1.26 It is important that public investment in agriculture and rural development is stepped up and there is greater focus on improving grading, storage, marketing and processing of agricultural produce to improve farmer’s incomes from per unit of output.\(^5\)

Infrastructure investments for better rural road connectivity, availability of quality power

\(^5\) Public sector investment plays an important role in the development of infrastructure like irrigation, electricity, agriculture research, markets, roads etc. The decline in public sector investments is particularly harsh on underdeveloped areas, which attract less private sector investments. [The private sector investment is influenced by availability of enabling infrastructure and expected returns from investments. In absence of public sector investments in infrastructure, which increase the returns from investments, private sector is also likely to ignore such areas]. The share of public sector in gross capital formation in agriculture declined from 33% in 1993-94 to 24.2% in 2000-01. The gross capital formation in agriculture as a proportion of the total gross capital formation in India has also continuously declined. [from 14.3% in 1970-71 to 7.1% in 2001-02].
supply, building human capital through education, training, quality assurance, timely input supply and sound advice based on market/weather forecasts etc. and greater focus or providing support for development of animal husbandry activities [backward and forward linkages] could help in improving the welfare of small / marginal farmers in India. An important aspect is to provide power of scale to farmers by encouraging formation of small farmer’s estates/ cooperative farmers’/ the self-help groups/ or corporate farming units etc. The Cooperatives could play an important role in various marketing related functions like collecting farmer’s produce, grading, transporting, initial processing, marketing and supplying of inputs etc. The need is for policy bias in favour of group approach for delivery of services, marketing, avoiding over capitalization and greater use of labour intensive technologies.

Agricultural Credit- Access and Other Issues

3.1.27 Access to institutional finance is important particularly in diversification and switching over to commercial and high value agriculture. Further, the small farmers whose operations and surpluses are small could ill afford high cost loans from non-institutional agencies. However, the World Bank, National Council of Applied Economic Research [NCAER], Rural Finance Access Survey [RFAS-2003] conducted in U. P. and A.P. indicated that the banks served primarily the needs of the richer rural borrowers: 44% of the large farmers were borrowers whereas 87% of the marginal farmers did not have access to credit. Access to formal credit was particularly a problem for meeting unforeseen expenditure and resulted in heavy reliance among poorer households on informal sources, mostly moneylenders, traders and sometimes friends and relatives. The interest rate charged by informal sources was invariably quite high [around 48% per annum]. As per available data\(^6\), as much as 55.2 per cent of the loans outstanding at the farmer household level were from the formal institutions (35.6 per cent from banks and 19.6 per cent from the cooperatives) 25.7 per cent from the professional money lenders, 8.5 per cent from relatives/ friends, 5.2 per cent from traders and the balance of 5.4 per cent from others including government (2.5 per cent). However, in Andhra Pradesh,

Rajasthan, Manipur, Meghalaya the loan outstanding from professional moneylenders exceeded that from the banks and the cooperatives put together. As regards the outreach, the professional moneylenders had the largest percentage of farmer household indebted to them. The position was as under:

**Table 3: Indebtedness of Farmer Households**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Source</th>
<th>Percentage of farmer households indebted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Government</td>
<td>2.5</td>
</tr>
<tr>
<td>2.</td>
<td>Cooperative Societies</td>
<td>21.7</td>
</tr>
<tr>
<td>3.</td>
<td>Banks</td>
<td>22.5</td>
</tr>
<tr>
<td>4.</td>
<td>Professional Money Lenders</td>
<td>24.1</td>
</tr>
<tr>
<td>5.</td>
<td>Traders</td>
<td>10.0</td>
</tr>
<tr>
<td>6.</td>
<td>Relatives and Friends</td>
<td>15.0</td>
</tr>
<tr>
<td>7.</td>
<td>Others</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

It is rather disturbing that after nearly 37 years of the nationalization of private sector banks and over fifteen years of credit targeting for agriculture, on all India basis the banks had a smaller outreach of the Indian farmers as compared to the professional moneylenders. In Andhra Pradesh, Bihar, Manipur, Meghalaya and Rajasthan the combined out reach of the Government, banks and cooperatives [the formal sector] was less than that of the moneylenders. More than 50% of the farmers’ households in Andhra Pradesh and Tamilnadu were indebted to moneylenders. The cooperative societies had the best out reach among all agencies [institutional as well as non-institutional] in Maharashtra [61%], Haryana [44%], Kerala [46%], Gujarat [40%], Punjab [38%], Chhattisgarh [37%] and Madhya Pradesh [37%].

3.1.28 In Eastern India where large growth potential has largely remained unexploited due to various reasons including credit constraints the outreach of the formal credit system needs considerable improvement. Excepting Orissa, Jharkhand and Tripura, friends and relatives [Meghalaya, Arunachal Pradesh, Manipur, Assam, Bihar, Mizoram] and Traders [West Bengal, Sikkim, Nagaland] were having the largest outreach.
3.1.29 Besides the question of restricted outreach of the banks, the other issues, which are resented by the rural borrowers, are the cumbersome lending procedures, documentation delays and difficulties, time taken in appraisal/sanction of loans, rigidities in lending, lack of appropriate products and insistence on collaterals by the banks. The adequacy and timely availability of credit is crucial for the farmers which does not get the required attention from the banks. The small borrowers are almost alienated from the commercial banks, which are often viewed by them as institutions for the rural elite. There is a need for streamlining the institutional lending procedures, improve the outreach and increase the supply of credit to farmers on a priority basis. There is very large regional imbalance in flow of institutional credit which needs to be corrected. The per capita credit in 1996-2001 in North Eastern Region [Rs. 17], Eastern Region [Rs. 42], Central Region [Rs. 86] was much lower than Northern Region [Rs. 153] and Southern Region [Rs. 280] and all India average of Rs. 128. Investment credit which adds to the total assets in the farming section, adds to the productivity of farms and helps in value addition is important. However, the proportion of investment credit in total credit has been declining. Since most of the investment credit is supported by mortgage/charge of land, there is a need to improve the land record system, streamlining the system of creating charge/mortgage, improve availability of land records, reduction in stamp duty/registration charges etc. to facilitate flow of more term credit. The State Governments may also look at the infrastructure/other backward and forward linkages etc. which could add to absorptive capacity of the farmers for increased credit. North Eastern Region where land vests with the Government/Community or oral lease holders, who can not mortgage land, would require special documentation from banks which in turn would require to the assured of assistance from State Government/Revenue Authorities etc. to recover their dues from such borrowers in case of default. Strengthening and supporting the more friendly and pro small clients localised banking institutions [the cooperatives, cooperative banks and the Regional Rural Banks] and providing separate dispensation to them to overcome their handicaps [higher risk profile and small geographical operational area, higher cost of funds etc.] are needed on a priority basis. The commercial banks need to relook their recruitment and personnel policies to have technically competent and willing staff to man the rural branches. The
rural branch managers need to be innovative and should be able to respond to the local situations and credit needs. The requirement of credit are likely to go up considerably with increase in purchased inputs, commercialization of agriculture, growth of agric-business opportunities [with improved connectivity] etc. and the rural branch managers can not continue to work in a routined manner responding only to traditional cropping pattern and extending investment credit for well known schemes of milch animals/tubewells and tractors etc.

3.1.30 Another issue is the risks, which the farmers face due to natural calamities, sudden pest attacks, diseases, market failure etc., which seriously impact their incomes and livelihood security. The risk profile is very high in rainfed farming which makes it nearly impossible for these farmers to switch over to commercial/high value crops to any significant extent. They are reluctant to use purchased inputs due to the uncertainty of production. Though the crop insurance scheme is being implemented since 1985 [which was widened in scope and content and introduced as National Agriculture Insurance Scheme’ in 1999] it has generally failed to attract and satisfy farmers mainly because of a large insurance unit [taluka/block to assess the loss instead of the farmer], the guaranteed yield fixed at 3 or 5 years average, low indemnity level [60% in most of the crops], inordinate delay in settlement of claims [as much as 12 months in many cases], non-coverage of crops like fruits/vegetables etc. The need is to thoroughly revise the crop insurance scheme and make it farmer friendly. An insurance scheme which does not promptly provide relief if the event for which insurance was taken happens, but looks at the average yield data for a tehsil/block and takes a long time in settlement of claim is not appreciated by the farmers. The Situation Assessment Survey of Farmers done by the NSSO [NSS Report No 496: Some Aspects of Farming 2003] reveals that at the all India level, only 4% of farmer households reported ever having insured their crops. Among those who had never insured their crops, a very large proportion-57% were unaware of the practice of crop insurance. While 16% were aware but not interested, 24% said that the facility was not available to them and 3% felt that they could not afford to pay the premium. Lack of awareness and interest in a scheme, which is in operation for nearly 20
years, is a sad commentary on the development/promotional efforts and nature of the scheme.

3.1.31 In absence of an effective crop insurance system, the successive droughts/natural calamities etc seriously erode the repaying capacity of small farmer/rainfed farmer who becomes a defaulter if he/she is unable to service institutional credit. The normal policy of reschedule/conversion of short-term loans into medium term loan in such situation is not really enough. The farmers in the event of successive droughts/natural calamities require ‘relief’ and not mere shifting of repayment obligation to future dates. The need is to constitute a Agriculture Credit Risk Fund to support the banks particularly the small localised banks to provide relief to the farmers in these conditions.

**The WTO**

3.1.32 At the time of signing the Agreement on Agriculture [AOA], it was hoped that the Indian farmers would gain from trade liberalisation and access to international markets for their products. The reduction in domestic support as well as export subsidies by other countries, particularly the Western countries and Japan etc. was expected to enhance competitiveness of our agriculture and result in gain to our farmers through exports. However, this has not happened. On the other hand, due to low tariffs, import of edible oils [palm oil in particular] has increased which has adversely affected the interest of our rain fed farmers diversifying into oil seeds. It would appear that the postponement of agreement in agricultural negotiations, inspite of our concerted efforts at Hong Kong [2005], would prolong the unequal trade bargain entered into in Marrakesh [1994].

3.1.33 There is a need for early consideration of the proposal made in the Third Report of the National Commission on Farmers [Serving Farmers and Saving Farming - 2006: Year of Agricultural Revival] for establishing an Indian Trade Organisation [ITO] and our own boxes for domestic agricultural support on the models of the WTO’s Blue, Green and Amber boxes. We need to segregate the support extended to farmers into two groups - those which are of the nature of life and livelihood support to small farm
families and those which could be considered as trade distorting in the international market. The first group of support measures needs to be strengthened for protecting the food and livelihood security of our farmers.

3.1.34 Incidentally, the Situation Assessment Report No. 496. Some Aspects of Farming, 2003 published by the NSSO Reveals that only 8% of the farmers at the all-India level had heard of the WTO and had some idea of its objectives and activities. Higher awareness about WTO was among farmers in Kerala [44%], Punjab [23%], Haryana, Tamil Nadu and West Bengal [12% each].

3.1.35 Another aspect, which impacts the well being and future prospects of the farmers and their families, is the availability of essential facilities in the villages. The NSS Report No.487 on Village Facilities, July-December, 2002 based on a sample of 4646 villages revealed in Table 4.

Table 4: Facilities in Villages

<table>
<thead>
<tr>
<th>Nature of facility</th>
<th>Percentage of villages having the facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary school</td>
<td>72</td>
</tr>
<tr>
<td>Pre-Primary School</td>
<td>66</td>
</tr>
<tr>
<td>Medicine shop</td>
<td>10</td>
</tr>
<tr>
<td>Private clinic/Doctor</td>
<td>20</td>
</tr>
<tr>
<td>Primary Health Centre with in kms.</td>
<td>46</td>
</tr>
<tr>
<td>Post office</td>
<td>22</td>
</tr>
<tr>
<td>Tap water</td>
<td>18</td>
</tr>
<tr>
<td>Access to electricity</td>
<td>75</td>
</tr>
<tr>
<td>Any type of drainage system</td>
<td>30</td>
</tr>
</tbody>
</table>


3.1.36 The above data reveals that a substantial number of villages did not have the basic facility of tap water, electricity, medical attention/availability of medicines, primary school, drainage and postal facilities. Availability of improved seeds, pesticides etc. also posed problems. Almost 24% of the farmers had to travel more than 10km for improved seeds and 21% of the farmers had to travel more than 10km for pesticides. Even for veterinary services about 15% farmers had to travel more than 15km. On all India basis
only 18%, 19% and 24% farmers respectively reported availability of improved seeds, pesticides and veterinary services in their villages. Absence of these facilities, a famine of jobs/livehood opportunities in the rural areas, declining profitability of agriculture, small holdings generating low surplus and increasing disparity between per capita farm and non-farm income is making farming rather unattractive particularly for the youth. Retaining educated and trained youth in the rural areas is a serious problem.

**The National Agriculture Policy**

3.1.37 The National Agriculture Policy formulated by the Government of India had observed “Agriculture has also become a relatively under rewarding profession due to generally unfavourable price regime and low value addition, causing abandoning of farming and increasing migration from rural areas. The situation is likely to be exacerbated further in the wake of integration of agriculture trade in global system, unless immediate corrective measures are taken.” The above statement rings the alarm bells as far as the state of the Indian farmer is concerned. The National Agriculture Policy therefore, sought to secure a fair standard of living for the farmers and agriculture workers and their families, discourage migration to the urban areas and face the challenges arising out of economic liberalisation and globalisation. It aimed to attain, over the next two decades:

- A growth rate in excess of 4 per cent per annum in the agriculture sector
- Growth that is based on efficient use of resources and conserve our soil, water and bio-diversity
- Growth with equity, i.e., growth which is widespread across regions and farmers
- Growth that is demand driven and caters to domestic markets and maximizes benefits from exports of agricultural products in the face of challenges arising from economic liberalisation and globalisation
- Growth that is sustainable technologically, environmentally and economically

3.1.38 It is essential to achieve the above aims without loosing sight of the farmer. It is therefore important that a National Policy for Farmers is formulated to guide the planners and policy makers so that the interests of the farmers are kept at centre stage
while achieving the objectives of sustainable high growth rate across regions and farmers and deriving benefits from economic liberalisation and globalisation under the National Agriculture Policy.

3.1.39 The National Policy on Agriculture has expressed concern about the agricultural workers and their families. The landless constitute about 11.24% of the rural households in India and their livelihood is primarily related to agriculture. A substantial percentage of these fall in the category of poor\(^7\). The urgency to improve their economic well being cannot be overemphasized. Exclusion of rural landless or coastal fisherman/fisher women from the coverage of the policy for farmers would make it rather restrictive. The National Policy for Farmers needs therefore to cover all farmers, landless agricultural labourers, sharecroppers, tenants, fishermen/fisherwomen, poultry/other animal husbandry farmers, bee keepers, others doing vermiculture, sericulture etc. Certain aspects of the definition of ‘farmers’ to clarify the coverage are discussed at Annexure II.
Current Agricultural Scenario:
Assessment by Union Planning Commission

1. Growth Rate

- GDP growth in agriculture and allied sectors during the first three years of the Tenth Plan averages only 1 percent per annum, in contrast to the Tenth Plan target of 4 percent.

- The share of agriculture and allied sectors was 3.9% of the total Tenth Plan outlay, as against 4.9% in the Ninth Plan. The total share of agriculture, irrigation and rural development stood reduced from 20.1% in the Ninth Plan to 18.7% in the Tenth Plan.

- Tenth Plan expenditure of the Ministry of Agriculture during 2002-03 and 2003-04 was 27% of the total Tenth Plan outlay.

2. National Accounts

- Growth rates of livestock and crop output have averaged about 3.6% and 1.1% per annum, respectively after 1996-97, down from 4.5% to 3.1% during 1980-97.

- Within the crop sector, only fruits and vegetables grew at over 2.5% per annum. The output of remaining crops fell below 0.5% per annum after 1996-97 as compared to over 3% earlier.

- Growth of input use in agriculture decelerated after 1996-97, to about 2% per annum from over 2.5% during 1980-97.

- After 1997-98, output prices began to fall relative to input prices.

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7 IARI-FAO/RAP study [2001] based of 50th NSS round (1993-94) quoted in India 2020 Report of the Planning Commission shows that 54% of the landless were poor.
• Part of the deceleration in agricultural growth can, therefore be attributed to lower profitability leading to a slow increase in input use. **Growth of input productivity became negligible after 1996-97.**

• During 1997-2002, agricultural prices declined **relative to prices not only of inputs but also non-food consumer goods.** Purchasing power of agriculture incomes decelerated more than GDP at constant prices. **Real farm incomes showed no per capita growth after 1996-97.**

• Real per capita food consumption declined after 1998-99, despite fall in relative food prices. **Per capita consumption declined absolutely in case of cereals, pulses and edible oils.** The growth rate in the consumption of fruits, vegetables and milk also declined.

• Input use and productivity growth decelerated from the 9th Plan onwards. **This was accompanied by low demand growth and higher farm income variability.**

### 3. Crop Production

• The Tenth Plan foodgrains target is 230 million tones in 2006-07. **The production was 212.9 million tones in 2001-02 and since then it has been declining.**

• Trend of rice and wheat production was less than population growth by the end of the 9th Plan. **Yield growth throughout the 1990s was about 1% per annum, as against 3% during the 1980s.** Large exports at below domestic prices and subsequent poor monsoons have now reduced the stocks to a low level.

• Yield growth in coarse cereals was about 2% per annum throughout the 1990s, mainly **because of maize**
• A Technology Mission in Pulses has been in existence since the early 1990s. Pulses yields have stagnated and the area under cultivation has also shrunk. A sharp increase in imports of pulses has further reduced incentives for home production.

• Oil Seeds Technology Mission started in 1986. There was a substantial expansion of area, yield and production till the mid 1990s. The production went up to 24.4 million tones in 1996-97. The production was 25.1 million tones in 2003-04, but growth continues to be negligible.

• Imports of edible oils, was less than 10% of domestic production till 1994-95. Now the volume of imports equals domestic production.

• There is an urgent need to review the work of the Technology Mission on Oilseeds and Pulses, since the mission mode approach to project formulation and implementation should yield the anticipated outputs.

• Cotton Production has been good during 2004-05, but yield and quality are still poor. The Technology Mission on Cotton needs to promote a symphony approach, linking the cotton producers and the textile industry in a symbiotic manner.

• Sugarcane yield has been either stagnating or declining – recovery of sugar from cane has not increased.

• In fruits and vegetables, there has been no increase in yield. Vegetable yields are declining. Output increase is entirely through area expansion. The National Horticulture Mission will have to concentrate on increasing yield and quality. Post-harvest processing and management need urgent attention. The National Horticulture Board needs careful restructuring and revitalization.
4. Livestock and Fish Production

- Milk and egg production has decelerated. There is, however, an increase in the number of crossbred cattle and poultry since 1997. Feed, Fodder and marketing need attention.

- Fish production is growing at a rate of 4% p.a. and the production was 6.4 million tones in 2003-04.

5. Overall Trends

- Almost every sector experienced lower growth after 1996-97. Even in the excellent monsoon year of 2003-04, per capita output was less, except in horticulture.

- Food consumption has stagnated since the beginning of the 9th Plan. National Accounts data show that real per capita consumption of cereals, pulses, edible oils, sugar, milk, fruits and vegetables was lower in 2003-04 than in 1998-99.

- Overall employment growth has been very slow. Real agricultural incomes have been stagnating or declining.

- Agriculture will progress only if demand (both home consumption and export) increases. Consumption should be increased through both nutrition intervention programmes and through accelerated non-farm employment.

- Cost of production should be reduced through enhanced factor productivity. The average fertilizer response of food grain output to NPK fertilization works out to 7.8 kg grain per kg NPK. This is a very low return. How can we become globally competitive if our factor productivity is both low and declining?
• Imports of pulses and oilseeds are growing. Import of pulses, which used to vary in the range of 3 to 6 lakh tonnes in the 1990s surged to over 2 million tones in 2001-02 and has remained at that level since then. Imports of edible oils increased from 1 million tonne in 1995-96 to over 4 million tonnes in 1999-2000. It is now ranging in the order of 4.2 to 5.3 million tones per year accounting for about half of domestic consumption.

• Sustainability of food production is threatened by depletion and pollution of the aquifer, soil health degradation, failure of research, extension and input supply systems and declining investment in the farm sector. In addition to being a gamble in the monsoon, farming is becoming increasingly a gamble in the market. “The fatigue of the green revolution” is due to both ecological damage and technology fatigue.

• India today has the largest number of under-nourished children, women and men in the world. Maternal and foetal under-nutrition is resulting in low birth weight babies. Such LBW children are handicapped at birth in brain development, the cruelest form of inequity. Yet, we often hear glib talks about India becoming a Knowledge Superpower. Unless there is widespread realization among political leaders and policy makers that we are on the threshold of an unprecedented human tragedy, we will have to revert once again to the “begging bowl” phase of our agricultural evolution. Also, where hunger rules, peace will not prevail.

Professor M S Swaminathan, 2005, “Science and Technology for Bharat Nirman”, Extract from Presidential Address at 12th General Body Meeting of National Academy of Agricultural Sciences, New Delhi, June 5, 2005
FARMER - SOME DEFINITIONAL ISSUES

Farmers in local languages in India are referred as Kisans, Krishaks, Roytus, Chasis etc. The term farmer includes those who cultivate land and also the sharecroppers/tenants and the agricultural labourers whose incomes come from agricultural operations and activities related/ allied to agriculture. However, the National Sample Survey Organisation [NSSO] defines a farmer as a person who operates some land [owned or taken on lease or otherwise possessed] and is engaged in the agricultural activities during the last 365 days. If either of the above requirements of the definition are not satisfied, the person is not treated as a farmer. Thus the person engaged in agricultural and /or allied activities but not operating a piece of land is not considered as farmers. In other words the agricultural labourers, coastal fishermen, rural artisans and other persons providing agricultural services are not classified as farmers.

2. A plot of land is considered to be owned by a person if the right of permanent heritable possession with or without the right of transfer of title, is vested in him/her. Land held in owner-like possession under long-term lease or assignment is also considered as land owned. The land held as Pattadars, Bhumidars, Bhumiswami, Rayat Sithibans is also considered as land owned as is land taken on lease. Land held under special conditions such that the holder does not possess the title of ownership but the right for long term possession of land [for example land possessed under perpetual lease, hereditary tenure, long-term lease for 30 years or more] is considered as being held under owner like possession. In the States where land reform legislations have provided for full proprietorship to rest with tenants, they are considered as having owner like possession, even if they have not paid the full compensation. Similarly, plot of land possessed by a tribal in accordance with the traditional tribal rights from local chieftains or village /district council or land occupied by a tenant for which the right of ownership vests with the community is considered under owner like possession.
3. The NSSO definition emphasises on two aspects i.e., operation on some land owned, leased or otherwise possessed and secondly engagement in agricultural activities. The agricultural activities are understood to mean cultivation of field and horticultural crops, growing of trees/plants such as rubber, coffee, cashew, coconut, pepper, tea, etc. animal husbandry, fisheries, bee keeping, vermiculture, sericulture etc. However as we are aiming to prepare a draft Kisan Policy, it would be necessary to give a broader coverage to the term farmer. It may therefore be appropriate to cover all those who are engaged in agricultural activities as defined above irrespective whether they own, have leased in or possess some land. This would enable us to include the farmers as defined by NSSO as also the agricultural labourers and coastal fisherman etc. Excluding the landless agricultural labourers who form 11.24 of the rural households and primarily earn their livelihood from agricultural operations would be rather restrictive. Similarly excluding coastal fishermen but including other fisherman who carry out fisheries on their own pond/fields etc. will also not be appropriate for the purpose of preparation of Kisan Policy.

4. Farmers so defined would represent landless agricultural labourers, sharecroppers, tenants, small and marginal cultivators, other farmers, tribal farmers, fishermen/ fisherwomen, poultry/other animal husbandry and pastoral farmers, bee keepers, others doing vermiculture, sericulture etc.
CHAPTER 3.2

GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

LAND POLICY

3.2.1.0 Introduction

3.2.1.1 Land is the most fundamental requirement for the very survival of the humankind. This finite resource is the most dynamically used agricultural resource for livelihood security. Its quality, quantity and availability in the market-driven setting are hence the most important elements of agro-ecological, socio-economic and environmental security of the nation. Land is not only an economic asset but also has enormous social, psychological and emotional relevance. Rights and access to land are thus fundamental to help empower the poor to adjust to the challenges posed from time to time, such as technology revolution and globalisation in recent years.

3.2.1.2 Secure rights to land are also a basis for shelter, for access to services and for civic and political participation. They are also a source of financial security, as collateral to raise credit or as a transferable asset that can be sold, rented out, mortgaged, loaned or bequeathed. Moreover, secure access to land creates incentives for the user to invest labour and other resources in it, so as to maintain or enhance its value and sustain its productivity, and to access social and economic development opportunities. Several studies have documented a positive relationship between equitably distributed land and economic growth as well as social cohesion. Facilitating land access for poorer groups and protecting their land rights, within the context of the rule of law, enables people to enjoy shelter, food and security in an increasingly competitive environment. This is particularly so where off-farm employment opportunities are limited.

3.2.1.3 Increasing demand for the fixed supply of land typically translates into higher prices. Control over this resource is often central to national and local political
power. As competition for land increases, those with weak rights tend to be cast aside, as they are unable effectively to assert their claims. Land rights once lost are difficult to re-establish. Tribal people may find that the lands on which their livelihoods depend have been sold off for mining developments, ostensibly bringing jobs and development to the local area (and the poor gets still poorer). Land policy must have explicit proactive rehabilitation provisions and measures.

3.2.1.4 Land policy in India has evolved over hundreds of years in line with the evolving agrarian and urban societies and political and governance patterns and occupied centre stage in India’s policy debate. In Independent India, the very First Five-Year Plan had spelt out country’s’ land policy, which aimed to reduce disparities in income and wealth, to eliminate exploitation and to provide security to tenants, as well as to achieve social transformation through equality of status and an opportunity for different sections of the population to participate in development initiatives. The policy has undergone broadly four phases. The first phase (1950-1972) consisted of land reforms, including abolition of the intermediaries, tenancy reform which has provision also for enabling tenants to acquire ownership rights and the distribution of land using land ceiling. The second phase (1972-85) shifted attention to bringing uncultivated land under cultivation. The third phase (1985-95) increased attention to watershed management and a Waste Land Development Agency was established. The fourth and current phase (beyond 1995) is giving greater attention to land administration, rental markets, land records and land titles. All the Five Year Plans since 1951 have addressed land policy and reforms (Annexure I), serving as a process of overall development.

3.2.1.5 Following the Land Ceiling Act, the surplus land was distributed to landless and near-landless poor farmers and tenurial rights to almost 10 million ha of land were transferred during the 1970s and 1980s - more than three times what was involved in the well-known land reforms of Japan, Korea and other East Asian countries. Box I gives details of the major achievements steered by the Ministry of Rural Development, Government of India as well as the States in the field of land reforms from the beginning of the First Five Year Plan till the Tenth Five Year Plan.
Box I. Land Reform Achievements

- Intermediaries have been abolished over 6.0 million hectares of land and ownership rights have been granted to 20 million tillers.
- 12.42 million tenants have got their rights protected over an area of 6.25 million hectares of land;
- An area of 2.12 million hectares of ceiling surplus land has been distributed to 5.67 million rural poor, 51% of which constitute Scheduled Castes/Scheduled Tribes.
- An area of 5.90 million hectares of Government wastelands and 0.87 million hectares of Bhoodan land have also been distributed among the eligible rural poor;
- 0.17 million hectares of alienated land has been restored to Scheduled Tribes land owners;
- An area of 65.34 million hectares has been consolidated in the country;
- 582 districts, 201 Sub-Divisions and 3142 tehsils / taluks have been covered under the Computerization of Land Records (CLR) programme, out of which 1553 tehsils wherein computerized copies of RoR are being issued to land owners. For this purpose a financial assistance of Rs. 3005.15 million has been released to States/UTs.
- Under the Scheme of Strengthening of Revenue Administration and Updating of Land Records, an amount of Rs. 2659.74 million as Central share has been provided to States/UTs for undertaking survey operations and updating of land records and creating infrastructure facilities or revenue administration.

Source: Annual Report, Ministry of Rural Development, Government of India, 2004-05

3.2.1.6 The above achievements notwithstanding and sporadic marginal impact on poverty and inequity reduction, the objectives of the land reforms, as described in the following Section, have only partially been met and in most cases the beneficiaries did not receive full ownership. In the meantime, the land reform activities have tapered off and the task remains eminently unfinished. On the other hand, despite the restrictions and high cost of transactions in the land rental markets, more than 15 million households are participating in rental markets, and concealed tenancy is not uncommon. Moreover, the area-development programmes such as watershed programmes and management of degraded lands have not proceeded satisfactorily. Land policy must address structural issues that, in the longer term, need to be addressed in order to ensure that the economic opportunities opened by other policy changes will benefit the broad majority of the poor.

3.2.1.7 Obviously, the old and ongoing land reform and land development programmes should be revisited and revitalised in context of the ground realities and
the various new developments such as globalisation, liberalisation and the accent on diversification, off-farm employment, public-private partnership, revival of rural cooperatives, group farming for enhanced scale of economy and on competitiveness. In doing so, the farmer must be kept in the centre of the development process and the interest of the small and marginal farmers and the landless poor should be actively promoted. Land affairs and agriculture being State subjects and matters of great socio-economic and political importance (and sensitivity), the Central and State Governments should synergise their efforts to empower the landless and near-landless. The States should be given due financial, legal and technical supports to develop necessary Acts and Laws, legal instruments, trained human resources and institutional mechanisms to implement the policy and reforms and to monitor their impact on poverty reduction, economic development and agro-ecological security.

3.2.2.0 Ground Realities

3.2.2.1 Summarised below are the major outcomes and trends of the land reforms in the past, specifically in terms of land distribution, holding size, rental market and land development.

- In the early years of the post-Independence era, four important components of land reform comprised: (i) the abolition of intermediaries, (ii) tenancy reforms, (iii) fixing ceiling on land holdings and (iv) consolidation of land holdings. By 1960, the whole process of legal enactment of the abolition of intermediaries was completed. The other land reforms, namely, consolidation of holdings and implementation of land ceilings, had mixed outcomes; the latter, however, has halted increase in the concentration of land in fewer hands. Further, the phenomenon of absentee landlords was weakened and there was greater convergence of ownership and management. A strong middle peasantry emerged which had largely anchored the Green Revolution.
- Land base of marginal and near-landless households has not improved much over time; at best, the percolation of gains from land redistribution has stopped at the middle level of peasantry. Only 40% of the land out of the
totally distributed has been given to the Scheduled Castes (SCs) and Scheduled Tribes (STs). Dispossession of the land allotted to Dalits is not uncommon. Lakhs of acres of land are still with the court for dispute settlement since the landowners or ryots have refused to hand over the land to the Dalits. In addition, the government has abolished the settlement courts.

- The politics of land distribution has been changing which is reflected in the changed power structure. In the earlier times, the SCs and STs occupied the primacy in terms of land distribution. On paper it is still continuing but ever since the backward classes have gained enhanced political economic concessions available land is mostly going to the OBCs than to the SCs and STs.

- The huge proliferation of extremely small and economically non-viable holdings is emerging as a major agrarian handicap for livelihood improvement of majority poor smallholders. Nearly 66 percent of the farming households own small holdings of less than 1 ha. Simultaneous occurrence of diversion of agricultural land to non-agricultural uses (net outflow) and under-utilization of available agricultural land (current fallows) has diminished availability of land for cultivation and has shrunk common property resources (CPRs).

- The quality of land has deteriorated over years, often linked with poverty and compulsive “mining” of the land. But, often the damage caused by rich farmers is much more widespread as compared to that by smallholders. Small farmers utilise their lands more fully compared to large ones. SCs and STs have greater underutilization of land because of their poor access to technology, irrigation, inputs and credit.

- Despite multi ministerial institutional interventions to strengthen integrated watershed management, involving also the landless and land poor to manage the watersheds, alongwith the encouragement of the role of NGOs and higher levels of peoples’ participation, the performance of majority of the watersheds is unsatisfactory and the efforts are often fragmented, nonparticipatory and duplicative.
• Despite ban on leasing in and leasing out, the amount of land actually leased in is high. Agricultural technology, encompassing seed, fertilizer, irrigation and mechanization has impacted extent of tenancy and the lease market. The extent of sharecropping has greatly declined, whereas fixed rent tenancy, including fixed share of produce, has increased. Reverse tenancy exists but is not of much consequence in most States; often holders of not very different farm-size categories dominate the lease market. Concealed tenancy is also prevalent. The land lease market is mostly functioning on the principle of demand supply balance.

• Although a good beginning has been made in some of the States, through projects such as “Bhoomi” in Karnataka, “Dharni” in Goa, “Tamil Niloin” in Tamil Nadu and “e-Dhara” in Gujarat, but in majority of the States, land record and clear status of land titles and rights are generally missing and nonexistent. Computerisation of such records, a prerequisite for implementation of reforms, has thus yet to show its impact on a wide scale and “the revenue administration in the country lacks vision, dynamism, a holistic view of land management by the State and hardly it takes any intrinsic momentum.”

3.2.3.0 Impact of Land Policy

3.2.3.1 India's land policy interventions during the last five decades can be assessed based on their impact on various parameters, including alleviation of poverty, conflict management and equity, sustainable economic development, environmental impact, and production efficiency. Despite the various shortcomings as described in the above Section II, the land policy interventions have had varying positive impacts across the States, depending in large part on the agrarian situation and the extent to which a given policy was implemented (Annexure III). Poverty alleviation could be considerably impacted by the first three phases of land reform, but the Drought Prone Area Development (DPAP) and Desert Area Development Programme (DADP) have made little inroad. Similar results are seen in respect of conflict management and equity, but a significant change was recorded in this area.
because of the computerization of land records. DADP, DPAP and Wasteland Development Programmes could impact environmental management significantly. Similarly, these could influence sustainable growth in some pockets. The major contribution to sustainable growth came, however, from the abolition of intermediaries and from the ceiling on land holdings, which together have put a pressure on economic use of resources. While production efficiency is not a direct derivative of land policy, its components can help. The abolition of intermediaries, land ceilings and the consolidation of holdings (wherever it could be done) have certainly contributed. But, the boost was not large enough to create significant spill over impact in non–farm sector and overall rural income. The Watershed Development Programme has been one of the important land policy interventions in the recent past but its impact on poverty alleviation, production efficiency, conflict management and environmental management could have been better.

3.2.4.0 Major Issues

- Ever shrinking land availability and sub-division of holdings due to: (i) conversion of agricultural land to non-agricultural uses and diminution of Common Property Resources, (ii) rising pace of urbanisation, (iii) increasing demographic pressure and (iv) lack of non-farm employment.
- Unequal and inadequate access to land adversely impacting the production base of cultivating households at the bottom of the farm size hierarchy, especially when over 80 percent of the Indian farmers are small and marginal; alienation of land allotted to poor and Dalits has also not been uncommon.
- Unplanned land utilization – underutilization, excessive mining, faulty exploitation causing low productivity and production and exacerbating unsustainability and inequity (defunct Land Use Boards); outflow of land and increased current fallows have hampered availability of land for cultivation.
- Restrictive land markets, anomalies and loopholes in land tenancy laws, concealed tenancy, extremely poor land records and their inaccessibility, lack of congruence among Common Property Rights, Women’s Land Rights, Customary Rights of Adivasis / Tribals and Dalit Land Rights, etc; Limited
role of PRIs and Gramsabhas; lack of structural change in agrarian system to operationalise land reforms.

- Changes have taken place in the basis of land reform policy from equity orientation to market orientation in a systematic manner in recent years. The market forces and speculations have further distorted land entitlement of the poor. Policy dialogues have been inconsistent in providing concrete approaches and actions to ensure inclusive economic development and access to production resources.

- Lack of sustained commitment from government and development agencies and disconnect among the concerned Ministries generally adopting short-term project based land use decisions are not only hurting the resources, but are often anti-poor. For instance, new Industrial Policies in some States are proving draconian for land rights of poor and should be harmonised with agriculture and land policies.

3.2.5.0 Policy Implications and Actions

Access to Land, Poverty Reduction and Agricultural Development

3.2.5.1 Rural poverty is strongly associated with poor access to land, either in the form of landlessness or because of insecure and contested land rights. Economic analyses have long recognized the importance of secure property rights for growth, and therefore for the poverty reduction which growth can bring. Increased land access for the poor can also bring direct benefits of poverty alleviation, not least by contributing directly to increased household food security. In an agriculturally important country like India, where alternative employment opportunities are limited, access to land is a fundamental means whereby the poor can ensure household food supplies and generate income. This applies both to societies in which subsistence agriculture is prevalent, where access to land is the \textit{sine qua non} of household food security, and to societies where agriculture is more market-oriented, in which family farming provides a principal source of employment generating the income with which to buy food and to ensure livelihood security.
3.2.5.2 The relationship between access to land and poverty reduction cannot be seen in isolation from broader agricultural and economic policy. Equally, these issues are intimately connected with rural development policies and environmental outcomes. The distribution of land rights and opportunities for access to land will have implications for the distribution of wealth, rates of economic growth and the incidence of poverty, and the shape and direction of agricultural development will affect the incomes and returns from different types of farming activity, the value of land and demands for owning or for accessing land resources. The incentives and tenure structures that largely determine how land is used will profoundly affect environmental impacts and sustainability.

3.2.5.3 Despite past and ongoing efforts of reducing the pressure on agricultural lands and lessening of the crowding in and overdependence on agriculture, in the absence of viable alternative employment opportunities, nearly 70% of the Indian population, a huge number of nearly 700 million people comprising nearly 125 million families, continue to be engaged in agriculture and dependent on agricultural land for their livelihood. Therefore, land policy which must promote inclusiveness and enhanced and sustained agricultural productivity and income should be transparently and effectively pursued. In the meantime, creation of off-farm and non-farm employment should be vigorously promoted. Provision should also be made to exit farming in a phased and confident manner, if desired and warranted.

3.2.5.4 Small farm family farming remains the backbone of rural livelihood, and has been shown to be dynamic, responsive to change, and an important source of investment in agriculture. However, given the context of increasingly globalised markets, sustaining rural livelihoods for smallholder farmers will depend on their continued modernization, with support from policy and resources to strengthen capacity and access to markets. Smallholders must have their property rights secured and protected. This would provide collateral to obtain seasonal or longer-term credit for investment in productivity-enhancing changes or selection of an optimal time to sell the produce; enable them to safely rent out part of the land or rent in other land;
or in the last resort provide the option to sell their land and harness the proceeds to develop new livelihood opportunities.

3.2.5.5 Some critics argue that smallholder farming is inefficient and that the rural poor would be better off leaving the land and finding employment in the modern economy whether in commercial farms or in the non-farm sector (Box II). But, considering the ground socio-political realities and continued high dependence on agriculture, lack of alternative employment, and the untapped potential of small farms, “corporatisation” of agriculture is not desirable from any angle. Farmer-friendly contract farming, Small Farmers Estates and other such group mechanisms like National Dairy Development Board (NDDB) milk cooperatives and sugarcane cooperatives in Maharashtra are the viable alternatives to provide desired economies of scale as well as end-to-end linkages. Felda Scheme in Malaysia and Rubber Board in Thailand are success stories of promotion of oil palm and rubber on small holdings and processing in centralized high – tech processing plants in a Nucleus - Estate system, which could be adapted in India.

3.2.5.6 The latest (59th) Round of NSSO released in 2005 revealed that, given a viable alternative, 40 percent of the farmers would like to quit farming. This is not to be considered something highly unusual as most socio-economic transformations have witnessed the declining contribution of and dependence on agriculture and rising contribution of manufacturing (industries) and services sectors to national economies. However, in India the trend is “unusual” in the sense that while the contribution of agricultural GDP to total GDP is now only around 20 percent, the dependence on agriculture for employment and livelihood security continues to be extremely high, around 60 percent, thus adversely affecting the per caput income of agricultural population and further exacerbating the rural-urban income and livelihood gaps (the Bharat-India divide). The only way out of this worsening agrarian economy is to enhance productivity and income of small farms and farmers and diversify employment (rural) opportunities by strengthening production-processing-value addition-marketing-consumer chain under the leadership and control of the farmer and the farming community. The Amul Model of cooperative of the National Dairy
Development Board should be widely adopted in other agricultural subsectors (Box III) as well.

Box II. Smallholders Versus Large Farms

There has been long-standing debate about farm size and productivity. Some argue that the era of the smallholder farmer is over, and that for reasons of efficiency, small farms should be consolidated into fewer large holdings, allowing for economies of scale and increased mechanization. They point on the one hand to impoverished peasant farmers on the margins of existence with little ability to generate a surplus for investment in the farm enterprise and limited capacity to adopt new technology, and on the other to profitable large farms, accessing world markets, and providing employment and good wages to the local rural workforce. Others refute such arguments and note that for many crops there are few if any economies of scale in agricultural production. They point on the one hand to dynamic smallholder production, in which innovation and investment are very evident, as people adapt to new market opportunities and changing environmental conditions, and on the other hand to inefficient, extensive large farms with few workers, low wages and poor productivity.

There is ample evidence to support either case, depending on the type of crop, the policy context, and forms of support available to different kinds of farmer. Small farms are generally family-run, may be subsistence-based or market-oriented, using few or many external inputs, working manually or with machinery, and use the land extensively or intensively. Large farms are generally market-oriented, may be family-run like small farms or corporate, and use few if any or many labourers. Both small and large farms may be resource-poor or rich, use largely manual methods or machinery, and use the land extensively or intensively. Because of this great variation in farm types any statements on the relative merits of small versus large farms can only be relevant within specific social, economic and biophysical environments.

Scale economies may be achieved by mechanization in crops such as sugarcane, some cereals and soya, for example, while perennial crops such as rubber, fruit and vegetables tend to do better under intensive production with a significant proportion of manual input. In the absence of economies of scale, small farms may be more efficient than large ones because of the favourable incentive structure in selfemployed farming and the significant transaction and monitoring costs associated with hired labour. In Indonesia, for example, some 80 percent of rubber and resin production and 95 percent of fruits are produced in smallholders tree gardens. But both smallholder and plantation rubber may be tapped by experts, owners or labourers with a direct interest in the sustained latex quality and productivity of the trees in their care, and limited need of supervision.

Even where there may be few economies of scale in production itself, there are increasing upstream and downstream economies of scale related to access to inputs and markets. Purchasers of commodities prefer dealing with a few larger suppliers because of the transaction costs associated with handling produce from a large number of individual smallholders, relegating these to less profitable local market outlets. Such local markets are also under threat where local produce is in competition with food grains, often subsidized, from countries with surplus stocks. However, groups of smallholders may also organize themselves to jointly store, grade and sell their produce to gain access to large buyers.

Box III. Empower the Farmer

India's heart and soul resides in her villages. Unless rural India becomes socially and economically free, there will be no true progress. The success of our democracy rests with the rural poor and if we want the rural economy to be liberalised, we must empower our farmers. One of the best ways of achieving this is through co-operatives. Co-operatives comprise a special category of business organisations because their raison d'être is not profits for distant shareholders, but returns to farmers who invest in land and animals.

The merit of the co-operative ideology is the co-ordination and balancing of fundamental principles of equality, democratic control and equality in institutions, and practices to maximise social welfare. It is my firm and unshakeable belief that the entire value chain from procurement to marketing is the sole and exclusive domain of the farmer. The moment the farmer loses or dilutes his right over it, being a small producer, he becomes nothing better than a contract labourer. Value addition in the procurement and processing functions is realised only at the time of marketing. If marketing is not in the hands of farmers' organisations, they will not get a good realisation for their efforts as marketing is the only revenue earning part of the value chain. There is no better way of helping our nation's producers to become productive members of our society.

A case in point is co-operative dairying, based on the Amul model where procurement, processing and marketing is in the hands of the farmers. A massive network, it involves collecting milk from more than 12 million farmers, testing, grading and transporting twice a day from 1,00,000 villages over 10,000 routes to about 180 dairy plants. It is later followed by processing, packing, and sending the milk to the market in almost 800 big and small towns every single day of the year — definitely no mean task in marketing. Delivering wholesome nutrition to the consumers at the most reasonable prices seen anywhere in the world, while transferring the bulk of the value realised back to the farmer is a feat both in marketing as well as in social development.

Co-operatives must be headed by professionals armed with tenures long enough to achieve meaningful changes. An officer deputed with ad hoc powers and subject to sudden transfers can hardly be expected to measure up to the task. As a corollary, no political consideration must colour the policies, objectives, strategies and functioning of a co-operative.

Source: Verghese Kurien, Times of India, 26th March, 2006

Land Reform an Unfinished Vital Agenda

3.2.5.7 Both the internal and the external environment of the Indian economy has changed since the first Five Year Plan which emphasized the importance of land reforms. The reform component has been put on the back burner. Questions have been arising as to how important is the ongoing land reform in the present context in which economic policies are driven more by market oriented reforms. There are three
compelling reasons to believe that land reform is even more important today than in the past:

- Land reform is important because the structure of the Indian economy is still dominated by agriculture which provides nearly 60 percent of employment and almost a one-fifth of the GDP. Moreover, hard core poverty still persists extensively in rural areas on an extensive scale which market forces are incapable of addressing. Therefore, both for employment generation and for assault on poverty the issue of land reform has to be faced squarely.

- It is stated objective of the UPA Government that the National Rural Employment Guarantee Programme (NREGP) can be implemented properly only through a decentralized Panchayati Raj system. This scheme can only be successful in reaching the poor if the Panchayats become less dominated by the landed and privileged rural elites. This requires a successful system of land reforms because inequality in land distribution is very often at the bottom of other forms of social discrimination and domination based on gender, caste, minority and tribal affiliation. This requires a new vision of land reforms which would intertwin it with the NREGP. Land reform should also be linked with Bharat Nirman.

- Democratic functioning of our institutions and successful decentralization of Panchayati Raj system is a way forward for the deepening of Indian democracy. This would be feasible only if land reform and significant changes in existing land relations can be brought about to make the pattern of growth more inclusive. Outflow of productive agricultural land, particularly in areas endowed with a strong infrastructural base for agriculture, must be checked through appropriate legal reforms. The decline in CPR should be stopped through suitable regulatory interventions; the legal bindings from the top should be intertwined with political awakening from below. PRIs and other grassroot institutions should play an important role in this direction and should be duly strengthened for the purpose.
3.2.5.8 In view of the above, land reform should be viewed in the entire context of agrarian reforms as ably summed up by D. Bandyopadhyay, “The basic issue in rural poverty turns out to be land reforms, in a sense little more than that resource reform. Resource reform would include land reform per se, community control over water and common property resources, right of forest dwellers and forest based self employed occupations and large measure of gender equity and intergenerational justice. Resource reform is primarily about changing relationships. First, it aims at changing access to land and tenurial relationship. Second, it aims at changing the culture of the exclusion so that the poor can gain access to credit, technology, market and other productive support services. Farmers’ suicides in our country only highlight the extent and depth of this culture of exclusion. Third, it aims for the poor to be active participants in the development of policies and programmes affecting their communities and livelihood. Thus Resource Reform would mean – secure access to land/water and secure and fair tenurial relationship plus (+) support services plus (+) participation.”

Land to the Landless and Land Redistribution

3.2.5.9 In general, redistributive land reforms have been motivated by three related but distinct objectives:

- To achieve more equitable access to land, so as to reduce poverty and landlessness in rural areas;
- To improve social justice by shifting the balance between different groups in the ownership and control of land and restoring alienated land rights;
- To promote rural development by raising agricultural productivity and creating a class of productive smallholder farmers.

3.2.5.10 These objectives have frequently been combined, but they may also conflict, leading to different types of land reform, targeting the very poor, or alternatively, commercially viable farmers. In particular, whether improvements in equity and social justice also enhance productivity and land use efficiency may depend on the agricultural development model adopted and the wider market context.
Researchers have documented a positive relationship between more equitably distributed land and economic growth. Experience from several East Asian countries (South Korea, Taiwan) shows clearly how a reform delivering more equitable land distribution is fundamental to create sustained economic development, by sweeping away conservative and unproductive land-owning classes, promoting farm modernization, and boosting rural purchasing power and domestic demand to support a growing and competitive industrial sector.

3.2.5.11 The experience of Taiwan and South Korea, where successful land redistribution took place after the end of a major war and under the communist threat, and in the Indian states of Kerala and West Bengal, where land reforms were key elements in egalitarian social change, shows that the success of a land reform programme ultimately depends upon strong political power allied to land reform movements seeking to change the land distribution of the country, and challenging resistance by landed interests.

3.2.5.12 The Government should make all out effort to improve poor people’s access to land, as it is crucial for poverty alleviation in some areas. While effort should be made to effectively implement the existing ceiling laws and also to redistribute the ceiling surplus land among landless and semi-landless poor, government should also purchase land from the market and distribute among the land-poor, as being done by some State governments, like Andhra Pradesh (Box IV). The large amount of surplus land involved in litigation must be got freed through suitable legislative intervention and distributed to the landless or the near landless households.

3.2.5.13 Government should allocate homestead cum garden plot of reasonable size to all landless families in rural areas, based on either available government land or purchasing land from the market. This will enable the poor landless families to construct house if needed on their own land and also grow some fruit trees, vegetables, rear cows, poultry birds etc. and earn supplementary income. This will also significantly improve their food and nutritional security.
3.2.5.14 While allocating a piece of land to the landless is the foremost step for alleviating rural poverty, the process should be followed up by the major agricultural technology sub-system, quality irrigation, credit system, extension system, seed system, fertilizer system, and marketing system. The main concern is improving the economic level and livelihood security of the poor farmer rather than making a landless person merely a landholder. Positive policy of bringing together various kinds of input supports including technology should be undertaken so that the poor could participate in the development process. The rural banks, NABARD and Land Development Banks should be encouraged and duly equipped for delivering credit, technology and marketing supports particularly to the landless, especially SCs and STs.

Box IV. Increasing Access to Land: The Andhra Pradesh Example

Indira Kranthi Patham (IKP), initiated in 1995 and now operational in 846 of the AP’s 1100 mandals, one of the pioneering projects, focuses on the poor women in the State and builds on the State’s strong SHG movement to help the poor to achieve tenure security and physical possession of land and empowers them through institution building and enhanced livelihood security. Committees comprising all stakeholders, including officials from the Revenue Department, are handling the matter at State, District and Sub-district levels, undertaking awareness-raising, data management and access administrative support and oversight and legal aid. These (land) non-purchase activities have put 1.2 lakh acres in the hands of the poor within a short period of 18 months.

The land purchase activities of the project assist the landless or nearly-landless poor to purchase and develop small plots of private land and helps the purchaser to access institutional financing for the purpose. With beneficiaries in the driver’s seat, IKP, in consultation with the SHGs, purchases land as per pre-purchase business plan and by loaning upto Rs. 30,000 per household to purchase either field plots or house-and-garden plots and to obtain resources for developing these plots, thus factoring in also the costs of improvements and technical assistance. The community coordinators identify the perspective SHGs whose members much meet a set of eligibility criteria and through a direct negotiation between buyer and seller the land is purchased at a price not higher than the maximum set by a Mandal Appraisal Committee. Under this component, in 14 districts purchase of over 2100 acres of land are underway.

Accelerated since October, 2004, the IKP, by August, 2005, had distributed (mostly redistributed) 3.25 lakh acres (85% being government land) to 2.4 lakh beneficiary households with full ownership rights, which were not there before. This was possible through close cooperation among IKP functionaries, Gram Sabhas, the Revenue staff and the farmers. Pattas were given exclusively to a large number of women farmers.


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3.2.5.15 Positive relationship exists between farm size and degree of underutilization of land, but this gets reduced as capital intensity of production goes up. Therefore, land development grants should particularly be directed towards small farmers in the more developed States while such grants in the rainfed regions might aim at benefiting all sections of the farming communities.

**Restoration of Alienated Lands**

3.2.5.16 There continues to be widespread dispossession of Dalits, tribal communities and other poor from their lands which have been legally allotted to them or should have been in their names. However, there is no official estimate of this and information of the villages where there are a large number of cases. As a consequence there can be no systematic effort by the State to restore possession to the rightful owners. It is essential therefore that a survey be undertaken of all the lands for which SC/ST and other BPL families have a legal right. Collection and compilation of data should be undertaken separately for the SC/ST beneficiaries under various land reform measures. This is the most fundamental task which must be taken up in all the States on a priority basis, since it will provide a base for ensuring the restoration of possession on the one hand, and development including investments on the land and improved productivity on the other. This nationwide survey to be taken up in the States may be supported by the Ministry of Rural Development (Department of Land Resources) and could be coordinated by the Revenue Departments of the States and the Collectors/Deputy Commissioners in the districts could, appropriately, undertake this work.

3.2.5.17 State Governments should strengthen their legal and administrative infrastructure to prevent alienation of tribal land and restore the alienated land to tribals along with plans for productive utilization of such land. On the basis of the survey, a drive for restoration of the possession of lands to the Dalits and other poor who have been dispossessed (or never given possession at all) is required to be taken up by the Revenue Departments in the States. This may be commenced, to begin with, in select regions where there are a large number of cases of such dispossession,
and on basis of experience gained, extended to all areas. One Steering Committee should be constituted incorporating the main stakeholders, particularly from the Ministry of Agriculture, Ministry of Rural Development and Ministry of Social Justice and Empowerment to oversee the progress of these issues.

**Tenancy Reforms**

3.2.5.18 Land tenure security refers to the degree of reasonable confidence not to be arbitrarily deprived of the land rights enjoyed or of the economic benefits deriving from them. Land tenure security is a key part of sustainable development, as agribusiness and smallholders alike need secure tenure in order to invest in the land. Yet, in many parts of the country property rights are weak or unclear, undermined by overlapping land claims and intense competition. This situation creates confusion and fosters tenure insecurity, which discourage agricultural investment and enable elites to grab common lands. Efforts to improve land tenure security have traditionally emphasized large-scale individual titling and registration programmes. Individual titles, a long-standing argument runs, would increase the willingness and ability of landholders to invest, by removing disincentives (as landholders would not invest in the land unless they can be reasonably confident that they will not be deprived of it) and by improving access to credit (as titles can be used as collateral). On the basis of these arguments, titling and registration programmes have been implemented over the past decades in many parts of the country. Land titles, when accompanied with other necessary services and inputs have led to higher land values, greater agricultural investment and higher productivity.

3.2.5.19 In India, land tenancy markets appear to work well, but they face legal hurdles in the shape of tenancy legislation originally intended to protect the interests of the poor: as most developed countries have found, such legislation effectively paralyses rental markets. In different Indian States, land legislation ranges from outright prohibition of tenancies to regulating their terms and conditions. However, implementation of this legislation has led to unintended consequences, driving tenancy underground. The creation of permanent rights for tenants and the outlawing
of tenancy has caused landlords to fear losing their land, limited rental opportunities for land-poor households, and led to the under-utilization of cultivable land and to pre-emptive evictions of tenants before the legislation came into force. The prohibition and excessive regulation of land rental markets tends to restrict land access opportunities, and while clear and secure tenancy rights and the elimination of exploitative practices are important, there is a compelling case for the liberalization of restrictions on both fixed rental and share tenancy contracts. Nevertheless, there remains a case for limited and balanced regulation of tenancy in favour of the poor, providing some measures of security of tenure and curbing the potential for exploitative practices of landlords.

3.2.5.20 The main components of tenancy reform included security of tenure, termination of tenancy, resumption for personal cultivation by the landlord, regulation of rent and confirmation of ownership rights, and the following guidelines were communicated by the Government of India to the State governments for incorporation in the State legislation:

- Security of the tenancy to be conferred on the actual cultivator;
- Fair rent to be fixed between 20 and 25 percent of the gross produce;
- Landowners may be permitted to cultivate land for their personal use;
- The surrender of the tenancy rights with mutual consent;
- In respect of some of the area, the landlord-tenant relationship to be ended and the tenant cultivator be brought directly into contact with the State;
- Disabled persons, defence personnel and other such exemptions to be allowed to lease their land;
- The term "personal cultivation" should be clearly defined if landlords are allowed to remove tenants in order to resume cultivation;
- Tenancy records should be corrected and oral tenancies should be abolished.

3.2.5.21 The guidelines have, however, not been followed uniformly. Many States have banned tenancy, some States have banned only old tenancies as the land has been assigned to the tillers and few States have banned new tenancies only. Thus
there is no uniformity of Tenancy Laws across the States and even there are deviations from the national policy on tenancy (Annexure II). Further, in spite of Tenancy Laws enacted by all the States, their implementation has been dismal. Except ‘Operation Barga’ in West Bengal where tenants / share croppers were recorded and tenants were given legal status, most other States have done least in this regard. In most States there is no recording of tenancy and in such cases share cropping becomes exploitative. Similarly, absentee land owners do not rent out land for the fear of losing ownership rights or go for informal leasing to the tenants. This also causes inefficient / poor use of the land. On the other hand, access to land by poor has become difficult due to tough tenancy laws, and sometimes, when in dire need, the poor and marginal landholder can not sale his/her land. Wherever tenancy is recorded, the rent is generally not properly fixed according to law and thus the tenants continue to be exploited. Hence, there is a need to examine the State policies on land tenancy and harmonise them as a national policy barring the most critical provisions to be covered under State- specific Acts.

3.2.5.22 Land reform should benefit the actual cultivators who till the land so that the productivity and growth in the agriculture would increase and subsequently, agricultural development will bring forward rural development and overall economic development. In the present scenario of liberalisation, privatisation and globalisation, the land market and the cropping system will be changing. There are already instances of reverse tenancy, contract farming, corporatisation of land, etc. There is a need to have legislation which legalizes the tenancy as an agreement between the owner and sharecropper and both of them should have a right or freewill to cancel it or anull it anytime. Tenure security is thus a major policy issue. To realize the full benefits that can accrue from rental markets, governments need to ensure that tenure security is adequate to facilitate long term contracts, and eliminate restrictions on the operation of such markets, except under special circumstances.
Legalising Land Leasing

3.2.5.23 To ensure equity, efficiency and feasibility, a regulation, which does not come as a threat to the landlords and will also provide security to the tenant, is necessary so that investment comes in, loans come in and there is an increase in the productivity. There is a tendency among the land owners to keep the land fallow rather than leasing it out as they fear that they may loose their land rights. Leasing in and leasing out of agricultural land should be legally permitted within ceiling limits of various States and both the tenant and the owner should have a guarantee of protection of their interests. This will promote occupational mobility of people as well as efficient utilization of land, labour and other resources.

3.2.5.24 A variety of promising initiatives in land leasing by NGOs to facilitate access to land by the poor have emerged. One of the best documented is the work of the Deccan Development Society in leasing out underutilized private land in Andhra Pradesh for use by Dalit women on a tenancy basis. Despite the need for small-scale land holders to be free to transact land amongst themselves, experience shows that land sales markets are much less effective than land leasing or sharecropping in providing new land access opportunities for the poor. High transaction costs and lack of access to credit limit the ability of the poor to buy land on the market. Distress sales of land by the poor may also occur, with negative equity outcomes. Nevertheless, the ability to transfer land on a freehold or leasehold basis may create incentives for greater investment and enable use of land as collateral in credit markets.

3.2.5.25 Legalised leasing will be a pro-poor move, as majority of the beneficiaries will be small and marginal farmers, hence should be given high priority. Allowing the lease market to function is good for those who want to lease out their tiny nonviable plot to avail of other opportunities as well as for those who want to supplement their tiny holdings to make them viable. Concealed tenancies are neither good for the tenant nor the landlord. Moreover, informal tenants cannot get loans from formal financial institutions. Studies have revealed that some of the farmers committing
suicides were informal tenants who borrowed from moneylenders and could not pay back because of high interest rates. Legalizing leasing will thus also enhance the access of small and marginal tenants to institutional credit. The move will also eliminate the unilateral fixation of land rent. Further, it is hoped that opening the lease market will attract much-needed private investment in agriculture.

Ownership Rights to Land and Use Rights of Land

3.2.5.26 Land reform has two broad dimensions based on ownership rights to land and use rights of land. In so far as the ownership right is concerned, it is increasingly clear that owners at the top-end of the distribution spectrum often do not accept full time agricultural occupation, nor do they derive their income only from agriculture. In several parts of the country, there has been an increasingly perspective shift in ownership patterns towards neogentlemen farmers and non-cultivating households and non-resident farms. Most land purchases are by these groups and in many respects they have the characteristics of erstwhile rentiers. In some parts of India in which Green revolution had an early start (Punjab, Western U.P.) evidence suggests that near landless farmers have rented out their land to join the category of strict landless groups. While top farmers have also lost, the proportion of small to medium farmers has remained stable. The main lesson to be drawn from this is that alternative possibilities of livelihood must be made available for the now landless peasants. The possible lines of action for coming to grips with the situation are:

1. Redefine self-cultivation and residence qualification;
2. Tighten the ceiling laws in following respects:
   - No further relaxation of ceilings, as there is nothing in technical or factor efficiency argument against this;
   - Allotted and alienated land to be restored;
   - Handing over possession of allotted land;
   - Settlement of court cases and allocation of bhoodan/temple lands to be hastened;
   - Benami transactions / power to reopen closed cases;
• Banning exemptions from agricultural ceiling for land converted to non-agricultural use and for corporate farming; and
• Reduction of ceiling limits to Non-resident Indians and for those who are predominantly non-resident and are non-resident farmers.

3.2.5.27 As regards use rights of land, these should be orchestrated to provide greater opportunities for small farmers. With a view to this, following recommendations mostly related to tenancy or use rights are made:
• Make tenancy relationship open, but record them and regulate security and fair rent;
• Provide access to tenants to agricultural services support and institutional credit;
• Stress use rights in CPRs, degraded wastelands/government land etc.;
• Develop a broader perspective of land consolidation and utilization to enable better land use, greater pooling of services, strengthening and monitoring of SHGs, organisation of small farmer estates, and promotion of cooperative mode of cultivation, joint investment in infrastructure, irrigation etc.

Balancing the Interests of Foreign Investors and the Land Rights of Local Users

3.2.5.28 Land and natural resources are an important sector for foreign investment, in agribusiness, forestry, tourism, mining and petroleum. If appropriate conditions are not in place, natural resource-based investment projects may undermine the ability of local communities to access the resources on which they depend for their survival. This may take the form of expropriation of community lands without adequate compensation and proactive rehabilitation. Investors may also be granted exploitation rights that severely affect the ability of local communities to use their resources, and in many cases, investment projects whether mining operations or large tourism facilities have led to the diversion and pollution of scarce water supplies. While these issues may emerge in relation to both domestic and foreign investments, the involvement of foreign capital in capital-poor countries may affect more profoundly the balance of bargaining power between local resource users and outside investors.
3.2.5.29 In recent years, laws and policies have been adopted to grant local resource users greater tenure security, including in their relations with foreign investors. The legal recognition of collective land rights has been opted in some cases rather than individual titling. In its recent Policy Research Report, the World Bank argues that while the individualization of land rights is the most efficient arrangement in many circumstances, in a number of cases definition of property rights at the level of the group can help to significantly reduce the danger of encroachment by outsiders while ensuring sufficient security to individuals. Indeed, where the primary source of tenure insecurity is outsider encroachment, the best legal response is to recognize and enforce local group rights, and (where it does not cause undue conflict) to demarcate and record certain lands in the name of that group. Above all, awareness and vigil of local communities can greatly help in protecting the CPRs and local natural resources, such as the Chipko Movement in Uttaranchal and stopping of construction of a huge skiing and tourist resort by a foreign MNC in Himachal Pradesh.

**Ceiling on Holdings**

3.2.5.30 Ceilings on land holdings were imposed to correct the highly skewed distribution of land in the post-independence era. The other economic compulsions were: (i) there was strong evidence indicating an inverse size - productivity relationship, hinting that the aggregate production efficiency is hampered when land is held in large holdings; (ii) there was some evidence that large holders of land left large areas fallow thereby perpetuating uneconomic land use; and (iii) a large proportion of the population were land-based poor who wanted land as an economic resource for their livelihood. It was thought that surplus land could be distributed to such poor people. The land ceilings move was largely to provide social justice and equity and not so much on the grounds of increasing agricultural production and productivity.

3.2.5.31 The main purpose of placing ceilings on landholdings was to detect and acquire surplus land that was above economic holding size and have it redistributed among the landless who require an economic base. However, redistribution failed in most States. Acquiring surplus land was not effective and as the acquisition was
meager the redistribution was also insignificant. This failure was mainly due to the lack of political will and poor management at the village level. The surplus land distributed does not form even 2 percent of the total net operated area, and even this small share was concentrated in only six States (West Bengal, Maharashtra, Andhra Pradesh, Assam, Jammu and Kashmir, and Rajasthan).

3.2.5.32 Yet, the ceiling laws have succeeded in keeping a check on concentration of land in the hands of a few. A large number of experts now agree that the further lowering of ceilings and further implementation of ceiling laws is no longer a feasible option of engendering social equity. Marginalization of the size of holdings, with the proliferation of minuscule holdings, has emerged as a new challenge. The proliferation of small economically non-viable land holdings, a major agrarian handicap, should be stopped through suitable legislative measures.

3.2.5.33 Certain corners have been voicing rolling back land ceiling laws with the argument that the current ceiling limits hinder investment in agriculture and diversification to high-tech agriculture. It is argued that while there are no limits on investment in other sectors why should agriculture face restrictions. It is further argued that economies of scale could be achieved by allowing larger holdings and that large farms would also attract greater investment in the agriculture sector and would generate exportable surpluses and would help to participate effectively in the world market. However, these arguments must be considered in light of the following ground realities:

i. poverty is essentially a rural phenomenon,
ii. nearly 60% of India’s population is employed in agriculture,
iii. land, even a small piece of land, is the main anchor of livelihood security,
iv. the unemployment especially in rural youth (and the associated socio-economic tensions) has been increasing and there is limited scope for off-farm or non-farm employment and alternative income, and
v. the lack of access to or entitlement to land and associated resources and
generally low agricultural productivity are the main causes of persisting rural
poverty.

3.2.5.34 The potential economy must not allow the majority of the rural poor to be
further alienated from their main source of survival – the land resource, even a small
piece, without providing viable alternative solution. Moreover, as mentioned earlier,
family owned small holding farms are more efficient and, if duly supported, can lead
to increased aggregate food production, higher level of employment for farm and
family labour, higher household food security, improved practices of soil and water
resource management and have higher multiplier effects both in rural and urban
economy. Thus, the existing land ceiling laws should not be rolled back. However,
under certain circumstances, necessitated in the interest of the community and majority
resource-poor, necessary relaxation may be permitted in case of wastelands. But, the
relaxation should not be used to evade income tax or indulging in land speculation.

Land Markets

3.2.5.35 Non-cultivating households tend to buy land mostly as assets or rentiers.
The land is used as a “store of value”, often with a view to making capital gains from
land. As a result, land is not used adequately and efficiently and factor productivity of
agriculture tends to be low by international standards. At the other end, land hunger,
which is intimately connected with rural poverty, tends to increase, but the high land
prices prohibit them to buy land in the open market on their own. The high land
prices have, however, induced many marginal farmers to sale off their lands, often
without alternative livelihood anchor, thus compounding the rural social problems.
Dealing with problems of interlocked markets and correcting market distortions and
enhancing land relations is thus an important issue. A massive programme based on a
new vision of how the government can ensure that labour is more gainfully absorbed
in agriculture and the poorest have some standing in the rural society through
ownership of land is needed. In view of this, the following interventions in the land
market are essential:
• Long term loans from institutions for land purchase like house purchase for the landless (the IKP experience in Andhra Pradesh, Box IV) and making available to them technical assistance to enable them to plough the land in keeping with the needs of productive agriculture and even commercial farming, and providing them with marketing support.

• A systematic programme for conferment of homestead rights and also allotment of homestead for landless poor (The IKP experience in Andhra Pradesh, Box IV).

• Contract farming should be redefined precisely indicating how it would protect or enhance the land and livelihood rights of the farmers. Otherwise, it will aggravate instead of solving the problem of agriculture. As discussed earlier, based on equity considerations, promotion of corporate farming through liberalising land ceiling will be generally of little relevance in the Indian context.

Consolidation of Holdings

3.2.5.36 Legislation on consolidation was adopted in some States in order to reduce inefficiency in operations and cultivation. For the most part, these laws and associated consolidation programmes have failed to achieve their goals because of the lack of political will and administrative difficulties. The legislation was difficult to formulate and did not consider the reality of the caste system within the farming communities, and the local processes of politicization. Except in Punjab, Haryana and Uttar Pradesh, consolidation programmes have not made any impact. Given its importance and the extremely unsatisfactory results of this programme, it is essential to evaluate the effectiveness of the legislation and to rethink an institutional solution.

3.2.5.37 Demographic and economic pressures naturally cause fragmentation of land, and marginalization of holdings can be seen as an important outcome of this. The numbers of holdings smaller than 1 ha and especially of those smaller than 0.5 ha have been increasing over the decades. This process causes concern. One successful
approach has been taken by a few groups of small and marginal farmers in some of the States such as Karnataka, Maharashtra, Punjab, etc. These farmers came together to cultivate a particular crop (strawberries, tomatoes, gherkins, rose or onions) on a contract basis with a price for the produce agreed in advance with the contractor (contract farming). They could therefore overcome the viability threshold to cultivate such investment-intensive crops, but the outcomes were not uniformly successful over extended time and space. These experiments provide an institutional alternative to consolidation of holdings and should be critically researched and promoted as per location-specificity.

3.2.5.38 In the context of globalization, it is clear that the small and marginal farmers are handicapped when it comes to participation in domestic and foreign markets. Their competitiveness is hampered by the crops they produce, by market imperfections and by a lack of access to available information. Other factors that inhibit India's farmers in competitive world markets include the small size of landholdings and low throughput of production. It is difficult for the small and marginal farmers to grow the commodities that are in demand in the world market, mainly because of the high cost of cultivation of these goods and their limited knowledge of them. In order to overcome this problem it is important to encourage farmer-centric contract farming and entrepreneur groups which can take the risk of competing to grow the crops with a domestic and international demand. Contract farming will help efficiently link production, processing, value addition and marketing for small farmers, and deserves a serious attempt.

**Integrating Forest, Land and Tribal Policies**

3.2.5.39 Forest policy, including the rights of tribal populations, is interactively linked with land policy. Until 1988, forest was considered as the sole property of the State, and State had all the rights to manage and appropriate the revenue generated from forests. However, with the emergence of the concept of joint forest management (JFM) and community forest management (CFM), management and revenue-sharing with the local people (often through Panchayat Raj or similar parallel political
institutions) was considered by many States as a method of involving people and giving them rights on the forest resources. The main emphasis of the 1988 Forest Policy was to arrest forest degradation, retaining as well as enhancing the quality of land use in this sector. The policy also aims to create a partnership between forest dwellers and forest development authorities. The recent Tribal Bill has ironed out some of the limitations of the forest and land use policies and granted following rights to the tribals:

- Right to hold and live in the forest land under the individual or common occupation for habitation or for self cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe;
- Rights such as nistar, by whatever name called, and uses in erstwhile princely States, Zamindari or such intermediary regimes;
- Right of access to, use or disposal of minor forest produce;
- Other rights of uses or entitlements such as grazing and traditional seasonal resource access of nomadic or pastoralist communities; right of habitat and habitation for primitive tribal groups and pre-agricultural communities;
- Rights in or over disputed lands under any nomenclature in any State where claims are disputed;
- Rights for conversion of Pattas or leases or grants issued by any local authority or any State Government on forest lands to titles;
- Rights of conversion of forest villages into revenue villages;
- Rights of settlement of old habitations and unsurveyed villages, whether notified or not;
- Right to access to bio-diversity and community right to intellectual property and traditional knowledge related to forest biodiversity and cultural diversity;
- Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving;
- Rights which are recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribals under any traditional or customary law of any State;
• Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes which are not mentioned above but excluding the right of hunting.

3.2.5.40 Implementation and integration of the above Rights and provisions is one of the most pressing areas in the entire agrarian relations and it is perhaps also the area where State policies have been least effective so far. Indeed, tribals are the poorest lot in the country with the lowest human development score. Therefore, it is no wonder that most of the tribal areas in the country are in ferment. The issue of tribal land rights should be taken up on a war footing and the following recommendations are made for this purpose:

• Prevention of land alienation and restoration of alienated land;
• Changes in rehabilitation policy providing land for land, and means of livelihood and not just livelihood compensation; ensure stake for displaced persons in future prosperity;
• Empowerment of tribal community for command over its resources and ancestral domain; and
• Large scale bids for mineral resources should be carefully examined with a view to protecting tribal domain, and appropriate policy of resettlement and rehabilitation of displaced cultivators should be formulated and effectively implemented.

3.2.5.41 Refocusing of management decisions to a more decentralized level of governance and people involvement in these decisions is a major paradigm shift in the Forest Management Policy. As highlighted in a recent FAO-supported study, the JFM system in India needs to be further transformed towards the sustainable development of the community living in and around the forested regions by integrating forest management with sustainable rural development. The study has suggested the following model (Figure 1) for management of non-timer forest
products (NTFP) and of forest in general for sustaining livelihood and long-term conservation.

![Diagram of a Conceptual Model for Management of NTFPs and Forest for Sustaining Livelihood and Long-term Conservation](image)

**Figure 1. A Conceptual Model for Management of NTFPs and Forest for Sustaining Livelihood and Long-term Conservation**

*Source: Exploring Options for Joint Forest Management in India; Forestry Policy and Institutions Working Paper No. 7, FAO.*

3.2.5.42 As indicated in the figure, the community assumes the central role in steering all the development processes and the government provides supporting services. The role of the local communities (the central large rectangle in the Figure) are as follows:-

- Led by Panchayati raj institution and other grassroot peoples’ organisations, development of local institutional and organizational capacity to undertake development planning and mobilizing local and external resources; provision of health care, drinking water and education;
• Establishment of councils/cooperatives for protection and management of existing forests; creation of new (commune owned) forests in deforested and degraded lands to meet their current and future needs;

• Decentralization of the decision making structure to local level; setting mechanism for inter-departmental cooperation and promoting participation of NGO and local people in the decision making process; recognition of the value of local production systems and cultural diversity; and

• Promotion of local processing of forest-products and their marketing through village cooperatives; development of partnership with private sector and NGOs.

3.3.5.43 The government is required to provide the following support:

• Establishment of legal, regulatory, conflict resolution and enforcement structures for the management of forest and common land resources; mechanism to redirect a part of revenue to the local community from the management of forests and to compensate them for the loss of revenue due to closure of area for regeneration or other technical reasons;

• Organization of science; information, technology and extension (SITE) services to support planning, monitoring and evaluation of forestry development and poverty alleviation programmes and periodic reporting on the state of poverty, progress achieved and constraints in the way;

• Marketing, processing and value addition: In case of NTFPs, there is market failure as well as institutional failure. There are possibilities for private-public-partnership (PPP) in cultivation, processing, value addition and marketing of timber as well as non-timber forest products, which should be harnessed.

The proposed community-government congruence is bound to synergise social, economic and ecological security of forests, forest-dwellers, tribals and other people around forests.
Integrated Coastal Zone Management

3.2.5.44 Coastal zone is defined as an area from the territorial waters limit (12 nautical miles) including its seabed up to the landward boundary of the local self-government abutting the sea coast. Coastal zone also includes inland water bodies influenced by tidal actions including its bed and the adjacent land up to the landward boundary of the local self-government abutting such water bodies. In case of ecologically sensitive areas, the entire notified area/biological boundary of the area will be included in the coastal zone.

3.2.5.45 Coastal environment plays a vital role in nation’s economy by virtue of the resources, productive habitats and rich biodiversity. India has a coastline of about 7,500 kms and nearly 250 million people live within a distance of 50 kms from the coast. The coastal zone is also endowed with a very wide range of coastal ecosystems like mangroves, coral reefs, sea grasses, salt marshes, sand dunes, estuaries, lagoons, etc. which are characterized by distinct biotic and abiotic processes. The coastal areas are assuming greater importance in recent years, owing to increasing human population, urbanization and accelerated developmental activities. Over 25% of India’s population will live in coastal areas. These anthropogenic activities have put tremendous pressure on the fragile coastal environment. An integrated and ecologically, economically and socially sound and sustainable coastal zone management system should be put in place jointly by government agencies and coastal communities.

3.2.5.46 A Committee was appointed to Review the Coastal Regulation Zone Notification 1991, by the Ministry of Environment and Forest, Government of India, under the Chairmanship of Prof. M.S. Swaminathan. In its Report, February, 2005, the Committee had identified need for extensive micro-surveys to critically assess the socio-economic and ecological assets and liabilities in the coastal zone and suggested that until the micro-surveys are completed the country should strictly adhere to the current rules of CRZ Notification 1991. The recommendations of the Committee for the setting up of a National Board for Sustainable Coastal Zone Management along with its supporting professionally-led institutions should be accepted and
promptly acted upon by the Ministry of Environment and Forests jointly with other concerned Ministries and Departments. The proposed public policy facilitation institutions should develop also the capacity for fostering professional conflict resolution mechanisms. They should also develop expertise in ecological economics as applied to the coastal zone. Above all, they should spearhead an ecological literacy movement through ICT based Rural Knowledge Centres.

Rehabilitating Wasted and Degraded Lands

3.2.5.47 Defining degraded lands, the National Remote Sensing Agency (NRSA) for the Department of Land Resources states: “Degraded lands (are those) which can be brought under vegetative cover with reasonable effort, and which are currently under-utilized and land which is deteriorating for lack of appropriate water and soil management or on account of natural causes. Wasteland can result from inherent/imposed disabilities such as by location, environment, chemical and physical properties of the soil or financial or management constraints.”

3.2.5.48 There is a great deal of inconsistency in information about land degradation and on size of cultivable waste land available from different sources (Annexure V). It is generally agreed that the cultivable waste together with fallow lands cover about 55 million ha. and forest wasteland account for additional 35 million ha. With the increasing emphasis on agro-forestry and with faithful implementation of Joint Forest Policy and the recently passed Tribal Bill, there is ample scope for integrating the development plans of the Forest Wastelands as well as the cultivable agricultural wastelands through participatory micro-planning and programme implementation by grassroot communities and institutions, including Panchayati Raj Institutions, comprising Programme Implementation Agencies (PIAs). As the wasted lands are likely to be owned either by the Government or private parties or communities, PIAs should ensure participation of all stakeholders in a consortium mode.

3.2.5.49 As seen from Annexure VI, both natural and manmade factors and their interactions cause land degradation in varying proportions in different agro-climatic
zones, and have assumed serious dimensions in many parts of rural India. Degradation caused and accelerated by human action is more extensive than the one caused by natural factors. The Himalayan region, Peninsular Plateau and Hill Regions are more exposed to this malaise. In terms of popular perceptions, degradation caused by human action could be attributed to sheer poverty of the farming community or to the spillover damages of one or the other type of development activities. While the extent of poverty did exert a significant negative impact on the level of degradation, there was a rather insignificant relationship between development-related factors and land degradation. The resource variable such as net sown area and forest cover also seem to have a significant and inverse relationship with degradation. This, among other things, indicates the importance of such resource variables in enhancing soil quality, increasing fuel-fodder and food production and reducing the compulsions of the farmers to ‘mine’ the land in an unsustainable manner. The results also strengthen the need for viewing land degradation from the users’ perspective.

3.2.5.50 It is clear that land degradation is a localized problem and depends not only on the agro-climatic and socio-economic conditions of the region but also, and perhaps more importantly, on the farmers’ access to assets. The livelihood strategies of the poorer farmers are indeed quite different from the profit-maximizing approach of the large and rich farmers. For the land-poor, the available scarce land resource is the very foundation on which their sustenance stands. On the other hand, the land rich usually go more by short term profit gains, possibly because they can afford to overlook and absorb a certain degree of deterioration in the quality of their land.

3.2.5.51 In face of the declining per capita availability of cultivated land on one hand, and the prevalence of large and expanding areas of cultivable waste land, on the other, new policies and action are called for rehabilitating and judiciously utilizing the degraded lands consistent with socio-economic acceptability and technological capability. It is important to build a reliable data-base on the temporal profile of land degradation. Definition and categories of wastelands should be standardized and uniformly adopted by the data collectors, planners and policy-makers. The Himalayan and the Peninsular regions are among the most susceptible regions prone to land
degradation. While watershed programmes extensively cover the latter, the same is not true for the former. There is thus an urgent need to initiate specific land development programmes for the mountainous agro-climatic zones based on watershed approach.

3.2.5.52 Rehabilitation of degraded lands can be achieved primarily through micro-watershed based approach. But, the watershed development programmes have only partially been successful in the northern States. The relevant issue that needs to be addressed in this context is how the polarized and heterogeneous rural communities, a characteristic feature of north Indian plains, can be brought together for a meaningful collective action. The philosophy of the watershed programme is inherently linked with the empowerment of rural communities living within the watershed. Full participation of the communities led by Panchayati Raj Institutions and duly supported by NGOs, is essential.

3.2.5.53 The external assistance for implementing the programme agreed by a participatory approach should directly reach the concerned community/local-level functionaries. After the launching of the programme, the role of the government and NGOs should be restricted to its mid-term monitoring and evaluation. The success of the land rehabilitation programmes is closely related to an authentic and workable formulation of legislation clearly defining the ownership of natural resources like common grazing land, forest cover and water resources within the village boundaries. In particular, the concept of stakeholders’ participation needs to be operationalised through such legislative measures.

3.2.5.54 The land rehabilitation and management policy should be seen as an integral component of the National Land Reform Programmes and in convergence with other related activities it should promote institutional framework that would encourage the productive utilization of land by synergizing the inputs of all concerned Ministries and Departments. The Tenth Plan had emphasized on:

   i. Participatory land and water conservation based on a micro-watershed approach;
ii. Involving corporate sector in restoring wastelands and reclaiming degraded lands, with sharing arrangements on public lands while encouraging farm forestry on private wastelands;

iii. Channelising greater resources for the development of wasteland through the involvement of financial institutions;

iv. Capacity building of various stakeholders through training programmes and awareness campaigns;

v. Creation of a comprehensive land use database by using latest technologies in consultation with the local people to capture the ground realities; and

vi. Delineation of “hot spots” of land degradation and using successful experience, undertake participatory microplanning and reclamation measures consistent with agro-ecological and socio-economic settings.

3.2.5.55 The above thrust areas of action are equally valid even today and will remain so at least in the short to medium terms. However, the involvement of the corporate sector should be planned and monitored carefully and critically, particularly keeping in mind the interest of landless and near-landless agricultural families. Linking with the Bharat Nirman and National Rural Employment Guarantee Programme, the landless and near-landless people could be engaged in the reclamation process and such reclaimed lands could be distributed to them individually or in groups (keeping in mind both equity and economies of scale) under an arrangement which will ensure end-to-end approach. The corporate sector could also be allotted adequate area of the land it must have helped to reclaim and serve a “nucleus” whereas the small holders will serve as “estates” under a “Nucleus-Estate: (NE) system to promote cost-effective and competitive “mass production by masses” and not “mass production by machines.”

3.2.5.56 Depending on agro-ecological capacity and socio-economic viability, the Nucleus–Estates could specialize in specific production-processing-distribution chains viz bio-energy plantations, medicinal plants and botanicals productions, agro-pastoral-based livestock production, etc. The Land Use Boards, the Waste Land Development Board, the various Watershed Development Programmes and other
such National, Regional and State level initiatives must congrue together and coordinate their efforts under one umbrella. Since bulk of the degraded and wasted lands are in rainfed areas, particularly arid zones, the recently announced National Rainfed Area Authority could play the orchestrating/coordinating role.

3.2.5.57 Permanent pastures, grazing lands, village forests, village ponds and, most important, ground water constitute important common property (CP) resources. The Common Property Rights on these resources are extremely important for the landless and the land-poor households for their sustenance. In the absence of clearly defined rights and institutions for management of these resources, often being no man’s land, these are over-exploited and left uncared for. These resources are also encroached upon by rural power lobbies, thus excluding the poor from utilizing them - often the only resource which they could fall back to. While in most States area under common properties has decreased, in some States like Punjab and Maharashtra, despite the increased demographic stress on agricultural land, area under CP resources has increased. Panchayati Raj and other grassroot institutions should determine the size and delineation of CPRs in each village or group of small villages and mange them sustainably especially to support livelihood security of landless and land-poor people. Appropriate rules should be established and adhered to use the rights judiciously for utilizing and conserving the CP resources and for sharing the products derived from these resources.

**Land Records and Title**

3.2.5.58 An appropriate system of guaranteeing land title and tenure security is essential for growth and poverty alleviation in rural areas. The system can be built only on accurate and valid record of land rights. Therefore, government should strengthen land administration and develop an appropriate system of guaranteeing land title and land tenure security. The Common Minimum Programme of the National Government (NCMP) states, “Revenue administration will be thoroughly modernized and clear land titles will be established”. If fulfilled, this will virtually
transform the landscape, economically, politically and socially - there can be no empowerment of the community without entitlements.

3.2.5.59 In fact, a Centrally Sponsored Scheme on Computerization of Land Records (CLR) was introduced during the Seventh Plan Period with 100 percent financial assistance from the Central Government for pilot projects in a few selected districts. The main objectives of the scheme were to: (1) computerize ownership and plot-wise details for issue of timely and accurate copy of the Records of Rights of legal sanctity to the landowners; (2) achieve low-cost, easily reproducible storage media for transparent and reliable long-term land information system; (3) provide fast and efficient retrieval of textual and graphical information; and (4) create a Land Information System (LIS) and database for the agricultural census to facilitate planning and monitoring.

3.2.5.60 The scheme has been operational for the last 15 years, but barring 5-6 States, the progress in most States has been slow. Many bottlenecks are also emerging in the process, including: (1) delayed transfer of funds to the final implementing authority in the field by the State governments; (2) a delay in the development of appropriate software tailored for the specific requirements of different States; (3) a lack of adequate training facilities to the revenue staff who handle computers in the field areas; and (4) unavailability of private vendors to enter data. In addition to these, an administrative system for the computerization has not been clearly set up. It is operated under the State-government revenue departments, sometimes with only partially trained staff. Therefore, a quantum change in this process is needed.

3.2.5.61 The existing scheme “Computerisation of Land Records (CLR)”, should be expanded to integrate title and deed registration, leading to clear titles. To realise this convergence, State Governments should transfer Registration and Stamps to the Revenue Departments. Each State should institute a single, integrated, professional agency for preparation and updating of land records using modern technology, dispensing with the use of stamp paper and providing comprehensive land records, including title, on the Website which could be viewed by all. The “computerised”
land records should be legalised, on the lines of Karnataka’s “Bhumi” programme and a few other such initiatives. The Centre should provide bulk of the financial resources for the purpose. Further, officers heading this project should have stable tenures.

3.2.5.62 Village Knowledge Centres or Kiosks should be established at appropriate and accessible-to-all sites, such as at Gramsabha’s or Panchayat’s premises or at agriclinics following a public-private–partnership approach. Capacities of Panchayat Raj institutions should be strengthened by training concerned personnels, including women, at each centre/kiosk whose connectivity with Sub-Divisional, Tahsil, District and State levels should be ensured. On a sharing basis, 75% from Central government and 25% from State government, training institutes on land records should be established in each State. In initial stages, the operational expenses should be provided by the Centre.

3.2.5.63 A Monitoring and mid-course correction system should be jointly instituted by Central and State governments to undertake and encourage social audits and peer reviews to check the quality of land records available on the Website and functioning of the system at Panchayat and higher levels. While Panchayats should be empowered for the overall management of land and other natural resources, the Panchayati Raj institutions and other rural institutions doing well in land record management should selectively be supplemented with additional financial resources and administrative powers.

Women’s Rights to Land

3.2.5.64 Women constitute a large portion of the economically active population engaged in agriculture, both as farmers and as farm workers, and play a crucial role in ensuring household food security, despite enjoying very limited rights to land. The role of women in agricultural production has increased in recent years as a result of men’s migration to urban areas and absorption in non-agricultural sectors. However, in many parts of the country, women have little or no access to resources such as
land, credit and extension services. Moreover, women tend to remain concentrated in the informal sector of the economy. In plantations, they often provide labour without employment contracts, on a temporary or seasonal basis or as wives or daughters of male farm workers. Although land and natural resource legislation tends to be gender neutral or to explicitly prohibit sex or gender discrimination in relation to land, it is scarcely implemented in rural areas.

3.2.5.65 Women’s unequal access to land is one of the main causes of gender inequality and socio-economic hardship to women, and consequently to the entire society. The absence of land titles prevents women farmers from accessing credit. Enhancement of women’s rights and entitlements to land will greatly boost rural economy, poverty alleviation and livelihood security. The following policy actions are suggested to enhance women’s ownership and control over land:

- Ensure the recording of women’s inheritance shares by the patwari in all land records. In cases where women own land (via any means), ensure that their names are entered in the corresponding land record.

- Land distribution by the government must be done equitably and titles to women should be clearly recorded.

- Help women, individually or collectively in groups, with managing and purchasing assets and leasing land and other associated assets. Enhance access of women groups to village common lands and village forests.

- In recognition of the instrumentality of women’s agency in co-managing Commons for subsistence use, policy and legislation should ensure that women be recognized as co-owners and inheritors wherever they reside, irrespective of their marital status.

- Promote group-based production activities related to application of women owned lands such as group-farming by groups of women, group-seed production, or joint management of fish ponds, poultry farms or animal husbandry.
• Enhance women farmer’s infrastructural support, credit access, information support, and marketing cooperatives support. Create special risk funds to provide insurance coverage to women-headed farm households for crop failures caused by lack of rain, drought, and damage by wildlife and landslides.

• Develop and support training programmes for government officials and raise awareness at all levels of relevant legislation on women’s right to land and resources. This can be done through radio and TV, for example special programmes could be relayed on the issue of women’s right to land, and by inserting information messages in slots between news programmes.

• Devise the collection of gender-disaggregated data on land and households in all major government surveys, National Sample Survey, and Agriculture–related censuses. Conduct and widely disseminate, findings of research studies on the correlation between women’s land and property ownership with overall well being of women.

3.2.5.66 The Hindu Succession Amendment Act, 2005, passed by the Parliament bears heavily on rights to land ownership for women, especially in context of the increasing feminization of agriculture. The National Commission on Farmers, in collaboration with the M.S. Swaminathan Research Foundation had organized a Consultation on this subject which had made several useful recommendations (Annexure IV).

3.2.5.67 The concerned Ministries and Departments at Central and State levels particularly the Ministries of Rural Development, Planning, Law, Tribal Affairs, Panchayati Raj, Agriculture and Environment and Forests should effectively implement the various recommendations of the above-mentioned Consultation and the Ammended Act. For instance, the National Planning Commission, in close consultation particularly with the Rural Development Ministry, should incorporate targets for redistribution of land to women with secure legal rights, including rights to forest land and agricultural land within the 11th Plan, and include land reform and
3.2.5.68 The Administrative Departments should promote the formation of community-based women's collectives and support groups beyond self help groups (SHGs) to deal with violence and to promote women's property rights. The role of Panchayats to address these issues should be promoted. Awareness-raising programmes should be developed about women’s legal rights to land and resources and gender sensitive government programmes among men, women and children in India’s villages, small towns and elsewhere. The government and programmatic staff should have legal literacy on the subject.

3.2.5.69 Government schemes should be initiated to enable women to lease land collectively by forming groups, with the mandate that the land would be used for collective economic activity (crop cultivation, poultry or animal husbandry) on long-term leases, as in Bihar for fish ponds and in Tamil Nadu for wasteland development. This will assist in increasing women's assets through strengthening skills, knowledge, bargaining power, and access to new technologies. Such initiatives should be linked with Bharat Nirman, National Rural Employment Guarantee Programme, JTY/SGSY and other initiatives of the Ministry of Rural Development.

3.2.6.0 Summary Policy Recommendations

**Land Reform at the Centre of the Country’s Development Agenda**

3.2.6.1 Land is an asset of enormous importance for over 600 million of rural dwellers in India. The nature of rights and how strongly they are held vary greatly, depending on competition for land, the degree of market penetration and the broader institutional and political context. The picture is diverse and complex between States. Nevertheless, certain generalizations can safely be made. Pressure on land is set to increase over future decades, given the impacts of continued population growth, globalization of markets and activities, and climate change.
3.2.6.2 As a resource becomes scarcer and more valuable, those with weak rights to this resource will tend to lose out. In the case of land, particular groups tend to be more vulnerable to such dispossession, including the poor, those in peri-urban areas, indigenous people, women, those relying on common property resources, and those in areas of conflict. A lack of attention to land tenure and security of land rights also risks hampering growth by discouraging local and foreign investment, because of the perceived risks involved where property rights are poorly secured.

3.2.6.3 Land policy in post-Independence India has evolved through different phases. These include: land reforms (tenurial rights, land ceiling, land distribution and land consolidation), land development, including Wasteland Development and Integrated Watershed Development Programmes and lately land administration, land records and titles, land leasing and land markets. The policy interventions have had varying impacts on poverty and the overall development process. The land-reform measures have generally positively impacted equity and poverty reduction. The measures dealing with the quality of land have a partial to significant impact on environmental parameters. In addition to these, the land-policy instruments were instrumental in transforming other development policies.

3.2.6.4 Land reform must therefore be seen as a part of the wider resource reform programme in rural areas and land access should be mainstreamed within the national development agenda, especially the poverty reduction programme. It should ensure secured access to land and water, secured tenurial relationship, support services and a high degree of participation by the poor in collective decision-making under Panchayati Raj Rule. A programme of rural resource transfer would encounter strong resistance not only from the rural elite but also from interests that want to promote agro-business, corporate agriculture and multinational interest in mineral resources often located in tribal areas. A strong political will is needed to implement the various measures, which must be duly monitored and kept progressing at the desired pace. We must recognise that “land reform is not only in the interest of those who have nothing but also in the interest of those who have something to lose.”
Key Areas for Urgent Action

3.2.6.5 The key areas for future land policy action include legalizing the tenancy market, land leasing, contract farming, and improving efficiency and effectiveness of integrated watershed and wasteland development to assume greater significance, and streamlining and updating land records, rights and administration. Such interventions involve internalisation of issues relating to the political economic aspects of the reform measures including institutional reforms.

3.2.6.6 Legislations and their thoughtful and timely implementation are needed to:

- Check the outflow of prime agricultural land which is endowed with necessary infrastructures for high and sustained agricultural productivity (irrigated land).
- Arrest fragmentation and minusculing of land holdings to promote self-reliance and to ensure livelihood security of farm households.
- Redefine self-cultivation and resident qualification to ensure transparent tenancy rights
- Strengthen rights to lands and use rights in the following respects:
  - No further relaxation of ceilings, nothing in technical or factor efficiency argument against this.
  - Allotted and alienated land to be restored.
  - Handing over possession of allotted land.
  - Settlement of land dispute court cases to be hastened, and Bhoodan and temple land and the freed land to be distributed to landless.
  - Quash benami transactions and grant power to reopen closed cases.
  - Ban exemptions from agricultural ceiling for land converted to non-agricultural use and for corporate farming.
  - Reduction of ceiling limits to Non-resident Indians and for those who are predominantly non-resident and are non-resident farmers.
3.2.6.7 Make tenancy relationship open, and increase tenants’ access to agricultural support institutions, such as technology, credit, etc. and repool resources through creating Self Help Groups (SHGs), Small Farmers’ Estates (SFEs), and rural cooperatives on NDDB pattern.

3.2.6.8 Appropriate policies are also needed to provide long-term institutional loans to landless and near landless for purchasing land and also to provide them technical assistance to efficiently manage the land and assist them with marketing support. Further, allot them homestead plots to increase their nutritional and livelihood security.

3.2.6.9 The recent Tribal Bill, which elaborates their rights to land use, should be integrated with the National Forest Policy to create a synergistic partnership between forest dwellers and forest development authorities. Large-scale bids for mineral resources should be carefully examined with a view to protecting tribal domain and to ensure proactive resettlement and rehabilitation of displaced persons.

3.2.6.10 Emphasise decentralised governance and decision-making, particularly in Forest Management Policy, and Community Forest Management should become the order of the day. Under this arrangement, the community should assume the central role in steering the development process and the Government should provide services, regulations, and protection to the weaker sections.

3.2.6.11 An integrated and ecologically, economically and socially sound coastal zone management system should be put in place jointly by the Government agencies and coastal communities. As recommended by the Swaminathan Committee, 2005, a National Board for Sustainable Coastal Zone Management along with its supporting professionally-led institutions should be established by the Ministry of Environment and Forests in close association with other concerned Ministries/Departments.

3.2.6.12 Women rights to land, especially those enunciated in Hindu Succession Amendment Act, 2005, should be strictly implemented.
3.2.6.13 In order to augment availability of cultivable land, new policies and actions are called for rehabilitating and judiciously utilizing the degraded lands consistent with socio-economical acceptability and technological capability. Reliable data bases on the temporal profile of land degradation is urgently needed. Micro-watershed based development of such areas should be given high priority, particularly in the Himalayan and the Peninsular regions which are highly prone to land degradation.

3.2.6.14 Although proposed in the 10th Plan, the involvement of the corporate sector in the management of waste and degraded lands should be monitored carefully and critically. Linking with the Bharat Nirman and National Rural Employment Guarantee Programme, the landless and near-landless people could be engaged in the reclamation process and such reclaimed lands could be distributed to them individually or in groups (keeping in mind both equity and economies of scale) under an arrangement which will ensure end-to-end approach. The corporate sector could also be allotted adequate area of the land it must have helped to reclaim and serve as a “nucleus” whereas the small holders will serve as “estates” under a “Nucleus-Estate” (NE) system to promote cost-effective and competitive “mass production by masses” and not “mass production by machines.” The Land Use Boards, the Wasteland Development Board, National Rainfed Area Authority and other concerned bodies should synergise their efforts in rehabilitating and effectively utilising the degraded lands.

3.2.6.15 Panchayati Raj and other grassroot institutions should determine the size and delineation of CPRs in each village or group of small villages and manage them sustainably especially to support livelihood security of landless and land-poor people. Appropriate rules should be established and adhered to use the rights judiciously for utilizing and conserving the CP resources and for sharing the products derived from these resources.
Key Research Areas

3.2.6.16 Comprehensive research is needed to generate reliable information to guide adjustment in or formulation of new appropriate policies. The research areas may include: (i) understanding of the underutilization of land, the causes behind increase in current fallows and around the urban centres, (ii) analysis of the land-lease market; who leases from whom, under what terms and conditions and under what set of circumstances; the role of the caste factor; the economies of scale in production; the response to new technologies and trade opportunities, (iii) how are the land-credit or land-labour or land-credit-product market interlocking and shaping themselves, especially under contract farming? and (iv) how can the initiation, and sustenance of peoples’ participation in land development programmes, especially the role of PRIs and other grassroot institutions, can be ensured?

Adjust Mechanisms for Land Redistribution and Distribution

3.2.6.17 Promoting rational access to land, especially where it is highly skewed, is crucial for social justice, political stability, rural development and peaceful co-existence. Large areas under prolonged litigations should be freed and restored soonest to the genuine title holders. Reclaimed and other available lands, such as temple lands, should be brought under dynamic and effective land redistribution programmes. The appropriateness of the ongoing mechanisms should be assessed. A menu of options may be the most viable approach. Provision should also be made to exit farming in a phased and confident manner, if desired. The policy of distribution of land to individual households for cultivation or house sites needs to be balanced with the need to preserve common lands in each village and community rights in these. Gram Sabhas should oversee this activity rather proactively.

Improve Land Administration and Land Tenure Security

3.2.6.18 Simple and inexpensive methods to bring together existing records and make them open to the public are essential in establishing transparent and corruption-free administration of land and property rights. Outdated, inefficient, incomplete and
inaccessible land registers and land administration systems generate conflicting claims and fuel disputes. In recent years there has been considerable innovation in this regard. One welcome shift in mainstream thinking has led to less emphasis on formal individual land titling as the essential tool to secure rights, in favour of a broader range of interventions according to cost and context. There is a need to:

- develop and disseminate a range of tools for improving land tenure security and delivering low-cost land titles (including group titles) appropriate for different groups and circumstances, paying special attention to the specific land tenure security needs of poorer and more vulnerable groups;
- systematically support democratic land institutions and land information systems that are decentralised and problem centred, and make links with existing indigenous and customary mechanisms for managing land; and
- improve access to appropriate and comprehensive systems of land dispute resolution incorporating formal, alternative dispute resolution (ADR) and customary procedures.

**Capacity Building to Implement Agrarian Reform**

3.2.6.19 New approaches to land policy require investment in essential skills including surveying, land registration, land use planning, land law, valuation and community-based planning and management. This calls for supporting opportunities for professional development, lesson sharing and capacity building, including at the university level, in centres of excellence and through learning networks of policymakers, practitioners and civil society. Building the capacity of citizens to use the opportunities offered by the law is of great importance to bridge this gap. Measures may include awareness-raising campaigns to disseminate information concerning land policies and laws, such as legal literacy programmes for women and vulnerable groups. The Village Knowledge Centres could particularly be helpful in this regard.
Strengthen Civil Society Groups and Networks

3.2.6.20 Supporting civil society initiatives at local, provincial and national levels is a vital element of enabling government to identify effectively and develop appropriate policies in support of improved access to land. The distribution and management of land has important political aspects. Capable and well-informed civil society organizations can play an important role in informing, and in providing checks and balances on government decision-making and the development and implementation of land policy. Exchange of experience through networks of civil society organizations, and analysis and research linked to action planning can also promote the development of appropriate land policies.

Acknowledgement

National Commission on Farmers is thankful to Shri B. N. Yugandhar, Member, Planning Commission and Dr. T. Haque, Chairman, Commission for Agriculture Costs and Prices (CACP) for their helpful inputs.
## Annexure I

### Land policy formulation through planning period

<table>
<thead>
<tr>
<th>Plan period</th>
<th>Major issues</th>
<th>Policy thrust</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Plan</strong>&lt;br&gt;1951-56</td>
<td>Area under cultivation to be increased. Community development (CD) networks to take of the village commons. Vast uncultivated lands locked under large sizes of holdings.</td>
<td>Land reforms to bring in the fallow under cultivation and increase land use efficiency. Tenant to be given the rights to cultivate land. Abolition of intermediaries.</td>
</tr>
<tr>
<td><strong>Second Plan</strong>&lt;br&gt;1956-61</td>
<td>Concern about vast rainfed agriculture, low land productivity and thrust on irrigated agriculture</td>
<td>Soil conservation as an important programme. First phase of land reform implementation. Irrigation development for the rainfed areas. Training and extension work for the technology through CD.</td>
</tr>
<tr>
<td><strong>Third Plan</strong>&lt;br&gt;1961-66</td>
<td>Food security concern dominated. Cultivable wasteland to be brought under cultivation. Bringing the lagging regions under mainstream growth.</td>
<td>Area development as an approach. Intensive area development programme adopted for selected districts. An integrated land policy approach was inherent. Soil surveys were taken up.</td>
</tr>
<tr>
<td><strong>Fourth Plan</strong>&lt;br&gt;1969-74</td>
<td>Emphasis on food security continued as minimum dietary requirements to be met. Incentives were created for diversion of land towards food crops and enhancing the capacity of such land. Domination of large holding sizes and low allocation and technical efficiency.</td>
<td>Increased emphasis on irrigation and soil conservation in dryland regions and technological change introduced. Higher cropping intensity the main concern. Second phase of land reforms with land ceiling acts and consolidation of holding. Institutional changes brought in.</td>
</tr>
<tr>
<td><strong>Fifth Plan</strong>&lt;br&gt;1974-79</td>
<td>Problems of degradation land management in irrigated command areas surfaced. Drought-prone areas attracted attention</td>
<td>Drought-prone area development. Desert area development programmes, and soil conservation started and further enhanced. New impetus to dry farming.</td>
</tr>
<tr>
<td><strong>Sixth Plan</strong>&lt;br&gt;1980-85</td>
<td>Underutilization of land resources. Drought-prone areas continued to attract attention. Attention lagging areas of the background of green</td>
<td>Land and water management programme under drought-prone area programme in selected areas.</td>
</tr>
<tr>
<td>Plan Period</td>
<td>Key Issues</td>
<td>Specific Actions</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Tenth Plan 2002-2007</strong></td>
<td>An ever-increasing human and animal population pressures have let to drastic changes in the proportion of land utilised for agricultural activities, urbanisation and industrial development. Intensive agricultural practices have caused widespread land degradation adversely impacting various production systems. These areas correlate very strongly with the incidence of poverty in the country, Integrated Watershed Management approach widely promoted to increase productivity and sustainability of such areas has performed below expectation.</td>
<td>On a micro-watershed basis, involve corporate sector and financial institutions restoring and utilising wastelands, build capacity through training and creation of databases, and high priority to “hotspots” and critical interfaces to avoid irreversible damage to the ecosystem. The correction and computerisation of land records, improving the land survey processes and revisiting the earlier land-reform interventions, such as land ceiling and tenancy restrictions are other thrust areas.</td>
</tr>
</tbody>
</table>

Source: from various plan documents. These are not exhaustive statements but only indicative of the thrust. Gaps in the plan periods were annual plans and full plan documents could not be prepared for these gaps (as given in R.S. Deshpande, 2005, Current Land Policy Issues in India. Land Reforms Special Edition, Food and Agricultural Organisation, Rome)
## Annexure II

### Variations in tenancy laws across major Indian states

<table>
<thead>
<tr>
<th>State</th>
<th>Specific features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>In Andhra region leasing is permitted but regulated. In Telangana region leasing out land by large holders is prohibited. Smallholdings below three family holdings are allowed to lease out land for a period of five years. Exemptions are provided.</td>
</tr>
<tr>
<td>Assam</td>
<td>There are no restrictions on leasing out of land.</td>
</tr>
<tr>
<td>Bihar</td>
<td>Leasing out is prohibited except for persons with disability. Public servants with a salary not exceeding Rs250 are included under exempt category.</td>
</tr>
<tr>
<td>Gujarat</td>
<td>Leasing is prohibited and unauthorized leasing is punishable offence with a fine up to Rs1 000.</td>
</tr>
<tr>
<td>Karnataka</td>
<td>Leasing is generally prohibited. Soldiers and seamen are exempted. Recent amendments allow further limited exemptions, most granted on a case-by-case basis. Violations result in land vesting in the state.</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>No ban on tenancy, but the tenant acquires the right to purchase the land within one year of the commencement of tenancy.</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>Abolished the past leases but not the future leases. Past leases are divided into two categories called Bhumiswami tenant without payment and other tenant with payment. They cultivate on terms and conditions agreed between parties. Other land owners can lease out their lands for one year during consecutive period of three years.</td>
</tr>
<tr>
<td>Orissa</td>
<td>Prohibited all future leases. Past leases continue after surrendering half of the leased land to the landlord or rayat.</td>
</tr>
<tr>
<td>Punjab and Haryana</td>
<td>There is no ban on leasing and the tenants do not acquire any rights on land.</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>The landowners (Khatedar) can lease out for a non-renewable period of five years. Ghair Khatedar tenants can sublease for a period of one year.</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>Leasing is permitted but the law stipulates that every contract should be in written form and in triplicate. A copy of the document shall be deposited with the revenue officials</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>Lease for any period is prohibited. Exemptions allowed for widows, unmarried women, military persons, students and physically disabled.</td>
</tr>
<tr>
<td>West Bengal</td>
<td>Fixed-rent leasing is prohibited, but sharecropping is allowed and subject to protection. A person lawfully cultivating others' land is presumed to be a sharecropper and is given permanent and heritable rights with a fixed level of rent (25% if sharecropper provides inputs and 50% if landlord shares in inputs). On resumption the sharecropper has to be left with 1 ha of land and the landowner can resume on a maximum of 3 ha.</td>
</tr>
</tbody>
</table>

## Annexure III

### Policy interventions and their perceived impact

<table>
<thead>
<tr>
<th>Policy interventions</th>
<th>Poverty alleviation</th>
<th>Conflict management/equity</th>
<th>Environmental management</th>
<th>Sustainable economic growth</th>
<th>Production efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abolition of intermediaries</td>
<td>Sig</td>
<td>Sig</td>
<td>Par</td>
<td>Sig</td>
<td>Sig</td>
</tr>
<tr>
<td>Tenancy reforms</td>
<td>Sig</td>
<td>Sig</td>
<td>Neg</td>
<td>Par</td>
<td>Sig</td>
</tr>
<tr>
<td>Ceiling on size of holding</td>
<td>Sig</td>
<td>Sig</td>
<td>Neg</td>
<td>Sig</td>
<td>Par</td>
</tr>
<tr>
<td>Consolidation of holdings</td>
<td>Neg</td>
<td>Neg</td>
<td>Par</td>
<td>Par</td>
<td>Sig</td>
</tr>
<tr>
<td>Computerization of land records</td>
<td>Neg</td>
<td>Sig</td>
<td>Neg</td>
<td>Neg</td>
<td>Par</td>
</tr>
<tr>
<td>Drought-Prone Area Development Programme (DPAP) and Desert Development Programme (DDP)</td>
<td>Par</td>
<td>Neg</td>
<td>Sig</td>
<td>Sig</td>
<td>Par</td>
</tr>
<tr>
<td>Watershed Development Programme</td>
<td>Sig</td>
<td>Sig</td>
<td>Sig</td>
<td>Par</td>
<td>Par</td>
</tr>
<tr>
<td>Wasteland development</td>
<td>Par</td>
<td>Neg</td>
<td>Sig</td>
<td>Par</td>
<td>Par</td>
</tr>
</tbody>
</table>

Note: impact levels are perceived as Sig, significant; Par, partial; Neg, negligible.

Annexure IV

Consultation (September 2005) on “Hindu Succession (Amendment) Act, 2005 and its Impact on Rights to Land Ownership for Women in the Context of Increasing Feminization of Agriculture” – Observations and Recommendations

- There cannot be a unique model for solution of the problems prevalent in different areas. Different models are needed for different areas.
- The voluntary transfer of land rights of women should be there. Often a woman wants to give land to her daughter, but she is restrained from doing so because of mafia/criminal pressures who simply grab her land.
- In most villages women get married within 7-8 km distance and they can take care of the land of their parents. Institutional mechanism to implement the law bypassing the obstructions should be thought out. Without protective mechanisms, it will be difficult to implement the Act.
- It is essential that similar rights for cultivation be provided to married and unmarried women. Right to cultivation should be determined by being a resident of the village. If a married woman comes back for some reason she should get access to land.
- The Hindu Succession Act should be renamed Indian Succession Act and be available to any citizen of India on demand. The option should be available to women from minority communities also to appeal under the act.
- Bureaucratic will is needed to address gender inequality. Creating a conducive environment to implement the act honestly is also necessary. The initiative of local officials in the implementation of the act should be publicized for greater adoption by others.
- MPs/MLAs should set an example by applying the act to themselves. It should be also a part of the service condition of IAS/Central Government employees, Panchayat members etc. Government should also provide incentives to local officers to proactively implement the act. This will promote acceptance by the citizen at large.
• With the Hindu Succession (Amendment) Act now in place, it is necessary that the government fixes a time frame for its implementation.

• A change in mind set is needed to address the issues facing women. There have been instances that the training has been provided to men folk to write their will so that no land is left intestate (without a valid written will), enabling women to demand their rights. Training for writing of will that benefit women folk should be provided.

• Ceiling law and definition of the family must be made uniform across the country. The importance of the act when the male members of the family migrate was emphasized.

• In the case of surplus land transfers, steps should be taken to avoid poor women getting poor quality of land.

• The cost of land registration should be waived or reduced when the land is registered in the name of women or a group of women.

• There should be a control on leasing out practice because if the land is leased out to women farmers or group farmers then they do hard work to develop the land and get better productivity out of it only to find the owners wanting to take back his land. The lease agreement should be such that it can be upheld in a court of law.

• There is a order from the State Government that the wasteland should be distributed to women’s groups by the Panachayats but the order is not having the desired effect.

• There is a need to start registration for land with joint pattas and it will be good if men will go for registration. State Govt. should document the wasteland, which is distributed under joint pattas. A wide campaigning is needed to promote joint pattas.

• The ceiling surplus land should be provided to women first, then in joint pattas and remaining land could go to men.

• At present data on ceiling surplus land, land acquired by the govt. and land distributed buy the govt. land under litigation is available for ten states only. There are no records available on how much land is registered in the name of
men and women in agriculture. There is need to collect and computerize the data regarding this aspect and without any bias. There is need to continue consultation with state governments and try to get data in women farmers at Tehsil levels. Data should be gathered to capture the fragmentation of land holdings.

- There is a need to go for Cadastral survey in the North East especially Meghalaya.
- There is a need to operationalise the law with greater awareness and opportunities to take maximum benefit of it.
- There is an urgent need for legal literacy to women in particular and farmers in general about the act. There is a strong need to strategies how this can be done and start legal literacy from school level. Legal aid should be available to the women. Small NGO group exist that are working in this area. Farmer’s organizations, bankers and panchayats should play a proactive role in the awareness and implementation of the Act. VKCs can also play an important role in this.
- Groups of women should be formed to access land accompanied by support services to improve the economies of scale because it is difficult to manage the land by individual women as she cannot access the services therefore, often sells the land. There is a need to develop village fund for women’s groups to purchase land for agriculture and other developmental activities.
- 80% of the SHGs are women SHGs but virtually none of them are land based. Necessary action should be taken to promote land based women SHGs.
- There is a need for crop diversification and a consolidated approach for off-farm and on-farm activity to enhance the income and productivity of the farm as well as assurance of livelihood and nutrition security at household level.
- Lack of access to finance is a major issue in rural areas. Inability of land banks to provide credit in spite of legislation to the effect in place should be addressed. Loans should be provided at concessional rates where land is in the name of women. Need for changes in collateral system of banking have also to be examined.
A holistic approach towards allotment of land to women should be adopted. The govt. should also help in developing the land, other basic facilities and soft loans (e.g. Malaysia).

There is a need for strengthening training for farm women and engendering of training institutions. Training on entrepreneurship development should be made a part of the Agricultural University curriculum.

**Annexure V**

**Various Estimates of Wastelands**

<table>
<thead>
<tr>
<th>Source</th>
<th>Area (mha)</th>
<th>Estimated/Scientific</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Commission on Agriculture(NCA-1976)</td>
<td>175.00</td>
<td>E</td>
</tr>
<tr>
<td>Directorate of Economics and Statistics, Department of Agriculture and Cooperation</td>
<td>38.40</td>
<td>E</td>
</tr>
<tr>
<td>Ministry of Agriculture (1982)</td>
<td>175.00</td>
<td>E</td>
</tr>
<tr>
<td>Department of Environment and Forests (B.B.Vohra)</td>
<td>95.00</td>
<td>E</td>
</tr>
<tr>
<td>National Wasteland Development Board (Ministry of Environment and Forests, 1985)</td>
<td>123.00</td>
<td>E</td>
</tr>
<tr>
<td>National Bureau of Soil Survey and Land Use Planning, ICAR 1994</td>
<td>187.00</td>
<td>E</td>
</tr>
<tr>
<td>Society for Promotion of Wasteland Development (SPWD-1984)</td>
<td>129.58</td>
<td>E</td>
</tr>
<tr>
<td>National Remote Sensing Agency (NRSA-1995)</td>
<td>75.50</td>
<td>S</td>
</tr>
<tr>
<td>Dr. N.C. Saxena (Seey. RD-WD)</td>
<td>125.00</td>
<td>E</td>
</tr>
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</table>

## Annexure VI

### Extent of Degradation by Causal Processes in Major Agro-Climatic Zones

<table>
<thead>
<tr>
<th>Agro-Climatic zones of India (Planning Commission)</th>
<th>As proportion of total geographical area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Wasteland</td>
</tr>
<tr>
<td>I Western Himalayan Region</td>
<td>45.35</td>
</tr>
<tr>
<td>II Eastern Himalayan Region</td>
<td>22.12</td>
</tr>
<tr>
<td>III Lower Gangetic Plains</td>
<td>7.33</td>
</tr>
<tr>
<td>IV Middle Gangetic Plains</td>
<td>7.52</td>
</tr>
<tr>
<td>V Upper Gangetic Plains</td>
<td>8.90</td>
</tr>
<tr>
<td>VI Trans Gangetic Plains</td>
<td>7.15</td>
</tr>
<tr>
<td>VII Eastern Plateau and Hills</td>
<td>12.25</td>
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<tr>
<td>VIII Central Plateau and Hills</td>
<td>23.28</td>
</tr>
<tr>
<td>IX Western plateau and Hills</td>
<td>18.65</td>
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<tr>
<td>X Southern Plateau and Hills</td>
<td>16.31</td>
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<tr>
<td>XI East Coast Plains and Hills</td>
<td>16.78</td>
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<tr>
<td>XII West Coast Plains and Hills</td>
<td>11.52</td>
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<tr>
<td>XIII Gujarat Plains and Hills</td>
<td>21.95</td>
</tr>
<tr>
<td>XIV Western Dry</td>
<td>35.21</td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>17.98</strong></td>
</tr>
</tbody>
</table>

CHAPTER 3.3
GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

WATER

Land, water and biodiversity represent the three crucial natural assets, which are supplemented by manmade assets like inputs, credit, insurance, marketing and processing. In India, water availability is marked by spatial and temporal variability and scarcity. These are projected to increase due to lesser and skewed pattern of rainfall and rising population. The challenges that this poses for the farm sector include reducing per capita availability of water, deterioration in quality, over exploitation of ground water resources leading to lowering of the water table in many areas. Cost/time over run in completion of irrigation and multi purpose projects and poor maintenance/management of the existing systems would exacerbate the problems. Since water is vital for agriculture, action in ensuring Jal Swaraj or self-sufficiency in water availability for agriculture needs overriding priority.

3.3.1.0 Irrigation: Current Status

a) The ultimate irrigation potential for the country has been estimated as 139.88 million hectare (Mha), which include potential through Major and Medium irrigation projects (58.46 Mha), surface water based minor irrigation schemes (17.42Mha) and ground water development (64.00 Mha). By 2004-05, the irrigation potential of 99.36Mha has already been created.

b) Given the delay in the completion of on going projects, an Accelerated Irrigation Benefit Potential (AIBP) programme was launched in 1996-97 for accelerating implementation of on going irrigation/multi purpose projects on which substantial progress had been made and which were beyond the resource capability of the State Government or in advanced stages of construction and could yield irrigation benefits soon. Under AIBP an additional irrigation potential of 3.25 million hectare
through major/medium projects and 121.15 thousand hectare potential through minor irrigation has been created up to November 2005.

c) Under Bharat Nirman 10 Million hectares of additional irrigation capacity is to be created by 2009 through major, medium and minor irrigation projects complemented by ground water development. Keeping in view the present status, the target for creation of irrigation potential under Bharat Nirman has been proposed to be met largely through completion of on going major/medium projects and utilization of completed projects/schemes. Minor irrigation projects to cater to the requirements of small and marginal farmers, dalits and tribals have also been included in Bharat Nirman.

3.3.2.0 Major and Medium Irrigation Schemes

a) Over the past 150 years huge investments in large-scale water infrastructure were made and there is no doubt that the country benefited from its direct and indirect effects. However, international comparisons have revealed that vast potential remains untapped in terms of capacity to store and generate power.

b) The ultimate major & medium irrigation potential in the country has been estimated to be 58.46 M ha. For the country as a whole, 66% of this ultimate irrigation potential has been created. However, there is considerable variation from almost full development in Tamil Nadu to negligible in case of Meghalaya. While the Gangetic plains and Eastern coast have achieved a relatively enhanced stage of irrigation development the arid region and the high rainfall receiving areas have a low level of achievement. As of 1st April 2005, there were 221 approved major & medium projects under construction. When completed, these projects would create an irrigation potential of 14.93 M ha out of which 6.80 M ha has since been created till March, 2004.

3.3.2.1 Problems Related to Creation of New Major & Medium Infrastructure

   Irrigation coverage still extends to only about 40 percent of net sown area. Expansion of surface major and medium irrigation infrastructure has been rather slow due to the following reasons:
a) It is increasingly getting difficult to set up new projects that give optimum multiple benefits due to conflicting interests of participating states.

b) Land acquisition is a long process subject to protracted litigation and compensation, when finally decided, is not paid for long periods.

c) Relief and rehabilitation policies have been formulated in the States, but their implementation has hardly ever left satisfied communities due to bad planning, slow release of funds etc.

d) Inter basin transfer of water by linking of rivers has also raised political and hydrological concerns.

e) Just as the share of agriculture in the total gross capital formation has declined in the last two decades, coming down by half from 15.4% in 1980-81 to 7.08% in 2000-01, the share of irrigation also in the total Plan outlays has been reduced from 16.33% in the Fourth Plan to 6.77% in the Tenth Plan. In absolute terms, the position is even worse since the overall Plan outlays have grown substantially and the costs also have gone up.

3.3.2.2 Problems with the Existing Infrastructure: Inefficient, Inequitable, Unsustainable and Conflict Ridden Use of Irrigation Water

a) Large investments have been made and huge infrastructure has been created but this has not translated into “on time” and “on demand” availability for farmers. There has been a wide disparity between design and delivery, inadequate command area development and poor maintenance/rehabilitation resulting in seepages, water logging and salinity in head reaches and poor conveyance in tail areas. Estimates of tail-enders deprivation vary from 7-91% and it is estimated that water use efficiency in canals is not even 40% of the possibility.

b) Large water infrastructure suffers from insufficient soil conservation in upstream areas leading to the problem of silting of the dams, cutting the expected life of the dam. This also implies that there is less water for the second crop (Rabi) as provision of drinking water in cities has the first call on reservoir water.

c) Land gradient & capillary spread of field channels have not got adequate attention leading to poor availability for tail-enders. Small and marginal farmers
suffer more as it is difficult for them to arrange for investment in bullocks/laser machines for land levelling.

d) Political considerations led to proliferation of new projects without adequate attention to completion of on-going projects or maintenance of existing projects. The resources were therefore very thinly spread. Many departments had a very bloated work force often recruited due to political pressures. Staff salaries, especially in the wake of the Fifth Pay Commission, have consumed meagre maintenance budgets. Further, the financial burden of surface irrigation and power subsidies and market borrowings of irrigation Corporations for surface irrigation development have contributed to many States facing crises rendering them unable to spend on maintenance.

e) The inability to charge/raise charge for irrigation water from canals and electricity for pumping has led to a financially unsustainable system. Poor water delivery and reliability have also discouraged farmers from paying up their water charges, thereby crippling Water User Associations (WUA) even where they exist. Recovery of cost is very difficult with departmental rivalry coming in the way of enforcement. Poor recovery coupled with budgetary constraints and poor systems management adversely affect proper operation and maintenance and lead to deterioration of the irrigation systems and threaten their sustainability.

f) Under pricing of water has also reduced the farmer’s incentive to save and use water efficiently and over application of water especially in Punjab has led to water logging / salinity in the head reaches. The under pricing of water has also led to cultivation of water intensive crops like paddy and sugarcane, especially in water scarce areas where they should have been contra-indicative. Coupled with poor targeting of energy subsidy this has led to unsustainable use of ground water in many parts of the country.

3.3.2.3 Multi-User Conflicts

a) Simultaneous existence of scarcity of water and inefficiency in its use remains a paradox. This has also led to multi user conflicts at several levels. The World Bank Draft Report, 2005-“ India’s Water Economy: Bracing for a Turbulent Future” has elaborated the water conflicts at several levels.
3.3.2.3.1 Conflicts at the Inter-state Level

a) In the words of Planning Commission “Inter-state conflicts over water sharing have been the bane of water resources development in the country. Tribunals have been constituted in the past for Narmada, Godavari and Krishna. Tribunals for Cauvery, Ravi-Beas and Krishna (second Tribunal) are presently engaged in adjudication. Although time limits have now been prescribed for Tribunals, still the adjudication process is a long drawn affair. Tribunal decisions are interpreted differently by Co-basin State and this again leads to disputes in operation of the Award”. This has lead to a situation where in most cases there is no clarity about who can use what amount of water. When there are awards they are incompletely specified and have no accompanying enforcement mechanism.

3.3.2.3.2 Conflict between Upstream and Downstream Riparian in Intra-State Rivers

a) Water sharing in closed basins is increasingly becoming contentious within the same state eg. the Viagai basin in Tamil Nadu.

3.3.2.3.3 Conflict within Irrigation Projects

a) An important recent case is that of the Indira Gandhi Canal where the farmers in the first half of the project to be completed were allowed to share the water for the whole project, on a temporary basis, with this water to be gradually reduced to their design share as the other command areas were completed. But this fact was either communicated informally to the farmers or not communicated to all. They thus became accustomed to having plenty of water and planted water intensive crops. When the time came for them to reduce their water to the originally envisaged amount they perceived this as “confiscation” and revolted.

3.3.2.3.4 Conflicts between Farmers and Environment

a) After the construction of the Laava ka Baas Dam a rainwater harvesting structure was constructed in the Bharatpur Sanctuary. Existing farmers claim that they have been squeezed by this and have refused to allow release of water for the Bharatpur Sanctuary.
3.3.2.4 Policy Issues Related with Surface Irrigation (MMI)

3.3.2.4.1 Issues with Creation of New Infrastructure

a) While it is difficult to initiate new irrigation projects quickly a concerted effort is required to expedite ongoing but unfinished projects involving 13.4 million hectare of potential. The AIBP scheme introduced recently is proving useful in creation of new irrigation potential through completion of major and medium projects started much earlier. The Tenth Plan Mid Term Review had observed that the “AIBP is sluggish on benefit delivery. Currently, projects are prioritized on the basis of likely completion time and continue with no further projects financed till selected projects are completed. This allows selected projects to drag and pre-empt resources from other projects. A better priority may be to allocate across projects according to the likely additional irrigation possible from a given investment within given time, without insisting on project completion but with actual benefits monitored directly through remote sensing or otherwise”.

b) Allocation of funds for completing the existing projects should give top priority to projects, which are at the stage of more than 75% completion. Second priority should be for projects in the range of 50 to 75% completion. This would help in ensuring that the benefits of investments start flowing faster. The existing budgets for micro irrigation and repair and restoration of water bodies is extremely small and must be enhanced substantially since such projects would be completed faster and would be subject to less litigation and relief and rehabilitation problems.

c) Inter State rivers lead to legal disputes involving substantial costs and delays. A mechanism should be in position to finally decide Inter-State disputes, which should then be taken out of the purview of Courts, in public interest. Inter-State river water disputes should be handled by the Govt. of India with the setting up of a River Board with statutory powers and comprising of technical experts, stakeholders and States Governments and some eminent persons drawn from media, academics and some economists. 50 years after the passing of the River Board Act, it has not been used even once to deal with inter state river disputes.

d) Proceeds of disinvestment of Public Sector Undertakings could be set apart in a Corpus Fund, which should be exclusively used for ensuring required funds for
irrigation projects. With the assured supply of funds, it should be possible to complete the projects in a time-bound fashion.

e) The main purpose behind large projects is irrigation water for farmers but this leads to the displacement of a large number of farmers in the catchment area raising their discontent. **Prior informed consent** of the affected community should be taken with the help of Gram Sabha/Panchayat before the approval of any new project.

f) Bharat Nirman has proposed to bring 10 million hectares of new area under irrigation. A nationally debated and accepted strategy should be evolved for this.

g) Concept of protective irrigation/localization needs to be revisited to have compact distribution system as irrigation managers have been unable to operate irrigation system as designed. With growing importance given to watershed development, water availability first needs to be established before taking up any new major and medium projects. Several major and medium projects have very limited or almost no inflows.

### 3.3.2.5 Promoting Efficient, Equitable and Sustainable Use of Irrigation Water: Price Initiatives

a) As for subsidies on inputs such as water and power, these should also be viewed in terms of the possible distortions and deleterious effects that they may be causing. For example, over-exploitation of ground water and ecological degradation from water-logging, salinity, etc., due to subsidised or free power or wasteful use of canal water leads to tail ender problems on the one hand and inadequate funds for the maintenance of delivery systems due to negligible user-charges on the other. There are distortions in crop planning too, camouflaging the scarcity of water/energy.
The Energy Irrigation Nexus: Metering vs. Rationed & Flat Tariff Regime

1. Option 1: Metered tariff: Using a metered tariff, a power utility can confidently recoup its costs and supply customers with as much power as they want, when they want it. However, cost and logistical problems with installing meters would be substantial.

2. Option 2: Flat Tariff with rationed supply: The flat rate currently in use is without rationing of supply, which encourages the wasteful use of both energy and water. The switch in approach would involve (1) gradually raising tariffs to cut power utility losses; (2) supplying farms with fewer hours of power per year, but ensuring a quality power supply during periods of moisture stress; and (3) metering at the feeder level to measure and monitor farm power use, to allow good management.

Source: IWMI

b) The supply oriented management regime of canal water regime should have an integral component of demand management encouraged through volumetric supply and pricing of canal water. This is urgently needed to encourage water efficiency and resources for operation and maintenance. On grounds of equity also, surface irrigation and its subsidies benefit medium and large farmers and those in the head-reaches of canals. Distribution of canal subsidies is regressive and a marginal farmer receives approximately one-tenth of the subsidies received by a large farmer. The canal water-pricing regime has to have an appropriate cross-subsidy element, which targets the poor.

c) The National Water Policy, 2002 also provided for setting water bodies initially to cover operation and maintenance costs and gradually charging for capital costs and it was also stipulated that the charges should be linked to the quality of service provided. However, due to the fear of annoying the more influential farmers, most States have not implemented this Policy leading to avoidable burdens on the States’ budgetary resources.

d) Rationalization of water rates and standardizing O&M components is a prerequisite for sustainability of associations. Revenue officers collecting the charges should be sensitized.

e) Financial Sustainability of WUAs is very important. Viability of the users’ organization depends on a large extent on the freedom given to them to fix and collect charges. Government must exercise restraint when announcing waiver of water rates.
Policies adopted by Government have tended to harm the interests of users who promptly pay. The culture to pay for the resource used needs to be promoted.

3.3.2.6 Issues Related to Operation and Maintenance: Irrigation Management Transfer

a) The irrigation water management system has been criticized on account of non-involvement of farmers in decision making at any stage—planning, execution and management. It has been pointed out that without active participation of beneficiaries, the irrigation system cannot be managed efficiently for which sufficient financial support is required.

b) National Water Policy, 2002 had emphasized that the management of water resources should incorporate a participatory approach by involving not only the Government agencies but also stakeholders in various aspect of planning, design and management. Involvement of stakeholders and beneficiaries in design, construction and maintenance of irrigation systems will help in efficient, equitable and sustainable use of water. Irrigation Management could be transferred to WUAs for the distribution of water, setting of charges, collection of revenue and repair and rehabilitation thereby enhancing the efficiency of the irrigation facilities. Recognizing the need for legal framework for Participatory Irrigation Management (PIM), the Ministry of Water Resources has brought out a Model Act to be adopted by the States for facilitation of PIM. Consequently, 10 states namely, Andhra Pradesh, Bihar, Goa, Madhya Pradesh, Maharashtra, Karnataka, Kerala, Orissa, Rajasthan, & Tamil Nadu, have either enacted new Acts or amended the existing Irrigation Act to facilitate PIM. In all, more than 55,000 WUAs have so far been formed in 23 states covering an area of about 10 million hectare, majority of which are under MI schemes. Some of the remaining States have been encouraging participation of farmers in Irrigation Management under Cooperation/Society Act at outlet level. Despite this progress, PIM is not working effectively in all States.

c) Evaluation studies of PIM carried out in MP and AP, which have introduced participatory management by legislation, have shown mixed outcome. Introduction of warabandi, increase in acreage, reduction in theft, timely availability of water etc. have been reported as some of the benefits in these two states. However WUAs are
hampered by political interference, lack of funds, substandard work, poor participation of tenant and women farmers in these two states. Another case in point is the Gujarat example where there is no law for PIM but enabling environment has been created for WUAs to flourish. This was made possible by close co-ordination between the WUAs and the Government leading to the latter creating a facilitating environment, software support provided by NGOs., and freedom of the WUAs in fixing even higher rates. The software support provided by credible NGOs costs a fraction of the investment per hectare for creation of new infrastructure or rehabilitation but helps in establishing and strengthening of the participatory management.

d) In the words of Shri Anil Shah, Chairman, DSC, Ahmedabad, PIM is not a panacea to cure all ailments of canal irrigation. Enabling environment has to be created to make participatory irrigation work.

e) Water availability gap determines how well PIM will work, i.e. with too much or too little water PIM does not work. It works best in areas of moderate water deficiency.

f) For successful transfer of the irrigation management the farmers should be convinced that the canal is theirs and its upkeep is their own responsibility. For this, hand holding after transfer of management for at least five years is necessary. In this context, capacity building of water users as well as staff involved assumes significance. Changing attitude of staff and preparing them to work with users and render technical assistance are necessary. To meet the capacity building needs, WALMIs need to undertake training of trainers and prepare the material required for training. NGOs, working well, need to be involved in capacity building.

g) The other constraints in implementing the PIM effectively like deficiencies in the irrigation supply system, unreliability of water at distributary’s/minor/outlet head, lack of training and leadership and cooperation of irrigation departments need to be addressed adequately. Agricultural extension services should be integrated with irrigation services. Proper roadmap and milestones will have to be devised and rigorously implemented.

h) Enabling legislation is a pre-requisite but without strong political and
administrative will, it will be impossible to implement PIM on a large scale.

i) A project approach, with users’ organization at the primary or sub-system level and federations of user’s organizations at the distributary and the project level will work better.

j) Modifications to and rehabilitation of canal network, providing adequate arrangements for regulating the flow of water and measuring flows at different points are necessary to make them amenable for PIM implementation. Technical problems cannot be resolved through new institutional arrangements. In other words the canals should be handed over only after repair and maintenance work has been carried out at the major level.

k) The Union Finance Minister had stated in the Budget speech, 2006 that “The Ministry of Water Resources will revamp the Command Area Development Programme to allow participatory irrigation management through Water Users’ Association”. For soil conservation efforts co-ordination exists at apex level. However, liaison at ground level is very poor. Water should be released from the reservoir only when required. Transfer of maintenance to the WUA is much better as workers are not engaged when there is no work but canals should be handed over only after extensive repairs. Distributory downwards the operation and maintenance of canal conveyance should be handed over to the farmers. A National Conveyance and PIM Authority should be established. There is an acute problem of waterlogging and nearly 2.46 million hectare of land has to be reclaimed back for cultivation. For this purpose a Land Reclamation Authority should be established.
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3.3.2.7 WUAs and Panchayati Raj Institutions

a) In Major and Medium Irrigation, the management is on a hydraulic (canal) basis and not village-wise. In many cases only a part of the village is irrigated. Therefore, organisation comprising of water users is likely to be much effective. Involvement of Panchayats is likely to politicise and complicate the situation. When 73rd Amendment does not include Major and Medium irrigation but Minor irrigation, it may be desirable to have only user organisations and their federations manage water.

b) Panchayats can help Water Users Associations by giving supplementary grants for maintenance in case their resources permit. They can also provide assistance to WUA in any outstanding disputes between them and governmental agencies because of their commanding position in the village society and administrative system. Panchayat’s help can also be sought by a WUA for resolving any outstanding dispute among its members. WUAs can also draw upon the services of Panchayat’s physical and administrative infrastructure for managing their affairs till such time as they are in a position to have their own infrastructure.

c) In order to facilitate interaction between the two institutions it would be useful if a representative of Panchayat is made a permanent invitee to the meetings of the Management Committee of WUAs. Similarly a representative of WUAs should be made a permanent invitee to the meetings of Panchayats. The arrangements can be reviewed later on in the light of the experience gained in this respect. A similar arrangement can be thought of with respect to relations between Zila Parishad (district level Panchayat) and distributory level WUA or a federation of WUAs at district level in case they exist.

3.3.2.8 Pro-poor Transfer of Irrigation Management

a) To make IMT more pro-poor, and to ensure the viability of WUAs, which depend heavily on the labour contribution of small farmers, policy makers should take steps to ensure that poor farmers participate equally in decision-making processes. These steps include raising awareness and access to information, and making the election of WUA committees more competitive and transparent. The relative absence of small scale farmers from committees and general meetings means that they may not gain the crucial benefits that could be realized from IMT.
BOX III

Making IMT more pro-poor

1. Clearly define the rights of farmers. Andhra Pradesh Farmers, management of Irrigation Systems (APFMIS) serves as a good model for this. By law, farmers have equal decision-making power within the WUA, regardless of farm size (i.e., one farm, one vote).

2. Raise awareness, especially among poor farmers. In forthcoming publicity campaigns, state policy makers and the civil service should ensure that farmers understand the IMT process and their rights and responsibilities.

3. Reform the election process within WUAs. This is the single most effective way to substantially improve small-scale farmers’ inclusion in the WUAs. Election of new presidents and committee members should be vote-based rather than consensus-based, to promote competition between several candidates. Ensuring this, and also that farmers are well-informed, will increase transparency and equity.

4. Differentiate between those farmers in the command area who use canal water and those who use alternative sources of irrigation in defining rights. A high proportion of farmers do not use canal irrigation at all (or may use it only in some years)-relying instead on alternative water sources. The management of canal irrigation does affect the availability of alternative water sources, such as ground water and hence the farmers who depend on them, but obviously not to the same degree as farmers who depend solely on canal water.

5. Monitor, by farm size, participation in the WUA (in elections, decision making process, fee collection etc.) Research showed farm size to be a reliable indicator of poverty for intra-scheme comparison. And, data are generally readily available, so that monitoring costs are minimal. Monitoring overtime provides a good indication of equity trends and is a prerequisite for ensuring pro-poor IMT.

Source: IWMI

3.3.2.9 Institutional Intervention for Water Management

a) During the 1970s and the 1980s, the World Bank and USAID invested heavily in creating more than a dozen state level Water and Land Management Institutes (WALMIs). Infrastructure and facilities were superb and things ran smoothly until their funding ended. State Governments had taken over them but due to fund shortages their functioning is reduced to low performance knowledge institution. There is a need to transform the existing water management institutions into world-class institutions for forward thinking research, policy formulation and development. These no longer deliver high-value thinking, insights and perspective. They also fail to deliver the crucial handholding and capacity building support to WUAs.

b) WALMIs have been handled by various departments leading to confusion in methodology/policies. Since this involves the appropriate and conjunctive use of land and water it should be preferably with the agriculture department of State Government.
3.3.3.0 Minor Irrigation Schemes (Surface)

a) Minor Irrigation through surface water covers water sources (tanks and small reservoirs) with a cultural command area (CCA) of less than 2000 ha. According to the census of Minor Irrigation conducted with reference year 1993-94, the number of tanks for lift irrigation schemes was 84,347 and the number of storages for surface flow irrigation scheme 3,08,958. In addition, 83,510 permanent diversions and 83,248 temporary diversions were in existence. Together, they account for irrigation potential of 10.04 Mha or about 10.3% of the total irrigation potential created in India.

b) About 70% of the ultimate potential through surface water based minor irrigation schemes has since been created. Of the balance potential of 5.15 Mha, majority of the area lies in Madhya Pradesh, Andhra Pradesh, Nagaland, Maharashtra and Assam.

c) It may be noted that there is considerable variation from State to State. While full (or even more) potential through minor irrigation has been tapped in Uttar Pradesh, Punjab, Haryana, Rajasthan and some of the Union Territories, it is as low as 17% in Manipur and 20% in Madhya Pradesh.

d) Many currently used tanks in the southern region were constructed in the past centuries. They account for more than one-third of the total irrigated area in Andhra Pradesh, Karnataka and Tamil Nadu. Tank irrigation is less energy and capital intensive and mainly serves subsistence agriculture in a widely dispersed region. It has a special significance to mainly rice growing small and marginal farmers. Tanks also play a vital role in conserving water at a local scale.

3.3.3.1 Decline of Tank irrigation

a) Tank irrigation, which is not only low cost source of irrigation for small and marginal farmers, but also predominantly managed by them, has gradually declined. The Report of the National Commission for Integrated Water Resources Development points out that the carrying capacity of tanks has decreased over time for a variety of reasons and that the restoration and renovation of tanks and other local sources is a priority task.
b) Key reasons identified for the decline of tank irrigation in India are as follows:

i. Encroachment in the tank foreshore and along the feeder channels has reduced supply of water to tanks;

ii. Accumulation of silt in the tank basin/bed has reduced the water holding capacity of the tanks;

iii. The construction of dams/reservoirs in the upper watershed or catchments area has prevented the water supplies from reaching downstream tanks;

iv. Rapid development of groundwater irrigation in the tank command areas has reduced the participation of farmers in tank related works which ultimately reduced the area under irrigation;

v. It has also been confirmed that the poor design of new tanks has resulted in low level of performance;

vi. Inadequate maintenance expenditure by the government coupled with absence of statutory powers for stakeholders to maintain and manage the system is another problem affecting tanks and other traditional irrigation sources;

vii. Break down in village institutions like “kudimaramath” due to caste and other conflict, the community participation which was part and parcel of tank irrigation development has declined drastically;

viii. Crop diversification away from rice mono cropping remains elusive coupled with declining profitability of rice cultivation in many of the minor irrigation projects.

3.3.3.2 Key Issues in Restoration of Tank Irrigation

a) In pursuance of the announcement made by the Finance Minister in the Budget Speech for the Year 2004-05, a scheme for “Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture” has been taken up as a State Sector Scheme. The Pilot Scheme is being implemented through District-Level Implementation Committee with active community participation. The main objectives of the scheme are to restore and augment the storage capacities of water
b) NCF had recommended that the traditional sources of irrigation like tanks, etc. should be preserved and maintained with the participation of local Panchayats and the community. Farmers should be encouraged to use the silt in the village tanks for their own fields, so that they also deepen the dried up tanks during the summer season. New technologies developed by ICAR and other institutes for the purpose should be widely demonstrated and adopted. In this context, nearly 1,000 field demonstrations are proposed to be organized by State Governments. Community surface water storage facilities should be provided to all the needy villages where the piped water supply of the Public Health and Engineering Department (PHED) is inadequate to meet the drinking water needs. With an additional rainwater surface storage of 137 mcm, raising the total capacity to 531 mcm, domestic needs of all arid villages of Rajasthan not covered by PHED could be met. About 70-80% harvesting of rainwater may provide community storage to all.

c) Small water-harvesting and storage structures, with a water spread area of a few acres, are known all over the country under various local names. They usually consist of a bund built along a contour, like a miniature version of an irrigation tank but without sluice gates and canals. For instance, the Kohlis, who are a small group of cultivators residing in the district of Bhandara, Maharashtra, built some 43,381 water tanks over several centuries, which formed the backbone of successful irrigation in the area. So is the community managed Phad Irrigation system that existed in Maharashtra. These should be strengthened and supported.

d) In western Rajasthan, the hub of the country’s arid zone, adopting an integrated water management programme, the “dying wisdom” of traditional system of rainwater harvesting in tanka, nalis, khadins, talab, etc. should be revived and restored. Over time, the capacity of Khadins and other water storage structures have decreased due to land degradation and crop intensification. Improvement of these devices and structures through enhancing and sensitizing group awareness and their
better management are the needs of the hour. Panchayats, Gram Sabhas, community organizations, NGOs and CSOs must play major roles in this effort.

**BOX IV**

**NGO Strategies for Small Tanks**

1. NGOs have placed much emphasis on the variety of roles the small tanks play in their socio-ecologies. As an example, PRADAN operates a rainwater conservation project in the Alwar district, Rajasthan, that aims at reviving the traditional *paal* (bund) system of rainwater harvesting. It has helped village groups build over 110 *paals* in several micro watersheds. PRADAN discovered early, the value of working on a system (or cascade) of *paals* covering an entire micro-watershed. A series of *paals* built in a zigzag manner in a micro-watershed capture and impound the floods flowing downstream, prevent massive soil erosion and greatly reduce flood pressure on the dams constructed downstream. At the same time, they produce dramatic impacts on both farm economies and the hydrology of these areas, mainly by improving groundwater recharge.

2. Tarun Bharat Sangh (TBS) works with *johads* in roughly 550 villages in the Ruparel river basin, Alwar district. Their water-harvesting work covers approximately 6500 square kilometers. This large range makes its impact more visible, and serves as an example for other villages who request for similar work. With a core staff of less than 100, TBS had several hundred volunteers chosen in the villages where they work, and they have evolved into small grassroots organizations.

3. Over the years, they developed a set of norms and rules that are generally accepted; for example, people who benefit have to contribute the labor required. They also contribute some material and cash. TBS tops this up with financial support for the hire of tractors and cement. TBS’s own ‘home-grown’ engineers also provide crucial help in community organization, finding out the needs and concerns of participating members, and designing a structure that addresses these needs. Each *johad* then is differently designed to meet the unique needs of each site and group.

4. TBS’s works are low-cost compared to government structures. A couple of middle-sized *pucca bandhs* (dams) in the village of Bikhampur cost only around Rs. 30000 (US $700) each, besides farmers’ contributions. The same bandhs would have cost around US $ 10000-15000 had they been built by the Irrigation Department.

e) There is some dispute about the desirability of use of low cost check dams etc. for trapping excess water flow during and post monsoon on the ground that this would interfere with catchments of village tanks. It is, however, felt that more often than not water in rivulets/nullahs flows into minor rivers which, in turn, ultimately merge with the sea. Very few of such nullahs/rivulets feed the small tanks and, therefore, construction of check dams is not likely to interfere with optimum catchments of monsoon water in such tanks. On the contrary, such check dams promote ground water recharge, involve low construction cost, require little maintenance and provide opportunity for drinking water for human and cattle post monsoon and also provide opportunity for economic activity like vegetable growing on the sides of the check dam, especially by women groups. Clearly, therefore, the
benefits outweigh the perceived dangers. The efficiency of such check dams in drought prone areas/market areas like Jhabua (MP) has been well demonstrated and appreciated. Check dams, as desirable activity, therefore, should be continued by utilizing labour available under NREGP.

f) The best strategy for rehabilitation is to view tanks as complex socio-ecological systems with multiple stakeholders groups and multiple uses. For each rehabilitation option, policy makers would, of course, have to consider the expected output, the financial investment required, and also the possibility of unrest in excluded parts of the population, and compare the appeal of the various solutions to motivate the farmers and other stakeholders, as members of WUAs, to participate in tank maintenance and water management.

g) Crop diversification with appropriate technological, market and institutional interventions should be promoted.

h) Renovation and rehabilitation of local community based irrigation sources should be made a major component in rural infrastructure projects. Rehabilitation of community irrigation systems should be an integral component of all rural employment generation programmes.

3.3.4.0 Minor irrigation: Unsustainable Withdrawal of Ground Water

a) The era of Ground Water exploitation started in 1960. The major facilitators of ground water usages included expansion of electricity supply (hydropower), availability of credit and cheap technology. Ground water pumping helped in overcoming water logging and salinity. Other advantage of ground water included abundance and timely supply. A major anomaly is that ground water utilization is low in eastern region where it is abundant due to energy shortage.

b) The problem of untimely and unreliable water faced in canal command areas was solved by resorting to ground water utilization by the farmers. But self-provision of water for irrigation and household purposes was an indicator of the failure of public water supply system. Tube well proliferated in canal commands because public irrigation managers were unable to deliver irrigation on demand. Urban household
also relied on boreholes because municipal service was inadequate and unreliable. There is an inherent inequity bias with resource rich farmers in a better position to use the ground water for irrigation and household purposes. Small and marginal farmers are not in a position to carry out investments for exploiting ground water. Easy availability of ground water also allowed farmers to grow water guzzling crops in areas they were contra-indicated.

c) A recent survey by Central Ground Water Board (CGWB) indicates that out of the 7414 identified units (blocks/talukas/watershed), 471 are “Overexploited” and 318 are “Critical or Dark” units. Thus, less than 11% of the total units fall under the category of “over-exploited” and “critical”. It may be noted that ground water is still available for exploitation in the eastern parts of the country, in Madhya Pradesh and Chhattisgarh and in specific pockets of Andhra Pradesh, Karnataka, Maharashtra, and Jammu & Kashmir. In Punjab, Haryana, Rajasthan, Gujarat and Tamil Nadu, the rechargeable quantum of ground water has been exceeded and mining of static reserves has commenced.

d) There is a lack of concerted regulatory policy to restraint the over-exploitation of ground water. Recharge is also not mandatory.

e) Progressive decline of water table has reduced the recharging capacity of dug wells especially in hard rock regions. For newer wells, the farmers have to dig deeper. A competitive deepening of wells leads to increase in cost of water and affects the small and marginal farmers, who own dug wells. In dark blocks, individual farmers are free to exploit further the ground water, thereby adversely affecting the existing wells.

g) For tube wells, there is embedded energy subsidy, which has adverse fiscal implications for State finances. In fact increase in the depth of aquifer leads to rise in pumping cost which, in turn, will lead to rise in input cost(if power is not free) or rise in subsidy costs.

3.3.4.1 Conflict Areas

a) Conflict over excessive ground water withdrawal between indigenous communities and cola multinational has been reported in Kerala.
3.3.4.2 Policy Considerations

a) Utilization of ground water potential is dependent on availability of electricity, which is a major constraint. The quantum as well as quality and duration of the power supply is unsatisfactory and is a major issue, especially since the farmers feel that they are being discriminated compared to the cities where the more vociferous urban consumers get better supply. While additional generation capacity has not been coming up adequately in view of resource constraint in the State Electricity Boards, the problem is made worse by widespread power thefts not only in the rural areas, but by the more affluent city dwellers, especially industries. Instead of relying on the State machinery, the people must be encouraged through financial incentives in reporting cases of thefts and there should be a very prompt follow up for disconnection and levy of very heavy penalties.

b) There is also a great scope for better management of the grid and the distribution network, including zoning, to ensure that the farmers get electricity at set hours even if it is for a restricted period.

c) Since ground water irrigation is mainly through field channels, it is essential that the water supply continue for a sufficient time to compensate for the initial loss due to absorption.

d) The watershed programmes should adopt a million well recharge programme to be linked to a rebate in the rate of interest provided under the enhanced agricultural credit programme, on priority basis.
BOX V

Groundwater Recharge and Rain Water Harvesting in Arid Regions

1. Groundwater recharge must be made compulsory for urban as well as rural settings. Due to negative water balance and higher withdrawals, there is hardly any build-up of groundwater in arid regions. Though starved for water, arid regions also face floods, may be once in 10 years, as recently witnessed in the arid agro ecosystem of Gujarat, which may generate on an average 2100-6200 mcm water. It is estimated that if 1/3rd of floodwater is made to recharge the groundwater, it can sustain five recurring droughts. Ephemeral river water should be used to recharge groundwater through check dams, percolation tanks, sub-surface barriers, sand fill dams, induced recharge, etc.

2. The feasibility of rainwater harvesting through farm ponds in areas with rainfall above 400 mm has been well established. Also, there are many examples of recycling such harvested water for successful raising of horticultural crops. It is estimated that in arid region there is potential of harvesting 70% of rainwater for recycling as well as ground water recharge. Under NATP, seven check dams were constructed in different areas, which led to recharging of ground water, by 80 m in Matyana watershed area of Junagarh in Gujarat. It is claimed that in four years time farmers could reap economic benefits as a result of sale of fruits and crops raised through use of the water for supplementary irrigation. Such “bright spots” should be used for training farmers and extension staff and should be replicated widely by State Governments.

Source: NCF Second Report

e) All the Technology Missions should also contribute to the national scheme to retain, renovate and restore the water bodies that are linked to agriculture.

f) There should be a symbiotic interaction between the National Rainfed Area Authority, the National Horticulture Mission, the Technology Missions and the National Rural Employment Guarantee Programme.


g) Tenth Plan had envisaged community-level investment on artificial recharge of ground water and on rainwater harvesting, and had mooted legislation to regulate groundwater use. If the latter is to extend beyond imposing ban on sinking new wells for regulation at the aquifer level, panchayats will need the power to regulate allocation and pricing of ground water. For this to be acceptable, panchayats must be able to deliver visible gains over what is possible through individual ownership. Besides capacity building, this requires that community control receives more government support.

h) Farmers need technical advice in site selection for borewells, particularly in the Southern Plateau region.

i) A water literacy movement should be launched and regulations should be developed for the sustainable use of ground water.
j) A farmer friendly insurance cover for failed wells is needed for ground water development.

k) There is a need for a Pani Panchayat in every village consisting of the Members of the Gram Sabha who could help in getting the available water distributed on an equitable basis.

3.3.4.3 Integrated Management of Ground Water and Surface water in Irrigated Areas

a) Ground Water Resources within irrigation systems should be mapped and monitored with respect to quantity/ depth and quality.

b) In areas with good ground water resources within irrigation schemes, farmers should be encouraged to sustainably tap these resources.

c) The availability of good quality ground water should be taken into account when allocating irrigation water at system & distributory level.

d) In irrigated area underlain by saline aquifers, irrigation-efficient measures should be promoted to prevent further salinization of fresh water resources.

e) Surface irrigation systems could also be used innovatively for ground water recharge.

3.3.5.0 Rainfed Areas

a) The most important characteristic of the rainfed areas is the extreme variability observed in rainfall both in spatial and quantitative dimension. Most of the rain occurs in 100 hours in a year; frequently heavy rainfall occurs within a short period of time and evaporation exceeds precipitation during most part of the year.

b) Close to two-third of cultivable area, falling in rainfed zone and much of it undulating and hilly, was generally bypassed by the Green Revolution. The yields of the rainfed crops have been stagnating at low levels and huge yields gaps persist. The annual rate of growth of coarse cereal output declined to nearly zero in 1990s. The net per capita availability of pulses has fallen to the level of 1950s.
c) Indiscriminate spread of deep tube wells in the hard rock regions of India has only aggravated the water crisis there. Water tables have fallen precipitously and soil health has greatly deteriorated in the intensively cropped rice/rice systems.

d) The farm sector provides livelihood and employment to nearly three-fourths of the population in the rainfed regions. Not surprisingly, these regions have emerged as concentrations of mass poverty and hot spots for civil strife. A majority of the 200 poorest districts in the country are in the rainfed regions. An overwhelming majority of the scheduled tribes depend on the rainfed farming.

e) Rainfed regions are characterized by great agro-ecological diversity. For example, soil conditions and water availability may vary significantly even within a village in undulating and hilly terrains. The great variation in rainfall across the country is the other well-known source of ecological diversity in the rainfed regions. The undulating and hilly landscapes also tend to be ecologically “interconnected” – what happens upstream affects the downstream and isolated actions bear no results.

f) In his recent inaugural address at the 93rd Session of the Indian Science Congress, the Hon’ble Prime Minister spoke of an “agricultural growth plateau”. He acknowledged that the “technologies and strategies unleashed by the first Green Revolution have run their course”. He spoke of the need for a second green revolution with a special focus on dryland agriculture and small and marginal farmers.

g) Climate changes will significantly impact the environment as well as livelihood and quality of life in resource fragile areas such as coastal, arid and semi-arid regions. While rising seas will inundate and submerge the low lying areas, atmospheric dynamics will subject drylands to even more variable and scantier rainfall regimes.

3.3.5.1 Water Shed Approach in Rainfed Areas for Sustainable Development

a) It was felt necessary to develop a coherent strategy for water conservation and management for rainfed areas. Watershed development programme had been introduced as a strategy for increasing over all development in rainfed areas by increasing the availability of moisture and water. During the Sixth Plan, some model watershed programmes were introduced. The National Watershed Development Programme for Rainfed Areas was introduced on a massive scale during the Seventh
Plan. Water shed approach was and is still thought to be the most appropriate one for lifting the economy of the rainfed areas in a manner that is efficient, equitable and sustainable. While expanding the pace and scope of watershed development, much greater attention needs to be paid on why past efforts have delivered less than promised. Following are some of the explanations offered.

3.3.5.2 Problems

a) There are too many agencies of the Central and State governments implementing watershed schemes. Rainfed agriculture and area development in the country, particularly watershed projects, are implemented by the Ministry of Agriculture, Ministry of Rural Development, Ministry of Water Resources, Ministry of Environment and Forests, Planning Commission and Externally-funded Projects. There have been considerable divergence and overlapping amongst the various projects implemented by different Ministries of the Government of India, let alone any fruitful linkages and synergies among the programmes and projects. This makes a coordinated approach towards prioritised planning and implementation rather difficult.

b) Major problem with the present programmes (such as watershed development) meant for the rainfed areas is that at each level they are administered by people like the Collector/CEO, Zilla Panchayat/Panchayat Secretary who have much else on their hands. The sharp focus needed to implement watershed programmes is often missing because they have many other competing priorities. With many competing priorities and insecure tenures, agency heads cannot follow the endeavour that calls for focused, long-term engagement. The Government organisations at the field level lack the essential technical expertise. Expertise in processes of community mobilisation is also limited.

c) Watershed development is capacity-intensive and inherently slow. The present rate of expenditure of Rs. 5000 to Rs. 6000 per hectare under the Government of India’s watershed programmes does not make for drought proofing. Watersheds also take a long time to fructify. The limit of 4 to 5 years is, therefore, wasteful.

d) Some Watersheds are poorly designed.
e) Most projects do not reach full potential in terms of agricultural production except under initiative and supervision of a few Non-Governmental Organizations (NGOs).

f) In many cases, watersheds have not been properly maintained because community involvement waned after the initial development stage. In any case, community involvement in watershed planning and design has typically been low; and distributional problems are persistent, arising from existing inequalities in land distribution because of ill-defined rights and encroachment.

3.3.5.3 Policy Issues

a) The country is already spending more than Rs. one lakh per hectare for making water available through canal irrigation. Funds should be provided more liberally for watershed programme on more liberal terms for quickening the pace of watershed development and drought proofing. Forward looking comprehensive watershed programmes like the KAWAD watershed in Karnataka provide for Rs. 15,000 per hectare.

b) An abrupt ending of watershed programme in the watershed villages at the end of the project period of 4-5 years is not appropriate for making the best use of the experience and institutions created during the project period due to the following reasons:

c) In the limited period and funds allocation, it is not possible to adequately develop land and water resources of the watershed project area.

d) The social institutions painstakingly built up during the intensive project period of watershed development, have no clear direction and role to continue the momentum after ‘the project period’. Without responsibilities and activities the Watershed Associations and the groups deteriorate and disintegrate.

e) ‘Watershed Maintenance and Development Fund’ accumulated out of people’s contribution, is wasted in absence of clear guidelines for their employment for productive purposes. Such funds in the country are estimated at about Rs. 500 crores.

f) Huge government sums are being proposed and spent on isolated programmes
of large number of such cases. A few examples are development of catchment areas of irrigation projects, scheme of ponds development, horticulture, livestock development, drip irrigation, farm machinery etc. All such programmes are of great relevance and benefits to the underdeveloped areas where the vulnerable communities live which can immensely benefit by incorporating such schemes in their plan of integrated development at the macro level. This could be termed “Watershed Plus” signifying that watershed will not remain an activity focused only on soil and water conservation but should encompass and integrate measures that could increase productivity and provide value addition to the community living in such difficult areas.

g) A more structured and monitorable system with much greater community participation needs to be put in place. There is a need for basic change in the institutional set up in the Government for managing the programme. The National Common Minimum Programme had envisaged that the Government would introduce a special programme for dryland farming in the arid and semi-arid regions of the Country. A National Rainfed Area Authority is proposed to be setup to manage the watershed programme. The structure and mandate for the National Rainfed Area Authority (NRAA) appropriate to the goal of enabling communities living and farming in rainfed areas to achieve Jal Swaraj both in relation to drinking and irrigation water needs is under the consideration of the Govt. of India.

3.3.5.4 Watershed Development Projects and Panchayati Raj Institutions

a) If the objective is poverty alleviation through watershed development, then it is only possible if the watershed dwellers plan, implement and organize together and collectively maintain created assets.

b) The argument that PRIs are constitutionally mandated and therefore should be the only instruments for watershed development is not convincing. Unless the PRI is people-mandated and legitimised, it will only remain an ineffective and toothless structure. If the people through a process of dialogue and consensus decide that their particular PRI enjoys their confidence, then, they will mandate it to implement a watershed project. If not, given that the objective is watershed development, it can be nobody’s case to argue that they should have no alternative.
### Recapitulating NCF Recommendations on rainfed areas in the First Report

**Productivity and Livelihood Enhancement in Rainfed Areas: Towards a Rainbow Revolution**

#### Major Recommendations

1. **Establish a National Network of Advanced Soil Testing Laboratories** capable of testing large volumes of soil samples for 16 macro and micronutrients – 1000 laboratories in all parts of the country, with 500 of them being located in dry farming areas, where there is scope for doubling average yields immediately through addressing the deficiencies of micro-nutrients in the soil, in addition to attending the needs for N, P, K.

2. Highest priority should be given to augmenting water availability by vigorously promoting **rainwater harvesting, restoring water bodies and a million wells recharge programmes**.

3. **Convergence and synergy of all agricultural programmes around a watershed**: We have recommended the formation of a National Federation of Farm Technology Missions which can assist the watershed community to access the provisions of appropriate technology missions like those relating to oilseeds, pulses, cotton, horticulture, dairy, etc. In addition, we propose the setting up at the national level a Commission for Sustainable Livelihood Security in Dry Farming Areas under the Chairmanship of an eminent farmer, who is an achiever in increasing productivity and income per every unit of water.

4. **Lab to Land**: Large-scale demonstrations should be organized on catalytic interventions both factor oriented, such as application of micro-nutrients for improving soil health and implements for improving soil physical properties (soil physics, chiseling and enhancing rain water absorption) and system oriented, such as crop-livestock and crop-livestock-fish integrated systems. These would be undertaken in collaboration with CRIDA and ICRISAT.

5. **Post harvest processing and value addition in collaboration with CFTRI and private sector** should receive priority attention. A post harvest technology wing should be added to each Krishi Vigyan Kendra to bridge the gap between production and post harvest technologies and the KVKs may be redesignated as Krishi and Udyog Vigyan Kendras (KUVKs).

6. **Rainbow revolution** should be promoted in rainfed areas achieving substantial enhancement in the productivity of millets, pulses, oilseeds and livestock through large scale adoption of highly successful new technology packages, such as hybrid pigeonpea. Fifty thousand **Farm Schools** should be established in the fields of farmer-achievers.

7. Create pulses and oilseeds villages (eg. *Arhar Villages, Sesame Villages*) for specialized enhanced production (ensuring full availability of quality seeds and other specified inputs), efficient processing and remunerative producer-oriented marketing of the selected crops as well as the optimization of producing more crops and income per every drop of water by cultivating low water-requiring crops.

8. **Rainwater harvesting through farm ponds for supplemental irrigation and recharging the dead open wells**: In most of the rainfed areas, the seasonal rainfall which comes as downpour, substantial part of that goes waste through runoff causing soil erosion as well as impoverishing the soil through soil erosion. It has been demonstrated throughout India that harvesting of excess runoff and storage into farm ponds as well as restoring water bodies and recharging the dead open wells is a very feasible and successful option for improving the groundwater recharge as well as enhancing the productivity of rainfed agriculture through supplemental irrigation. In the areas with rainfall above 400 mm these technologies could be widely adopted which will enhance the cropping intensity, diversify the system into high value crops, increase the productivity and incomes from rainfed agriculture and at the same time, create assets in the villages. These technologies have shown remarkable increase in the groundwater as well as productivity and incomes for the farmers. The watershed programmes should adopt a **million well recharge programme** to be linked to a rebate in the rate of interest provided under the enhanced agricultural credit programme, on priority basis. All the Technology Missions should also contribute to the national scheme to retain, renovate and restore the water bodies that are linked to agriculture.

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Source: NCF First Report
c) To conclude, in the words of Crispino Lobo, if done right, with people in the driver’s seat and an enabling administrative and policy environment, watershed development can contribute significantly in meeting the difficulties of the farmers in the rainfed areas and achieving some of the Millennium Development Goals.

### 3.3.6.0 Sea Water

a) The First Report of NCF had made recommendations on enlarging opportunities for sustainable livelihoods based on a pro nature, pro poor, pro woman orientation and strengthening environmental defence systems in the wake of the devastating tsunami in the coastal areas. It was recommended that the coastal bio-shield movement should be initiated along the coastal areas, involving the raising of mangrove forests, plantations of casuarina, salicornia, laucaena, atriplex, palms, bamboo and other tree species and halophytes which can grow near the sea. They will serve as speed-breakers under conditions of coastal storms, cyclones and Tsunami. They will in addition serve as carbon sinks, since they will help to enhance carbon sequestration and thereby contribute to reducing the growing imbalance between carbon emissions and absorption. Mangroves are very efficient in carbon sequestration. They also promote sustainable fisheries by releasing nutrients in the water. In addition, they will provide additional income and make coastal communities eligible for carbon credit.

b) The Coastal Bio-shield can also involve agro-forestry programmes, like the intercropping of casuarinas with hybrid pigeon pea (cajanus cajan) or Red gram, to be undertaken by farming families. Thus, the Bio-shield movement will confer multiple benefits to local communities as well as to the country as a whole.

### 3.3.7.0 Recycled Water

a) Water reuse is already becoming an integral part of water management in many water-scarce areas. For example, it is common practice for farmers in Egypt and North China to place small pumps in drainage ditches to reuse water. The irrigation agency supports this reuse strategy by blending drainage water with fresh water to increase the useable supplies. Millions of farmers in Indo-Gangetic plains employ shallow tube wells to recycle the water that percolates through the soil layer-
effectively capturing and using water before it flows out of the basin. This practice also gives farmers more control over the amount and timing of irrigation applications—with dramatic effects on yields.

b) Many farmers living near urban setting rely on wastewater from cities for their crops. Irrigating with low-quality water is often the only option; but even when farmers do have access to canal irrigation, many prefer wastewater because they are guaranteed a constant supply, and the nutrients the water contains allow them to save on fertilizer. Pollution and health risks should be considered when crafting reuse strategies. The problem is that in many cases reuse is by an unregulated individual or community initiative—often ignored by water management agencies. This leads to suboptimal situations in terms of degradation of water quality, human health, and water productivity.

3.3.8.0 Water Use Efficiency: More Crop Per Drop

a) Getting more crop per drop—improving water productivity—will enhance food security and incomes of the poor in canal, tank command and rainfed areas; will enable us to use the water storages and irrigation infrastructure more efficiently and make more water available for nature, industry and domestic users.

3.3.8.1 Irrigation and Cropping Pattern

a) Regulate cultivation of water intensive cash crops in “dark and grey zones”. All new crop varieties being introduced in the country from any source should be assessed for their water requirement.

b) Research should focus on producing crops that can yield more with less water, withstand water scarce conditions, and thrive on low quality (saline/alkaline water).
BOX VII

Where is More Research Needed?

1. Crop breeding for drought-tolerance, water conservation, and ability to thrive on low-quality water.
2. Understanding the interaction between water management practices at different levels-field, system, basin.
3. Co-managing water for agriculture and the environment.
4. Appropriate pro-poor technologies and practices for improving water productivity at field and system levels.
5. Policies and incentives needed to implement water-saving technologies and practices.
6. How to manage irrigation water for multiple uses-for crops, for domestic use, for other income-generating activities.
7. Tools and models to support responsible decision making for valuing the productivity of water in its various uses and examining trade-offs.

Source: IWMI

c) Agronomists should present their data not just based on productivity per hectare but also based on net income per unit of water.

d) Supplemental irrigation combined with on-farm water harvesting practices reduces vulnerability to drought and helps farmers get the most out of the scarce resources. Priority should be given for in situ moisture conservation like compartment bunding, ridges and furrow, tide ridges, double cropping, strip cropping, mulching and vegetative barriers.

e) Land and water degradation constraint efforts to improve water productivity. Soil erosion, for example, reduces not only soil depth but also its capacity to hold water and the amount of nutrients it contains.
3.3.8.2 Precision Irrigation: Sprinkler and Drip

a) Individual farmers must adopt water conservation and management practices like water harvesting, introducing low cost precision technologies such as laser land levelling and drip etc to match allocation as closely as possible to crop water requirement. Awareness amongst farmers for natural resource conservation should be encouraged.

b) Various forms of precision irrigation- mainly sprinkler, drip irrigation systems can increase yields considerably. In South Asia and Africa, very low- cost bucket and drip sets are offering low cost technological solutions to water use efficiency. They deserve a thought on widespread uptake.

c) Though many States have been facing the problem of water scarcity except a few States, the technology is not popular. 50% of area under drip irrigation lies in Maharashtra. Due to high implementation cost, theft etc sprinkler irrigation is also not popular.

d) In the Vidarbha region of Maharashtra, farmers with the help of NGOs started using pipes and micro tubes to water their cotton fields for a longer time from

boxed text:

**Enhancing Water Productivity and Saving Water and Soil Erosion**

Large tracts of cotton soils, particularly in the Central Zone, are shallow with hardpan at about 8 to 10" depth causing several interdependent soil, water and plant nutrition problems. Breaking the hard pan will obviate the problems in many ways. Rainwater is stored deep, down wherefrom it will not easily evaporate and is available to plants for a prolonged period and a much healthier and larger crop is produced. These reduce the need for irrigation particularly to deep-rooted crops like cotton to as low as 20% of that normally required, and thus the water productivity will increase manifold. But, despite this knowledge and know-how this water conservation technology has generally not been adapted in India. Chiselling (1 m interval) in rainfed areas would need high power prime movers such as 50 hp tractors because of larger draft requirements. Such tractors were not available until few years ago. Presently, both high power tractors and chisel plough are available to do the job. Traditionally, lack of high power tractors, research efforts, and extension efforts did not permit large-scale adoption of the chiselling operation. The cost of chiselling is estimated to be Rs 1000/ha. However, large scale demonstrations of about 100 ha. each in about 200 watersheds in 40 districts should be undertaken to assess the efficacy of the approach in terms of energy, economics and environment. Based on the results, a national plan should be prepared to benefit from the technology.

Source: NCF Second Report
open shallow wells. Most striking was the use of low grade, light weight pipes used for making ice candy locally called ‘pepsi’ which costs less than Rs. 1000/acre as compared to micro-irrigation kits that cost Rs. 12,000/acre and branded drip irrigation systems that cost Rs. 60,000/acre.

e) Cost of micro irrigation systems, which are essential for water use efficiency, could be decreased through abolition of taxes, including VAT. Taxes on use of raw materials for the manufacture of micro irrigation systems should also be substantially reduced.

f) Lease financing for micro irrigation by manufacturing firms to provide credit support, as in case of cars, should be promoted.

g) Full reduction of expenditure for all investments by private sector in promoting dryland agriculture should be provided to supplement Government’s efforts in the field.

h) There should be contracting and sub-contracting of the distribution system in the command areas to bring in greater efficiency in water distribution.

i) Drainage line treatment should be encouraged.

j) Irrigation system needs to be modernized to enable delivery of water on demand basis to farmers through pipes based on crop-water requirements.

k) Since micro irrigation covers only 2.2 million hectares against a potential of 62.5 million hectares, the coverage under this system should be accelerated through public-private partnership.

l) Channels of water from source to field as well as creation of water harvesting facility needs inclusion in the Micro Irrigation Assistance Package.

m) Human resource development, both for farmers as well as for manufacturers, needs to be promoted for optimum utilisation of the potential for micro irrigation.

3.3.9.0 Water Quality

a) Water quality also needs attention since water often gets polluted at sources with pesticides residue and toxic chemicals. Nearly 65% area in Thar Desert has
saline groundwater, having at places fluoride and nitrate levels beyond the permissible limits, thus compelling people to use scarce surface water storage for drinking. Ingress of soil salinity in coastal areas poses yet another serious problem. There is also the problem of arsenic poisoning in ground water. The problem of arsenic poisoning abounds because people residing in regions blessed with abundant surface water such as West Bengal increasingly depend on the groundwater for drinking and irrigation purposes. There is an urgent need to remove this dependency by making available other safe drinking water options – for instance, surface water, which is arsenic free. West Bengal has 7000 cubic meter of available surface water per capita. Effective management of surface water including rivers, canals, water bodies, lakes, ponds and rainwater can reduce groundwater dependency in drinking water and irrigation.

3.3.10.0 Water Markets

a) Analysts believe that the informal water market is growing rapidly, and it may catch up with Rs. 8000 crore organized market of bottled water soon. With ground water getting limited day by day the unorganized water market all over the country has grown. Big farmers or landowners installed tube wells with electric pumps and sell water mostly to marginal farmers for irrigation purposes. The price varies from Rs.3 per hour in the Godvari basin to Rs 45 per hour in parts of Gujarat. The supply of water to tankers for domestic purposes fetches Rs. 200 to Rs. 250 per tanker, which goes up to Rs.400 during summer. Many experts feel that there is nothing wrong in selling water. However, the State should enact law to regulate the market.

b) It has also been argued that introduction of a system of enforceable Water Rights needs consideration. It has been argued that moving towards a formal water entitlement system first requires clarifying that water is publicly owned and that water entitlement is usufructory - it is a right to use, not a right to own water. Further, it has to be related to the sustainable use of surface and subsurface resources. However, in practice it may be difficult because of lack of clarity on who has the right to use what water.
It is felt that water markets are a contentious issue since the fundamental point about ownership of scarce resource of water has not been finally addressed and opinions differ on its ownership by the Central Government/State Government/Local Authority/PRI/ People. The situation is complicated because of imbalance between supply/demand and history is full of examples where a market develops to deal with the situation. Since in practice it may be difficult to formulate and even more difficult to implement a law on the subject in all the rural areas, it may perhaps be best to leave the issue to the wisdom/consensus building at Gram Sabha level.

3.3.11.0 Multiple User Conflict and Conjunctive Use Of water

a) Through years of neglect, the water bodies particularly river systems in the country have faced massive pollution level arising out of increased and unrestrained industrial activity. This has recently affected the fisheries resources particularly in the rivers.

b) There has been inadequate attention to maintenance of water bodies like ponds, floodplain lakes (beels) etc., and even recently constructed reservoirs and ponds/tanks have reduced capacity for stocking of fish due to growth of water hyacinth etc.

c) Multi-user conflicts and excess extraction of water for multifarious uses lead to depletion of fish stocks.

d) There are a few other challenges viz. multiple use of water leading to scarcity of water in future affecting aquaculture activities, large scale diversion and abstraction of water in view of emergence of new river valley projects.

e) Water abstraction owing to construction of dams has resulted in reduced flow affecting the migratory run of fishes. The increased pollution and silt load have further aggravated the problem of water quality and fish carrying capacities. Happiness of fish is indeed an index of the quality of water. Yamuna is highly polluted due to discharge of effluents.

3.3.11.1 Aquarian Reforms

a) The fish farmers are not getting the same concessions in income tax, water
and power tariffs, etc. as the agriculture sector does, although aquaculture is recognised as a part of agriculture, even by NABARD. Therefore, policy intervention is required to treat aquaculture at par with agriculture. Necessary policy guidelines on uniform long term leasing of all suitable water bodies need to be circulated to states/Union Territories for streamlining the efforts to enhance production and productivity through aquaculture. Policy intervention is also required for the effective management of in-shore fisheries and rational exploitation of deep sea, offshore and oceanic fishery resources for the overall development of marine fisheries. Subsidiary industries relating to fisheries like culture of pearls, development of global trade of ornamental fish to provide high-margin business opportunities for fishers, setting up of adequate fish marketing network etc. are some of the other areas which need adequate attention.

b) Fisheries Department must be consulted by the Irrigation Departments of States while managing the water resources, since single-minded attention to irrigation can work to the serious detriment of the fisheries resources. Water allocation policies should be in tune with the biological threshold levels for fisheries so that both the water resources and fish resources could be optimally utilized. In fact even while the Irrigation Department could continue to manage the head works and the canals, the management of the water resource for fisheries in terms of stocking, exploitation, conservation, fishing rights etc., must be under the exclusive control of State Fisheries Department, if the production and productivity of fisheries in reservoirs is to be raised.

c) Water is critical for fish; it has non-consumptive use in fishery sector. It also acts as substrate for its growth and sustenance. Therefore, any water management issue affects fishery directly. The emerging freshwater scarcity needs to be recognized as an issue of utmost importance. There is a growing awareness that increased water use by humans not only reduces the amount of water available for future industrial and agricultural development but also has a profound effect on aquatic ecosystems and their dependent aquatic life, including fishes. Balancing the needs of the aquatic environment and other uses is becoming critical in many of the river systems in the country as population and associated water demands increase. In this context, what is often lacking is the understanding that planning environmental water allocation means
striking the right balance between allocation of water for direct human use and indirect human use.

d) Large areas in the country have suffered from the problem of salinity due to excessive irrigation and inappropriate water management. While these soils have been treated with gypsum to control the salinity, which is costly, a more profitable utilisation of such saline soils can be through culture of Scampi. The technology is indigenously available and the States using the saline soils/water for production of scampi should launch special extension efforts and incentives to popularize freshwater prawn farming.

e) Hills have more water than land. Schemes such as running water fish culture offer great scope and promise in the expansion of aquaculture in cold-water States.

f) Productive utilization of water bodies such as reservoirs, rivers, inland saline/alkaline lands, and waterlogged areas like beels, oxbow lakes and derelict water bodies (At least 75% of the water spread area to be brought under aquaculture in place of the present level of about 40%).

g) There is need for a comprehensive set of Aquarian Reforms in order to foster the sustainable and equitable use of both coastal and inland waters for capture and culture fisheries. Introduction of Aquarian Reforms to help the fishers and the spread of fish enterprises based on the principle of gender and social equity as well as ecology are long overdue, even though concerns have been voiced in various fora over time. These reforms would, inter-alia, consist of leasing policy for major inland water resources like ponds, reservoirs and river system etc, as well as coastal areas for aquaculture, water tariff at concessional rate at par with agriculture, power tariff again at par with agriculture for small and marginal fishers, insurance against accidents/livelihood threatening events, enforcement of close season to permit sustainable fisheries in river system, the reservoirs and ponds.

h) While the elements of Aquarian Reforms are obvious, their implementation over the years has been less than satisfactory for various reasons. It is suggested that the DAHDF should set up a small Committee, which should go into these elements keeping the requirements of gender and social equity and ecology in view and give its recommendations on the lines of land reforms, for adoption by the states after consultation with all stakeholders.
3.3.12.0 General Considerations for Policy

a) The bulk of the investment that has taken place both in the public and the private sectors is accounted for by investment in augmenting irrigation resources: canal irrigation in the case of public investment and groundwater exploitation in the case of private investment. In order to make the investment more productive, it is necessary to invest more for completion of incomplete irrigation projects, better water management in the running projects and augmenting land and ground water resources in the non-command areas through the watershed development approach.

b) Water because of its multifarious uses presents an equally large number of issues and conflicts. Since water is fundamental need both to human life as well as to agriculture including livestock and fisheries, where practiced, public policy has to be designed in a manner, which is not only efficient in usage but also affordable and sustainable. Above all, the policy has to be socially and politically acceptable as well as egalitarian in order to satisfy human and animals needs.

c) Even more importantly, agricultural and industrial growths are interconnected and both target the same resources for water. This throws up important issues of ownership and management of water resources and the irresponsibility of the industry, in view of its large resources, to return the water it consumes in terms of both quantity and quality to the community. Aquarian reforms, therefore, involve a close and sensitive look at the strengths, weaknesses, opportunities and the threats to the water system and arrive at an acceptable policy for harnessing conservation and usage of the most precious resources for life – “water”.

d) Water use efficiency is as important as creation of additional capacity, but insufficient attention has been paid to the dissemination of knowledge for improving water use efficiency and its application on the ground. There is little incentive to follow the improved practices in view of the present management policies and pricing of water. The existing system of water delivery and pricing have in fact encouraged wasteful use of water. Attention should, therefore, be paid on encouraging efficient water use. There should be empowerment of WUAs through devolvement of adequate powers and capacity building at the grass root level. The involvement of farmers in the management of irrigation systems at all levels and with adequate
powers should be actively encouraged, particularly in order to deal with the problems faced by tail-enders in the canal system.

e) Farmer awareness about water and its efficient use can lead to greater sense of responsibility. WUAs should be empowered and could be encouraged to charge and collect water and electricity rates from farmers based on volume of actual consumption or based on quantities of water received or electricity consumed. The collected revenues should be retained by the Associations for maintenance and development of irrigation facilities.

f) Principle of social ownership of water should be accepted and measures should be taken to ensure equitable distribution of water resources. This would require a check on unrestricted exploitation of water resources.

g) Water conservation, equity, fairness, and public good will have to be the basis of water policies. Privatization should not work against the interests of small and marginal farmers. Irrigation policies need to be viewed in a holistic manner and made pro-poor.

h) A new comprehensive Water Law should be enacted for integrated water resources management, dealing with surface and ground water as well as with all aspects of water conservation and usage would be needed to overcome a fragmented approach to water. Multiplicity of laws relating to water has resulted in problems of the enforcement. A new comprehensive enactment will also lead to repeal of several conflicting and redundant laws. Autonomous Water Resources Regulatory Authority at State Level (similar to Electricity Regulatory Authority) should be constituted to look into all water sector issues.

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CHAPTER 3.4

GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

FISHERIES

India is the third largest producer of fish and second largest producer of inland fisheries in the world. It provides cheap and protein rich food and earns the valuable foreign exchange. This sector also provides livelihood to some 11 million people involved fully/partially in fisheries and on subsidiary activities connected with the sector.

3.4.1.1 India has large resources of untapped water bodies which can be utilized by traditional fishers and small/marginal farmers and landless labourers to earn additional income through use of low input technology like use of compost and weeds and use of seasonal ponds, roadside canals etc., NGOs can assist poor and ill-educated farmers through training, micro credit and assistance for marketing.

3.4.1.2 The potential of inland aquaculture can be gauged from the fact that one cubic meter of water can produce about 3 kg. of rice but can produce 6 kg of fresh water fish. The latter uses much less fertilizers too. Fresh water aquaculture therefore has to attract larger funding support specially for feed and technology in the interest of poor for whom it can provide 50-80 % of animal protein comparatively cheaply.

3.4.1.3 The Tenth Plan has already adopted a holistic approach for sustainable development of fisheries and aquaculture for optimizing production and productivity, optimizing the export of marine products, generation of additional employment opportunities and improving the socio-economic conditions of the fisher community with adequate attention to gender issues, and conservation of aquatic resources and genetic diversity.

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3.4.1.4 Fisheries have been presented in detail in Chapter 3 of the Second Report of NCF. Some of the major recommendations, however, are summarized for urgent attention in the interest of the fishers:

i. Treat aquaculture at par with agriculture in order to provide concession in income tax, water and power tariffs at par with agriculture.

ii. Develop of policy guidelines on uniform long term leasing of water bodies by States/Panchayati Raj Institutions exclusively for Cooperative Societies/Self Help Groups (SHGs) of genuine fishers, especially women.

iii. Effective enforcement of close season for fisheries conservation through provision of financial support of Rs. 1500 per month per family instead of to Rs. 300 per month per family, as at present during the close season.

3.4.1.5 Enforcement of a strategy for achieving the objectives of “Fish for All” by:

a) Enhancing productivity in all inland ponds and achieving sustained high production per cubic volume of water in them; giving integrated attention to capture and culture fisheries both in inland ponds and in coastal areas.

b) Ensuring the adoption of responsible and sustainable fishery practices in the area of marine fisheries and introducing a code of conduct for this purpose.

c) Establishing agro-aqua farms, involving the cultivation of mangroves and *Salicornia, casuarinas*, cashewnut, coconut and other appropriate tree species and the culture of prawns and shrimps.

d) Spreading quality literacy among fisher families with reference to sanitary and phytosanitary measures and codex alimentarius food safety standards.

e) Improving facilities for fish landing, storage, transportation, processing and marketing.
f) **Developing** social marketing techniques, which can help to ensure the availability of good quality aquatic products to resource-poor consumers.

g) **Introducing Aquarian Reforms** to help in the spread of fish enterprises based on the principle of environmental sustainability, economic viability, social, general equity, nutritive quality and food safety. Aquarian Reforms should aim to promote harmony between artesenal and mechanized fishers and Agriculture and Aquaculture and cover both Indian and coastal water resources.

h) **Organizing Fish for All Training Centres** for fisher families based on the principle of learning by doing, to impart latest technical skills ranging from capture or culture to consumption. Helping both resource poor producers and resource poor consumers through sustainable self-help groups is a major objective of the “Fish for All” programme.

i) Specific segments, which have potential for employment and income generation, are as under:

i. Increased exploitation of under utilized fish species

ii. Promotion of:

a. Backyard fish culture

b. Air breathing fish culture

c. Cold water fish culture

d. Running water and game fish culture

e. Fresh water shrimp culture

f. Ornamental fish culture

g. Seaweed culture

h. Artificial Pearl Culture

i. Mussels culture

j. Sea cucumbers
iii. Encouragement of sea ranching and artificial reefs for resource conservation and sustainable exploitation.

iv. Area expansion for semi-intensive brackish water shrimp culture

v. Quality control of seed and feed

vi. Improvement in marketing infrastructure and setting up of cold storages/cold chain

vii. Setting up of Conflict resolution mechanisms with participation of fishermen involved in artisanal and mechanized fisheries.

viii. Technology transfer and awareness generation regarding safety issues amongst fishers involved in marine fisheries.

ix. Technology transfer and awareness generation regarding quality control in fishing operation and landing.

x. More Fisheries harbours/fishing lending centers particularly for artisanal and mechanized fishers.

xi. Provision of Mother Ships, which can ensure hygienic handling of catch in mid ocean and permit longer voyages in the sea by fishers.

xii. Provision of Small dredgers to service fish landing centers and make them more efficient.

xiii. Research, production and wide dissemination of labour saving devices/containers particularly for women involved in marketing/processing.

xiv. Investment in infrastructure for small farmers, aquaculture estates, particularly effluent treatment plant

xv. Popularization of consumption of processed fish to spur demand and to attract large private sector investment in fish processing leading to employment generation

xvi. Research in technology for cost effective and producer level processing and packaging including value addition by fishers.
xvii. Enactment and enforcement of laws to regulate mesh sizes and trawler designs to ensure sustainable levels of exploitation of fish.

xviii. Affordable insurance schemes for fishers in view of hazardous nature of their work.

xix. Preparation of schemes for pension for fishers more than 60 years of age to ensure social security for this vulnerable segment.

xx. Research and production of affordable and efficient fishing boats.

xxi. Effective and regular system of consultation with fishers for polices affecting their livelihood including responsibilities for management of resources like fish landing center etc, which are vital to their livelihood.

xxii. Investment in mother boats to assist fishers in undertaking longer journeys into the sea and maintenance of quality of catch.

xxiii. Promotion of knowledge centers in fishing villages for dissemination of information regarding efficient fisheries practices / weather conditions at sea etc.

xxiv. Infrastructure development in fishers’ villages through utilization of resources in Bharat Nirman for improving quality of life for fishers.
CHAPTER 3.5
GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

LIVESTOCK

Livestock sector has produced 90.7 million tonnes of milk, 45.2 billion eggs, 44.5 million kg of wool and 2.12 million tonnes of meat during 2004-05. The value of the Livestock output is estimated to be around Rs.165 thousand crores. India, at present, is the first in milk production, fifth in egg production and seventh in total meat production in the world.

Total Livestock output increased at 3.8 per cent per annum during the Ninth Plan, even though it was slower than the 4.5 per cent growth rate during 1980-97. While the growth rate of Livestock has been 3.6 per cent, the growth rate in crop output has been 1.1 per cent per annum only after 1996-97, according to the Mid Term Review of the Tenth Plan.

Further, Livestock production in India is largely an output of small holders and contributes to livelihood of over 70 million rural households. Unlike land holdings, the Livestock holdings are fairly equitable with over 70 per cent of all species owned by smallholder groups of small/marginal farmers and landless labourers. In 2003, India had some 283.4 million bovines, 61.5 million sheep, 124.4 million goats, 13.5 million pigs and 489 million poultry. Even more importantly, Livestock provides a major source of supplementary income for a huge majority of rural households and the sector is therefore, highly livelihood intensive. The sector has provided sustenance to families during drought and other natural calamities.

India ranks first in respect of cattle and buffalos and second in goats, third in sheep and seventh in poultry population in the world and nearly 90 million people work in Livestock sector. The contribution of Livestock sector to the Agricultural GDP has increased from 18.1 per cent in 1981 to 26 per cent in 2004-05. The
contribution of Livestock and fisheries sector in the total GDP during 2003-04 was 6.3 per cent.

Total export earnings from Livestock and poultry related products were Rs. 4734 crores in 2003-04.

Given India’s agro climatic diversity, a large variety of Livestock is available for transportation, tillage, milk, meat, and other by-products, and for providing additional livelihood to the farmers. In particular, Angora rabbits, ducks, turkey quails, parakeets as pets can be bred to cater to the emerging niche markets in the urban areas.

Improvement in Livestock production is an important pathway for increasing the income of marginal and small farmers and landless labourers, given the uncertainties of crop production. Market opportunities due to the anticipated rise in demand for Livestock products, will provide an avenue for resource-poor farmers to increase production, improve their livelihoods, reduce malnutrition and thereby, contribute to the goal of overall poverty alleviation. However there is need to provide an enabling environment in which small producers are able to take advantage of the opportunities, overcome the challenges and meet the threats. Constraints to increased Livestock production will need to be properly identified and addressed.

3.5.1.0 Highlights of the NSS Report No. 493 on Livestock Ownership: 2002-03

a) An estimated 69 per cent of rural households and 11 per cent of urban households operated some land during the kharif season of 2002-03.

b) As many as 79 per cent of rural households in 2002-03 (kharif season) possessed land of a size of 1 hectare or less. About 32 per cent possessed less than 0.002 hectare of land.

c) The cattle population in rural India, which was between 160 million and 170 million during the 20 years prior to 1991-92, declined to 154 million in 2002-03.

d) The buffalo population in rural India continued to grow from 69 million in 1991-92 to 76 million in 2002-03.
e) The stock of *poultry* in rural areas declined from 193 million in 1991-92 to 182 million in 2002-03.

f) The stock of *working cattle* in rural areas declined by 25 per cent between 1991-92 and 2002-03, reflecting the falling importance of bullock power in cultivation and allied activities.

g) The stock of *in-milk cattle* in rural India showed a slight fall of about 2 million from its 1991-92 level of 30 million.

h) The number of *sheep and goats* in rural areas declined from 85 per 100 rural households in 1991-92 to 64 per 100 households in 2002-03.

i) The share of marginal holdings in total stock of in-milk bovines, which was only 20 per cent in 1971-72, continued to rise from 44 per cent in 1991-92 to 52 per cent in 2002-03.

j) The share of marginal holdings in total poultry stock continued to grow from 55 per cent in 1991-92 to 63 per cent in 2002-03.

### 3.5.2.0 Highlights of NSS Report No. 497 on Farmer Households: 2003

a) Tribal farmer households possessed larger number of cattle heads compared to farmer households of other categories. There were 173 heads of cattle per 100 Tribal farmer households. While SC farmer households had 98, OBC farmer households had 126 and the others had 132 cattle per 100 farmer households.

b) While ST/SC farmers had 40 to 45 buffaloes per 100 farmer households, the OBC and Other category had 78 to 80 buffaloes per 100 farmer households.

c) Farmer households in the lowest monthly expenditure class or the poorest category had 31 buffaloes per 100 households, whereas the highest monthly expenditure class had 113 buffaloes per 100 households.

d) Of the average monthly income of a farmer household, Rs.969 came from cultivation. Wage earning contributed Rs.819 while the non-farm business generated Rs.236 and income from farming of animals brought in only Rs.91 per farmer household.
e) About 58 per cent of the farmers kept some kind of farm animals. Households engaged in dairying spent on an average Rs.814 per month on dairy farming. Farmer households who kept poultry spent on an average Rs.129 per month on poultry farming.

**Table 1 : Number per 1000 of households reporting owning of Livestock and poultry of different types for each size class of household operational holding in India**

<table>
<thead>
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<th>Size class of Operational holding (ha)</th>
<th>No. of households per 1000 households reporting owning of</th>
<th>Cattle</th>
<th>Buffalo</th>
<th>Other large heads</th>
<th>Sheep, Goats</th>
<th>Fowl*, duck</th>
<th>Other birds</th>
<th>Pigs and rabbits</th>
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<td></td>
<td>Cross Breed</td>
<td>Non-descript</td>
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<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
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<td>635</td>
<td>29</td>
<td>140</td>
<td>79</td>
<td>2</td>
</tr>
<tr>
<td>10.0-20.0</td>
<td>132</td>
<td>791</td>
<td>861</td>
<td>559</td>
<td>94</td>
<td>253</td>
<td>41</td>
<td>4</td>
</tr>
<tr>
<td>&gt;20.0</td>
<td>116</td>
<td>822</td>
<td>847</td>
<td>649</td>
<td>140</td>
<td>194</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>All sizes</td>
<td>51</td>
<td>319</td>
<td>361</td>
<td>214</td>
<td>5</td>
<td>152</td>
<td>143</td>
<td>9</td>
</tr>
</tbody>
</table>

| Estimated No of hhs                    | 75283                                                  | 471791  | 533201  | 315651          | 8055        | 224875     | 211987    | 126040         | 16900        |
| No. of sample hhs                      | 3467                                                   | 17795   | 20595   | 11125           | 459         | 8206       | 10417     | 533            | 1853         |

* Includes hens, cocks and chickens

Table 2: Percentage distribution of land operated for farming of animals for each size class of household operational holding in India.

<table>
<thead>
<tr>
<th>Size class of operational holding (ha)</th>
<th>Per cent of area operated for farming of animals</th>
<th>Percentage share of area operated for</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dairy</td>
<td>Piggery</td>
<td>Poultry/ Duckery</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Nil</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>≤ 0.002</td>
<td>77.66</td>
<td>68.61</td>
<td>1.57</td>
</tr>
<tr>
<td>0.002-0.005</td>
<td>66.26</td>
<td>69.58</td>
<td>1.78</td>
</tr>
<tr>
<td>0.005-0.040</td>
<td>50.42</td>
<td>70.56</td>
<td>2.85</td>
</tr>
<tr>
<td>0.040-0.5</td>
<td>1.91</td>
<td>56.49</td>
<td>0.76</td>
</tr>
<tr>
<td>0.5-1.0</td>
<td>0.80</td>
<td>54.34</td>
<td>0.27</td>
</tr>
<tr>
<td>1.0-2.0</td>
<td>0.59</td>
<td>51.14</td>
<td>0.27</td>
</tr>
<tr>
<td>2.0-3.0</td>
<td>0.58</td>
<td>47.67</td>
<td>0.03</td>
</tr>
<tr>
<td>3.0-4.0</td>
<td>0.52</td>
<td>38.77</td>
<td>9.14</td>
</tr>
<tr>
<td>4.0-5.0</td>
<td>0.43</td>
<td>58.86</td>
<td>0.11</td>
</tr>
<tr>
<td>5.0-7.5</td>
<td>0.42</td>
<td>45.06</td>
<td>0.03</td>
</tr>
<tr>
<td>7.5-10.0</td>
<td>0.23</td>
<td>78.36</td>
<td>0.00</td>
</tr>
<tr>
<td>10.0-20.0</td>
<td>0.22</td>
<td>88.59</td>
<td>0.00</td>
</tr>
<tr>
<td>&gt;20.0</td>
<td>0.22</td>
<td>91.11</td>
<td>0.00</td>
</tr>
<tr>
<td>All sizes</td>
<td>0.72</td>
<td>55.87</td>
<td>1.16</td>
</tr>
<tr>
<td>Estd. No of hhs</td>
<td>-</td>
<td>342444</td>
<td>3496</td>
</tr>
<tr>
<td>No. of sample hhs</td>
<td>-</td>
<td>11874</td>
<td>259</td>
</tr>
</tbody>
</table>


The number per 1000 House Holds (HH) reporting owning of Livestock and poultry for each size class, generally declines with the decline in the landholding size, except for bovines. Lower the landholding size, lower is the number per 1000 HHs owning Livestock (Ref. NSSO Report No. 493).

Similarly, the nil category (operating no land or up to 0.002 Ha) representing some 32 per cent of the rural population, shows a steady decline in the number of animals held per 100 HHs during the period from 1971-72 to 2002-03. This seems to be true in respect of almost all species of Livestock and poultry (Source: NSSO report 493) held by them. Labour being the major input of this category of resource poor farmers for Livestock production, the trend perhaps shows that the income from Livestock production looks less and less attractive for them over time.
Table 3: Changes in stock of Livestock and poultry held by the nil category of house hold operational holdings

<table>
<thead>
<tr>
<th>Type of animals</th>
<th>Stock of Livestock per 100 HH operational holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of nil category of house hold (HH) operational holdings</td>
<td>27.4</td>
</tr>
<tr>
<td>No. of in milk bovines / 100 HHs</td>
<td>16</td>
</tr>
<tr>
<td>No. of in milk Cattle / 100 HHs</td>
<td>9</td>
</tr>
<tr>
<td>No. of in milk Buffaloes/ 100 HHs</td>
<td>7</td>
</tr>
<tr>
<td>Small Ruminants / 100 HHs</td>
<td>45</td>
</tr>
<tr>
<td>Pigs / 100 HHs</td>
<td>5.2</td>
</tr>
<tr>
<td>Poultry / 100 HHs</td>
<td>56</td>
</tr>
</tbody>
</table>


This category has no resources to improve productivity, no risk taking ability and no good quality animals which could respond to inputs for productivity enhancement. At the same time, poverty reduction requires paradigm shifts through which the under-privileged should be enabled to earn better and gradually grow out of subsistence system through application of appropriate technology, skills, market linkages, information and service delivery systems. The goal should be to support the subsistence farmers to “live” and not “leave”. Unless helped to gradually become competitive through some of the ways listed below, it is likely to become increasingly difficult for them to co-exist/ compete with the commercial type production units. Their number being very large, providing options of employment for this category might remain extremely difficult. Some suggestions in this regard are:

a) Support creation of institutional structures, owned, responsive and alive to the needs of this category. Depending on the local environment, these could be Producer Cooperatives, Producer Companies, Self Help Groups with their Federations, Producer Associations etc. as may be locally suitable.

b) They cannot be expected to leapfrog in to highly productive and profitable systems. However, appropriate support through a multi-agency partnership to function under an integrated umbrella, enabling an economy of scale to ensure viability, may be provided.

c) Market access, being the most important component, may be established for Livestock/ Livestock products, either by equipping these organisations with
infrastructure, capacity and skills, or through suitable linkages or institutional arrangements such as Public-Private Partnerships/Contract Farming etc. so that assured price and round the year market are assured.

d) Their risk-taking capacity being nil, Government may support them through (i) prevention and control of diseases in the form of complete cover in the identified intensive production zone and through isolated number of vaccinations (ii) provide risk coverage under appropriate insurance schemes (iii) build their capacities through extension, training, exposure visits etc. in line with the rate of growth expected.

e) An animal health system, taking advantage of both traditional system of medicine extended by trained Animal Health Workers at the grass-root level and supported by modern medicine, mainly for ailments which are not amenable to traditional medicine, may be introduced, preferably through their own institutions or on public-private partnership. Their economic burden on treatment being very large and unaffordable, the government may financially support them establish such an economically sustainable system, in the initial 5-7 year period.

f) Their institutions may be supported to take up effective breed improvement programmes so as to steadily improve the quality of their animals. To avoid risks, the breed selected for productivity upgradation should match with the capacity building efforts taken up or vice versa.

g) Most categories of resource poor farmers, being dependant on Common Property Resources (CPRs), user rights may be assigned to the community organisations for development, regeneration and use of CPRs for livestock production. In this respect, hundreds of successful examples established on ground with community participation by Sevamandir in Rajasthan, Foundation for Ecological Security, Gujarat etc. in many parts of the country may be documented and disseminated as models for replication. Facilitating a mechanism for effective interdepartmental coordination could reduce undue delays in the process.

h) Commensurate with the above steps, least cost supplementary feeding on scientific lines may be promoted through their SHGs/Associations/Cooperatives etc., always keeping an eye on the cost and incremental earning to the farmer.
i) Through appropriate policies, the private sector could be made to play a partnership role in the process. Keeping in view the economic position of the resource poor farmers, additional inputs and services should only be on the principle of (i) Value addition to result in incremental benefit after offsetting its cost and risk (ii) Government to support such endeavour with an idea to make the system self-sustainable over a 3-7 year period.

j) All these are to be directed in such a way to ensure that the incremental income generated is not only able to meet the costs and risks, but are able to provide a net income attractive enough to retain them in Livestock production - in any case not less than the income opportunity for labour prevailing in the area.

k) It should also lead to a gradual reversal of the growth in the number of low productive Livestock contributing to further degradation of the environment.

l) Given the right support, Livestock production has the potential to demonstrate such growth. Government should make efforts to try out such models on a pilot scale and, once established, widely disseminate and replicate in newer areas.

3.5.3.0 Segmentation of Livestock Farmers

a) It must be appreciated that Livestock in India is highly segmented. A vast majority of Livestock producers come from under-privileged section of rural community and need a Livestock development and research paradigm to achieve sustainable Livestock development. This section represents a sizeable population of rural families and contributes substantial Livestock produce. Livestock are important in their livelihood culture and they have limited alternative opportunities for employment. Studies have shown that development of small holders’ mixed crop-livestock production is one of the most effective methods of poverty alleviation.

b) In contrast, the resource-rich section of the rural population also utilizes Livestock development for optimising their wealth. This section has the means and ability to obtain the desired variety of Livestock and the inputs and services needed to harness them. From the point of view of the national economy as well as exports, output of this resource-rich segment of the population is also important.
c) However, it should be appreciated that the constraints as well as the remedial measures for these two segments have to be different and policies must be clearly targeted in order to be effective.

3.5.3.1.0 Under-privileged Section Scenario

Some of the characteristics of the Livestock production by this category can be listed as under:

a) Livestock keeping is traditional and a part of livelihood system with strong socio-cultural linkage. This linkage has profound influence on production systems but is not given due weightage by research organizations.

b) Livestock are kept with multiple objectives, an aspect which is usually ignored. The main objectives are – meeting family and farm needs, asset building and getting supplementary income.

c) The production systems are highly internalised, based mainly on farm and family resources. Output of one sub-system is input for the other sub-system. External inputs are low.

d) Perceptions of resource poor farmers regarding economics and benefits from Livestock are at variance with classical economic and technical considerations.

e) Indigenous Livestock cow, goat, poultry though considered low producing, are preferred as these niche well with the conditions.

f) Assured subsistence is preferred to risky high production since they have no risk taking ability. High reliability of production is desired.

g) Low producing animal/bird is useful to the family and none of these is non-productive. It is a fallacy to believe that all farmers, poor as well as rich want the same strategy of high value, high inputs including health care and feed and involving high risks in marketing.

h) Families settled in developed areas have adopted more productive animals and practices.

i) Women play a major role in Livestock production and most of them have good knowledge about Livestock behaviour and local feeds. This is usually ignored
by Research Organizations. Extent and nature of involvement varies within and between regions.

j) Adoption of technologies and scientific recommendations is very poor, probably due to lack of confidence in these or most of these are not relevant for the underprivileged.

k) Traditional systems of health and breeding services are commonly used and modern services are either not accessible or not adopted.

l) Traditional animal feeding and management practices are commonly followed and modern ones are adopted by very few. Livestock producers are not fully convinced of the benefits of modern ones over the traditional.

The constraints specifically being faced by the under-privileged Livestock producer can be listed as under:

a) Access to modern Livestock services, especially veterinary services are poor and effective and efficient services are not available. Privatisation of services is not likely to be useful for the underprivileged.

b) Marketing support is poor and prices received for products are low. For example, majority of milk producers get only 50 per cent of the price paid by consumer.

c) Credit support for purchase of animals and its maintenance is not easily available.

d) Goat, Pigs and Backyard poultry are most commonly kept by the underprivileged and these get very little development / research support.

e) Extension/advisory services for underprivileged Livestock producers are not easily available. Extension, concentrates on transfer of Technology – and often works like a postman.

f) Extension officers are often insufficiently informed, not well-trained for the job, lack adequate communication skills and extension material is scarce. Hardly any attempt is made to assess information needs.

g) Appropriate technologies and recommendations for improving Livestock productivity, under systems prevailing with the underprivileged are not available.
Hardly any research programme is developed keeping underprivileged producer in focus.

h) Training programmes are often not practical and provide stereotyped training. Most programmes cover all aspects of animal husbandry and hardly any attempt is made to assess specific training needs.

i) There are very few training programmes planned to suit women.

j) Improved animals that would ‘niche well’ with the systems of the underprivileged and adverse agro-ecological conditions in which majority of them live, particularly the ecologically fragile regions, are not available. There are hardly any programmes to assess their needs and produce or make available such animals.

k) Feed, fodder availability is a major constraint and conventional approach to improve the situation does not work with the underprivileged. Not much work is done for ecologically fragile areas. Developing common property resources needs more of social engineering than technical expertise.

l) There is an increasing reduction in availability of grazing lands due to spread of irrigation and crop cultivation, banning of grazing on lands belonging to the Forest Department and wildlife sanctuaries.

m) Social aspects of livestock-keeping are usually ignored though they have profound influence on the systems.

n) Traditional Livestock breeders have made major contribution to development of indigenous breeds. However, not much research and development effort is planned for them – there is much to learn from these groups on Livestock management under adverse conditions.

The policy for poverty eradication and improvement of Livestock production in sustainable manner would therefore need the following ingredients:

a) A paradigm shift in Livestock research and development programmes, keeping in view the constraints of the poor.

b) ‘Sensitisation and orientation of Livestock research and development planners for taking a ‘pro-poor approach’.
c) Integration of Livestock development should be with crop improvement and Natural Resource Management – development programmes.

d) A system of situation analysis and assessment of needs and constraints focused by the underprivileged in different agro-climatic conditions.

e) Farmer participation on farm research on the basis of adoption of the outputs of technology by the under-privileged.

f) Development of a separate Livestock extension system, which should be pro-active and should assess needs before presenting them to research system and thereafter assess the impact of the research recommendations.

 g) Development of producers’ organizations with full involvement of the underprivileged.

h) Development of common property resources for dealing with seasonal/locational fodder scarcity.

i) A shift from the conventional approach to fodder development through integration of food, horticulture and fodder crops since spare land may not be available for exclusive cultivation of fodder.

j) More research into improved varieties of fodder crops given the soil/irrigation constraints of the underprivileged.

k) More research on socio-economic and production system of small animals like goats, pigs and backyard poultry to benefit the small/marginal farmers.

l) Need to study traditional poultry production system critically and take participatory approach in planning their development. There is considerable scope for their productivity through a sustainable and environmentally sound system, less dependent on costly external inputs.

3.5.3.1.1 Livestock and Environment

a) Thousands of poor farm households in India depend on different forms of Livestock to varying degrees for their subsistence. The role of Livestock in livelihood generation is well recognized. Livestock also play an important role in eco-system protection. Livestock manure contributes to soil porosity, water-holding capacity, soil
nutrient retention capacity and provides a suitable climate for soil micro flora and fauna. However, Livestock if improperly managed can also cause damage to the environment. In the subsistence based Livestock production system prevalent in most semi-arid regions of India, common lands are the primary source of Livestock feed for landless households, marginal farmers and pastoral communities. Forests, pasture lands, nala bunds and roadside plantations are important sources of fodder. However, too large a number of animals on common land can cause intense grazing pressure leading to overgrazing and degradation of the natural resource base.

b) Fuelled by a growing population, rising income and rapid urbanisation, the demand for Livestock products is rising. In the absence of a clear focus on Common Property Resources (CPRs) and fodder and biomass development, increased Livestock production is likely to have negative consequences on the environment (land, water, vegetation, air, and bio-diversity). This ultimately affects landless, marginal farmers and pastoralists who depend on these resources for their livelihood.

c) Some major issues, which need attention urgently, are:

3.5.3.1.2 Shrinkage and degradation of Common Property Resources

a) Grazing is the most important source of fodder for both large and small ruminants. Most grazing takes place in forest areas, non-arable lands, along streams roads, permanent pastures and grazing areas and land under miscellaneous tree crops and groves.

b) Factors that limit access to various resources are:

i. Reduction in land available for grazing and drastic decline in watering points.

ii. Proportional decrease in CPRs in villages and decrease in their biomass potential as traditional systems of collective management of CPRs break down.

iii. Notification of several pasture lands as protected areas which has forced pastoralists to vacate them.

iv. Restrictions on grazing on JFM sites as specified by Forest policies.
v. Lack of engagement of key stakeholders such as government and non-government bodies and institutions in policy formulation

vi. Imposition of restrictions and bans on grazing during watershed interventions and afforestation programmes. If such restrictions are simultaneous the impact on dependent Livestock is disastrous.

3.5.3.1.2.1 Implications

a) Poor availability of fodder leading to uncontrolled grazing in turn resulting in diminished vegetative cover and accelerated degradation through erosion.

b) Loss/lack of access to grazing land

c) Ceiling on the number of Livestock, small ruminants in particular due to social fencing and restricted access to fodder in watershed development programme.

d) Restrictions on common grazing land areas often result in a shift to stall feeding systems. This may not be a suitable option for landless, small and marginal farmers. In addition, women are required to spend extra time collecting and / or cutting and carrying feeding materials for Livestock.

e) Degradation and decline of CPRs make it difficult for the poor and landless to maintain Livestock (particularly local or “desi” cattle and small ruminants).

3.5.3.1.2.2 The Solutions could be

a) Establish productive CPRs in terms of biomass sources that enable people to develop a greater stake in developing, protecting and using them

b) Create a bigger stake for communities (all stakeholder categories including sheep/goat rearers) in the development, management and sustainable utilization of CPRs.

c) Provide compensatory opportunities for upgrading production systems and /or off-farm employment to the affected families in case of non-alternate options for CPRs.
d) Organize primary groups within the Village Forest Protection Committees to democratise the larger bodies and allow room for individuals in decision-making.

e) Hold multi-stakeholder consultations prior to forming User Groups.

f) CPRs should be assigned to User groups to permit scientific biomass/pasture development.

g) Improve the effective role of Panchayati Raj Institutions in Natural Resource Management (NRM), which is currently seen as minor.

3.5.3.1.3 Pollution from Industrial Livestock and poultry production

a) Pollution from industrial livestock and poultry production in the future is going to be a major threat in India, especially in view of the ongoing Livestock revolution. The rapid growth in the demand for animal protein due to the increase in income, population growth and urbanization may cause a quick evolution of the most sustainable mixed farming systems in India giving rise to an industrial production system. Trends reveal that large industrial cattle farms that are not land based are increasing, especially in the urban and peri-urban areas. This may lead to environmental (air, water) pollution, mainly because management of cattle manure is difficult (unlike poultry manure) and easily enters water routes. This is a small problem at the moment but may intensify with time unless control measures are undertaken. This problem can be managed since cattle owners operate on a large scale and will be able to invest in precautionary measures.

b) The poultry sub-sector in India is one of the fastest growing segments of the agricultural sector today. These poultry units are mainly concentrated around urban and peri-urban areas and there is no integration with crop production systems. This causes increasing concerns relating to environmental pollution.

c) The transformation of the poultry sector from a backyard activity into a commercial activity has resulted in the involution of farming systems, causing loss of various breeds of country birds which are suited to backyard systems with low input requirements and low health risks. This has also adversely affected income generation opportunities for rural women.
d) The presence of pesticide and antibiotic residues in Livestock products is also a growing problem in India. Most crops are sprayed with pesticides, which then find entry into animals through crop residues. Similar problems are caused by the rampant use of antibiotics for the treatment of animals. This is a quality and trade issue. As a result of low attention to food safety and quality, Indian Livestock products face difficulties in entering the export market.

3.5.3.1.3.1 The Solution lies in

a) Enforcement of environmental regulations relating to the use of pesticides and antibiotics, disincentives on urban / peri urban Livestock keeping and incentives for crop-livestock integrated farming system.

b) Technological options comprise development and promotion of indigenous breeds suitable for backyard systems, adoption of manure management techniques, which will make them economically viable.

3.5.3.2.0 Resource Rich Section Scenario

a) This section has access to the exotic breeds, high quality feed, preventive and curative health care through paid services from professionals, access to credit, access to organized marketing including export avenues due to their large scale and assured supply of the Livestock product and facilities for providing sanitary and phyto-sanitary certification etc. Most research has gone to benefit this segment, which, in turn, has undoubtedly contributed to growth of poultry and commercial dairying etc. and has led to substantial export earning also. This segment can and would benefit from corporatisation of the Livestock sector through large-scale operations, preventive and curative health measures through production and easy supply of vaccines/medicines, affordable supply of feed, modern abattoirs, better processing and network of cold storages as well as facilitation of export procedures in view of perishable nature of the Livestock commodity.

b) However, even this segment of Livestock farmers / corporates needs several reforms to optimise their performance and tap the domestic and global potential fully. Reforms for this segment would also indirectly benefit the
comparatively better small scale Livestock producers, since there are significant synergies. These can be listed as under:

i. Include meat as an eligible item in Vishesh Krishi Upaj Yojna. Restore APEDA’s financial assistance for upgradation of export-oriented abattoirs/processing plants, which was in force till 2002.

ii. Include buffalo meat under APEDA’s Transport assistance scheme for new markets in Africa/CIS where freight cost from India is much higher than from competing countries.

iii. Restore Duty Entitlement Pass Book (DEPB) scheme for frozen buffalo meat.

iv. Exempt service tax on transportation of meat products processed for exports, especially since this facility is already available for fruits, vegetables, eggs etc. even for domestic consumption.

v. Give special attention to premium priced buffalo-calf meat for niche market abroad.

vi. Concentrate on health of Livestock for abattoirs processing meat for export in order to satisfy the sanitary and phyto-sanitary standards required in EU.

vii. Revamp and simplify the schemes of the Ministry of Food Processing Industries in order to ensure that the flow of financial assistance is in tune with the published provisions.

viii. Ensure thrust on value added processed meat products, so that India could compete in international market where it, even today, has a small presence.

ix. Take up cost effective artificial insemination programme for the resource rich farmers/corporates, involving high yielding exotic breeds, in the Dairy sector.

x. KVKs and private veterinary clinics should deliver quality health services, both preventive and curative, at a cost since dairying for such resource rich producers would be almost a commercial activity.

xi. Large corporates on the pattern of NDDB, should come up in all the parts of the country and should do hand-holding for producers starting with
production to marketing and export, including processing, in the Dairy sector.

xii. Corporates should also need to provide similar hand-holding and go in for contract farming for other Livestock, by taking care of the provision of animal health care and hygiene to assured purchase of the produce of the farmers. They would thus undertake a commercial activity in a decentralized manner, thereby preventing the possibility of large-scale disease infestation in a single farm and also interest people around their processing facility.

xiii. Poultry sector has already seen such examples of large-scale production, leading to a quantum jump in the production of eggs and birds in the country, thereby benefiting the producers as well as the consumers in both urban and rural areas. Organisations like National Egg Coordination Committee have contributed to the setting up of a National Egg Grid leading to well publicized and fairly uniform egg prices etc. Similar initiative would be possible and necessary for other animals in the interest of producers as well as consumers and also in the interest of macro level management of Livestock.

xiv. Eggs could be included in the Mid Day Meal programme in order to push up demand, which in turn could benefit producers also besides meeting the nutritional requirements of children.

xv. Professional Managers specifically for the Livestock sector should be produced and trained to provide management services for large-scale operations in the Livestock sector especially for the resource rich producers including corporates.

xvi. Efforts should be intensified for removal of non-tariff trade barriers for export of Indian milk products and ingredients, especially for SAARC countries and beyond. Joint ventures should be encouraged to bring the technology of large-scale operations and production for niche markets.

xvii. In order to further enhance the potential of Livestock industry, India has to deal with the problem of direct and indirect subsidies and non-tariff
barriers by developed countries, and try for a greater market access to our products and a reasonable degree of protection of domestic industry through enhancement of tariffs to the permissible extent. India also has to guard against several diseases like Avian Flu etc., which can cause immense damage to the industry and farmers. Prevention of such diseases is perhaps the best option and this can be achieved through establishment of several regional testing and analytical labs with latest facilities and scientists, instead of relying on a single laboratory at Bhopal.

3.5.4.0 General Issues

a) A National Policy on Livestock should be formulated keeping the objectives and capabilities of the various categories of farmers owning Livestock. Special attention should be paid to Policy on Livestock Breeding, particularly cross breeding, in order to enhance and sustain the productivity of domestic stock. The Policy should address the entire production – consumption – export chain and should be pro-active, pro-poor and gender sensitive. Simultaneously, the policy should identify methodologies, which could link the poor and underprivileged producers with the more capable farmers and the Livestock industry in a win-win relationship, so that all of them could benefit from the global opportunities opened up by WTO as well as the rising domestic demand for good quality animal products in the wake of our encouraging economic growth and rising incomes in the urban areas.

b) It needs to be stressed that the analysis of the smallholder subsistence system and the resource rich commercial system is a static snapshot of the current situation. However, since economic growth is a dynamic process, the smallholder subsistence system would have to be enabled to carefully graduate on to a resource rich commercial system, since it may not be feasible for the former to continue an unviable existence for long. In the meantime, the smallholder system may have to maintain a mutually collaborative symbiotic relationship with the commercial system.

c) Production objectives of the various categories of farmers must be clearly understood in a participative mode and a strategy for breed improvement, feed formulation; supply of services and marketing etc. should be tailored for these
objectives. A uniform policy for all segments of farmers in all parts of the country may not succeed.

d) Krishi Vigyan Kendras (KVKs) can be and should be a strong tool for providing support to farmers for all aspects of Livestock including marketing. KVKs are perceived to be focusing too much on crops and horticulture and their Livestock component needs to be strengthened through better staffing and tie up with research.

e) In spite of rapid growth of tractorisation and other implements of farming, many small and marginal farmers are not able to afford the cost of purchase and maintenance. Draught animal power, therefore, would continue to be necessary for mixed crop-livestock farming system, which is the preponderant mode in India.

f) Mixed crop-livestock production system is a common feature, particularly for the small and marginal farmers in India. Many of such farmers are turning to Organic farming to enhance their incomes from their smallholdings. Bullock power, therefore, represents a major resource and opportunity. Bullocks provide dung/urine, which could be used by the farmers to enrich their hungry soil and improve the soil structure/health. Enriched manure from the bullock dung reduces use of costly fertilisers and is a critical input for Organic farming.

g) Bullocks can and should be increasingly used in conjunction with farm machinery meant for smallholdings in order to encourage minimum tillage and enhance employment opportunities, while cutting out expenditure on costly tractors/machinery and diesel. At the macro level, this would result in reduced pollution and lesser subsidy bill and lead to sustainable eco-friendly agriculture. Several innovations like Kamdhenu bullock driven tractors have been developed, which can perform a variety of operations at a much lower cost. These technologies would also need to be encouraged for adoption on a larger scale.

h) Cyclical use of poultry/ducks, pigs and fishery particularly in the North-East have proved very profitable and could be popularised all over the country especially where some water is available for fisheries.

i) The requirements of Livestock should invariably be kept in mind while planning for crops in the watershed.
j) Farmer Workshop on Farming Systems should sensitise the participants on efficient use of crop residues for Livestock.

k) Among total population of Livestock, only a fraction falls under the descript breeds for milk and draught purposes. The remaining fraction presently is described as non-descript. There is an urgent need that, some specific breeds should be identified amongst the meat producing species and genetically improved through selection, for further production.

l) Attempt should also be made to select the breed with good performance from the local geography for grading up of non-descript rather than only using the germplasm of exotic or established breed from remote areas.

m) The WTO regulations now expose the small and marginal farmers to global competition. The Government should provide them the minimum protection and support measures permissible under the WTO for poverty alleviation and livelihood protection.

n) Subsidies, though very small compared to other sectors, have been used to support free supply of animal health care, artificial insemination and other services through Government departments. Subsidies have also been used as part of poverty alleviation programmes, to enhance the participation of the poor in Livestock development. However, better targeting and reach of such direct or indirect subsidies in favour of the poor farmers is desirable.

o) It has often been argued that Livestock sector growth in recent decades has been largely a response to the market pull, and that the productivity of subsistence farming system is so low that with even moderate market-stimulus, producers are able to effortlessly raise output and productivity using the inherent ‘slack’ in the system, in the form of under-utilized family labour and crop residues, and with moderate improvements in breeding efficiency.

p) In the States of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh, chances are high that large farmers will move out of dairying – which they may find uncompetitive in the absence of a powerful market pull, leaving it to small and marginal farmers. In contrast, some of the better-endowed areas – in the north and the west – will, in all likelihood, emerge as frontline milk-sheds of the country. In areas
experiencing strong ‘market-pull’, mixed farming may weaken and semi-specialised
Livestock farming may increasingly emerge as the dominant mode of organising
production. Private investments in value-adding technologies near the consumer-end
of the production chain would perhaps increase while public and co-operative
investments near the production-end would stagnate. Without early and drastic
reforms in legal framework and bureaucratic environment, many producer co-
operatives may take a beating; and as co-operative and public systems for technical
input supply – such as they are – wilt under progressive resource crunch, there is a
likely emergence of an institutional void in many areas in production support systems
serving small producers. All these changes will bring smallholder Livestock farmer
under pressure. This pressure may ease but only if there are growing opportunities for
off-farm work or for urban wage employment.

q) Like many agrarian countries such as Sri Lanka, Bangladesh and Pakistan,
Indian Livestock product markets are filled with cheaper imports, giving India neither
a global foothold nor a sector that can support livelihood of the rural poor any longer.
It is necessary and important to develop a creative and positive response to this
challenge. Progress and efficiency should not be antithetical to the interests of the
resource poor; indeed, it should be the opposite.

r) Even the resource poor have begun to realize that poor services do not
take them very far even when they are free. They would be ready to pay a reasonable
market price if the service is of good quality. It may, therefore, be desirable to out-
source several veterinary services to the private sector consisting of veterinary
graduates setting up Livestock Clinics. This may be necessary since resource
constraints have prevented the establishment and efficient operation of veterinary
services with full complement of staff in the public sector, to fully cater to the rapidly
increasing number of animals. It would be desirable and indeed cheaper to subsidise
the provision of such out-sourced services to small and marginal farmers. Such a
policy would also spur the employment of Veterinary graduates and lead to an
increase in the number of students opting for veterinary courses in Agricultural
Universities, commensurate with the potential of the Livestock sector in India and its
importance for the mixed crop-livestock farming by small and marginal farmers.
s) It may be necessary for the Government to set up fully integrated pilot projects covering all aspects of the production – consumption - export chain to provide handholding to Livestock farmers. While the Government could take care of credit and risk cover, disease prevention and control, the private sector could take care of AI services and marketing and processing. In this, public-private partnership model, smallholder production could be backed with guaranteed price by the private sector in a win-win relationship. This model could be very suitable for small ruminants, poultry etc. and could be started in districts with potential and could later be up-scaled.

t) Institutional reforms for providing economies of scale to smallholders would be necessary. This could be through cooperatives, self help groups, production companies and public-private partnerships.

u) Government should encourage schemes which cater to production of Angora rabbits in suitable agro-climatic zones and ducks, turkey, quails and parakeets as pets for supply to the niche markets emerging in the urban areas due to rising incomes. Such production should be generally encouraged in areas around the cities and near roads in the interest of logistics.

v) Since 16.6 per cent of rural households have up to 0.01-hectare land holding, Livestock would have to be the major source of income for them as their incomes from crops are likely to be negligible. Similarly, 58 per cent of rural households have land up to 1 hectare and this large target group can supplement its income through Livestock.

w) Priority should, therefore, be given to marginal farmers producing coarse grains in different areas. Since coarse grains may not be very remunerative in the market, it could be used as low cost feed for Livestock. The targeted farmers should be provided a mix of Livestock, cattle and poultry after consultations and in a participatory mode through loans on concessional interest of 4 per cent and with a maturity period of five years and a moratorium of two years in view of the gestation periods involved.

x) An yearly review should be prepared cooperatively by the Government department and the target group to quantify the income generated at the farmers’ level through the supply of Livestock.
y) It needs to be stressed that progress should be measured in terms of rise in the income of the farmers and not merely through macro-level production/export statistics.

3.5.4.1 Policy Initiatives Needed

a) Transform the national and global market pull into an engine for generating sectoral and national competitive advantage, and create conditions which propel and enable sectoral decision-makers to creatively utilise the opportunities offered by the new economic environment to establish competitive advantage not only at the farm-level but also at industry and sector levels, making India a leading player in global Livestock product markets through sustained and all-round improvements in quality and efficiency.

b) Enable the small producers to participate in the process of Globalisation, and to promote institutional and technological change that will enable resource poor households and women throughout our countryside, but especially in the agriculturally backward and poorly endowed regions of the country, to gainfully participate in the processes of growth and modernisation of the Livestock sector.

c) Ensure the ecological sustainability of Livestock sector growth and modernization, that is, to constantly monitor the environmental impact of the new market-induced growth processes in the Livestock sector, and design programmes and policies to effectively mitigate their adverse ecological impacts.

d) The thrust of the Government policy should be to remove all impediments in the way of achieving such competitive advantage through changes in the legal and regulatory framework, and through a policy and institutional environment that promotes productivity, excellence and competitive advantage. The central thrust of the Livestock sector policy should be to generate a strong market pull, which will facilitate this transformation.

e) Globalisation and marketisation creates phenomena of islands of high-tech, capital and input intensive, market-oriented production systems flourishing near processing plants, while the majority of rural households continue to pursue traditional systems. While the market takes care of the growth and competitiveness, government policy must focus on strategies to prevent exploitations and unsustainable
practices, and to integrate the small producer to the larger process of sectoral growth, in a win-win mode.

f) A real danger of market-led approach is that firm-level interests often acquire priority over sectoral and national interests. It is entirely possible that a handful of manufacturers and processors, especially with global linkages, are able to take full advantage of the liberalised regime and create pockets of excellence and competitive advantage while the rest of the sector languishes. As the custodian of the sectoral and national interests, the prime role of the Government is to shape the market pull to serve the sectoral and national interests. In order to take maximum advantage of the ‘market-pull’ for lifting the sector up by the bootstraps, it is critical to promote supportive institutional frameworks and operating mechanisms.

g) The Government needs to devise specific policies and programmes to enable and encourage small holders - the main actors in Indian Livestock production - to progressively approach global levels of efficiency and output. This would involve, among other things, promoting diversification in agriculture through access to better quality - rather than subsidized - credit support, information and technical support needed for them to exercise options for diversification, extension support needed to optimise resource use, and, in general, to help small holders to pull in the inherent slack in the system to their advantage.

h) Finally, a big area for aggressive experimental and promotional work is the organisation of smallholder livestock production. Throughout the world, the modernisation of Livestock production is accompanied by major reorganization of production. There are currently a large number of small-scale, mostly subsistence production units producing for the market. In essence, in this process, the subsistence farmer is joined by entrepreneurs who profit from pursuit of productivity growth. This is essentially how modernisation produces growth. In India, we have seen this process occurring in the poultry sector in the past decades, resulting in a bi-polar production organisation. On the one hand, we have a small number of large, very efficient producers and on the other; we have a vast backyard sector with low productivity and no market orientation. Given time, the globalisation could produce similar centralising tendencies in other livestock systems as well. Public policies must make this process as pro-poor and gender-sensitive as feasible.
A recent World Bank study has examined the drivers for pro-poor growth and has recommended (a) give priority to diversification, both to high value agriculture and a dynamic non-farm sector, increasingly linked to agro and urban industrialisation, (b) shift emphasis to less favoured areas, which may now and in future provide higher returns in terms of both growth and poverty reduction.

It is critical that Livestock researchers understand how livestock systems are changing, whether in the systems in more marginal areas or, in the rapidly changing systems responding to market demand for livestock and livestock products. Secondly, within different systems, it is important that a mixture of technology, policy and institutional innovations be combined if sustainable and equitable livestock sector growth is to be achieved. Thirdly, beyond broader livestock sector growth, specific attention will need to be paid to how the poor can benefit from the emerging opportunities. This will not happen without targeted and intelligent public sector research and development action.

Livestock policies would be more pro-poor if they include strategies for (i) establishing the basics for livestock production through secure and adequate access to inputs like land, feed, and water as well as risk-coping mechanisms for natural disasters and price shocks, (ii) kick-starting domestic livestock markets to promote a pro-poor credit market and efficient, pro-poor system of animal health and extension service and adequate access to output market for small holders and (iii) supporting and expanding livestock markets through encouragement to sustainable production of high quality commodities, research for feed and breeds, environmental protection, food quality control, certification and grading to enable the products to be competitive in international markets and to avoid small holders being crowded out by foreign competitors.

3.5.5.0 Genetic Improvement

a) There is urgent need to establish scientific genetic improvement programs (and strengthen existing programs) for all important indigenous breeds of large and small ruminants (including cattle, buffaloes, goats, sheep, camels) and poultry. This will help in achieving the dual objectives of breed conservation and genetic
improvement. In such programs, emphasis should be placed on accurate genetic evaluation using modern statistical methods.

b) Existing Government programs have generally not been successful in producing large numbers of improved Livestock germplasm. Therefore, the private sector should also be encouraged to establish breeding programmes with appropriate breeding objectives.

c) Breed improvement programmes may be based on field recording/progeny testing of animals maintained at the farmers’ level. Improved progeny selected through field recording should be used for future breeding programmes.

d) Scientific selective breeding programs also need to be established for crossbred cattle with different levels of exotic breed inheritance.

e) Only progeny tested ‘proven’ bulls which are the product of scientific breeding should be used for semen production.

f) Large corporates on the pattern of NDDB should come up in all parts of the country which should do handholding for producers starting with production to marketing and export, including processing.

g) Most of the economically important characters in farm animals like milk production, rate of gain (growth), efficiency of gain, carcass quality, etc are quantitative traits. These traits are controlled by a large number of genes, which may act adaptively, multiplicatively and interact epistatically with each other or exert dominance. Identification of quantitative traits and exploitation of these polygene characters using biotechnologies has immense potential.

h) More research inputs based on farmers’ feedback and requirements of different soil types/fodder availability and costs would be needed to cater to this requirement. In particular, the opportunities of fodder by indigenous breeds should also be tapped, in view of their hardiness and adaptability.

3.5.6.0 Dissemination of Genetic Improvement

a) All semen production stations need to be monitored strictly to ensure that they follow the guidelines laid down by OIE and maintain high standards of quality control at all stages.
b) Quality animals are not available in adequate numbers and are also dispersed leading to inefficient supply chain of frozen semen.

c) Inadequate facilities for production, maintenance and supply of frozen semen hinder insemination in far-flung areas. There is insufficient involvement of the private sector and trained rural youths in the task of providing artificial insemination facility. The service covers only some 20 per cent of the breeding females among cattle and in not even 5 per cent of buffalo; the conception rate to AI is less than 20 per cent. In short, the quality of AI services in India is very poor.

d) 100 million doses of semen must be made available in a year to inseminate the cows and buffaloes for breed improvement and sustenance of milk production.

3.5.7.0 Research and Training

a) Livestock vocational training at district / divisional /agricultural university level needs to be started to prepare Para Veterinarians.

b) Curriculum for Para Veterinarians should be standardized and should be supplemented through attachments with Institutions/Governments/NGOs for supplies, support, supervision and quality control.

c) Veterinary colleges in the Agricultural Universities should receive greater focus and funding to come up with digital Extension Content development so that farmers can access the required information through IT network.

d) There is need to undertake progeny testing programmes, since there are virtually no testing bulls available and good genetics require use of biotechnology techniques.

e) There is a need to set up a system of animal registration and performance data recording. Good work has been done in this area by Maharashtra Animal and Fisheries Science University, Nagpur, and needs to be replicated.

f) There is a need for creation of a Regulatory Authority of animal breeding quality assurance, which could consider and decide on issues relating to artificial breeding services in rural areas.
g) The current ban on importing semen and embryos should be considered for relaxation under regulated conditions, since it would require a decade for progeny selection of bulls and till then we have to depend on imported semen and embryos.

h) Progeny testing programme would involve testing potential bulls for genetic disorders and production potential with the help of gene markers. This could be attempted afresh through setting up of well-equipped biotechnology centres in each State, which could run on commercial basis. In view of importance of buffalo in India and its well-known capability, there is a need to formulate buffalo semen production protocols and develop Hazards Analysis Critical Control Point (HACCP) standards for semen supply to rural areas.

i) To promote livestock marketing access to farmers, Maharashtra Animal and Fisheries Science University, Nagpur has developed a web-marketing platform at www.pashubazar.com. This initiative also needs to be replicated so that rural Agri-business centres, veterinary dispensary, Dairy Corporation and rural cyber café could provide franchise Livestock marketing services to farmers. The site can also be used for sale/purchase of farm equipments etc. Animal health and productivity services at veterinary centres are becoming redundant in view of absenteeism and logistic problems in carrying sick animals to the centres. Farmers now request door service, provided quality inputs are made available. The farmers need assured services for Livestock purchase, genetic improvement, and breeding and production improvement consultancy, and feed diagnostic approval services. There is a great scope for privatisation of such services through trained veterinarians on the pattern of Agri-clinics. A franchise approach with mechanism of cost recovery would be desirable.

j) Promote Institutions and establish mechanisms to ensure quality consciousness in milk, meat, vaccine and other products of this sector, encourage research and innovation, and to enhance sector level efficiency in quality production, value addition, procurement, processing, storage and marketing of all Livestock products.

3.5.8.0 Breed Conservation

a) In recent years, a widespread consensus has developed that the best way to conserve breeds is to facilitate the maintenance of them as part of functional
production systems and in the social and ecological context in which they were
developed and continue to develop. Thus community-based conservation of Livestock
breeds should be encouraged and supported.

b) In order to protect the local breeds against indiscriminate cross-breeding
with exotic species, it would be necessary to set up Living Gene Banks for local
breeds like Rathi, Bhadawari etc. The existing Suratgarh Farm could be used for this
purpose. However, supporting low input smallholder systems is a more promising
approach to biodiversity conservation.

c) There is need to have some kind of control on breeding of small ruminants
in the villages. Forming ‘User groups’ in the villages might help in doing this. The
farmers in one or more villages may form such ‘User groups’. The ‘User group’ may
decide to keep certain breeding males and those could be used on payment basis.

d) In comparison to many exotic pure breeds and crossbreds, our indigenous
dairy cattle, like Haryana and Sahiwal, also known as Brahmans abroad, show a
greater degree of heat tolerance with minimum loss of body weight during exposure
to stress, nutritional deficiency and transport, as well as low mortality rate and good
reproduction rate and longevity. Similarly, the Indian Red Jungle fowl (Gallus
gallus), Frizzle fowl and Naked neck fowl are better known for heat tolerance quality.
Among the different genetic groups of sheep, Malpura and Chokla show a greater
degree of heat tolerance value.

e) Accreditation of indigenous breeds by State Governments by way of
registration is warranted. The registration programme should be expanded for all
breeds and strive to identify animals with higher productivity. State Governments
should carry out field recording of performance of the animals with help of other
agencies and State Animal Husbandry Departments. NGOs should be encouraged and
given incentives to start this kind of work.

3.5.9.0 Gender Issues

a) There is a variation in the extent and nature of the involvement of women
in Livestock management as well as their perception, knowledge and views between
regions and socio-economic strata. Despite variations, women mostly handle aspects
like milking, care of young and sick animals, cleaning and feeding. This is significant for design of extension and training strategies.

b) Consequently, training and extension programme in Livestock need several changes. Prevailing illiteracy, household responsibility leading to limited time and mobility and women’ priorities and felt needs should be considered and provided for, in gender focused programmes for their training.

c) Women’s knowledge of animal behaviour, feed resources, useful medicinal, fodder plants and bushes etc. should be developed and utilised.

d) Since women generally attend to most of the activities relating to feeding of animals and milking as also primary processing of milk products such as curd and butter, there is need for dissemination of knowledge to them on aspects of better feeding and maintenance of Livestock and disease control.

e) More research is needed for equipments, which could reduce the drudgery of women in handling of Livestock and processing of Livestock products.

f) More mentoring is needed for women’s self help groups so that they could be more efficient in handling their Livestock wealth and for improving livelihoods.

3.5.10.0 Problems of Small Ruminants

a) Small Ruminants contribute about 10 per cent to the total value of Livestock sector but receive only 2.5 per cent of the public spending on this sector. They account for 14 per cent of meat output, 4 per cent of milk output and 15 per cent of hides and skin output. Goats are widely distributed in various agro-climate regions but have special significance for West Bengal, Rajasthan, U.P., Maharashtra, Bihar and M.P. Sheep density is the highest in arid and semi-arid eco system and they have special significance for nomadic communities and in A.P., Rajasthan, Karnataka, Tamil Nadu, J&K and Maharashtra. In general, the small ruminants make an important contribution to the sustenance of small and marginal landholders and the landless.

b) The critical issues for this sub-sector are poor awareness regarding their importance in the livelihood system, lack of active rearer organisations, pressure on fodder resource base, inadequate veterinary health services, lack of focus on genetic
improvement, reduced access to credit and insurance, lack of efficient market mechanisms, and poor inter departmental coordination.

c) The approaches to these issues would consist of development of multi stakeholders platforms for knowledge sharing and inter-departmental coordination, promotion of gender balanced, small ruminant, rearer organisations, capacity building of rearer groups, mechanisms to improve veterinary health services, institutional arrangements for improved access to credit and insurance, selective breeding for breed improvement and systems to improve access to remunerative markets. It would be useful to set up a pilot study to understand the balance between stocking rate and biomass availability.

d) There is an urgent need to have some kind of regulation and proper marketing policy for small ruminants and their products. The policy should also focus on export requirement. For this, regional goat/sheep Marketing Boards may be constituted. The boards should ensure quality standards and remunerative prices for producers.

3.5.11.0 Problems of Organized Dairy Marketing

a) There are 100 million farm holdings in our country out of which at least 5 million holdings should be motivated to establish organized dairy units which can be monitored and linked up with modern amenities of bulk cooling, refrigeration, transport, storage and processing of surplus milk into products.

b) The latest techniques such as use of BST (Bovine Somato Tropin) and ET (Embryo Transfer) etc. have not been applied to its full potential, which should be made available to farmers at a reasonable cost to increase the production by 20-25 per cent.

c) There are many villages having the potential for milk production but not covered in Operation Flood (OF) programme. For example, the percentage of villages covered by OF in UP, Rajasthan, MP, WB and Bihar was 21, 15, 9, 5 and 9 per cent respectively. Out of 168 Milk Unions, 119 Milk Unions (70.8 per cent) are running in loss. The major causes, which may explain the closure of societies/unions are : i) active price competition with informal traders especially in the villages around cities, ii) single milk collection point: this increases travel time and waiting time, iii) village
politics, iv) dishonesty, v) Alternative opportunities like soybean cultivation (in Madhya Pradesh) provide higher income than dairying; and also fewer by-products for cattle feed than the cotton and groundnuts they replace, vi) rejection of the Anand principles of farmer control in many States, vii) under-utilization of processing capacity in some of the loss making unions resulting in high overhead cost and huge interest burden to these unions, viii) milk unions fail to dispose of all milk collected during the flush season through their own channels or the National Milk Grid. As a result, they are compelled to convert the surplus milk into milk powder and butter oil to be used only in the lean season. In this process, a large sum of the milk union’s money is blocked and creates a shortage of working capital which further leads to non-payment to milk producers, a major cause for poor procurement performance of many loss-making unions.

d) Among the loss making unions, 22 dairy cooperative unions have the capability and the potential to become self-sustaining entities in time. Their performance has been mainly constrained by insufficient growth in milk procurement and marketing. They can effectively turn themselves around through appropriate interventions and many of them have already initiated steps to do so. 44 cooperative milk unions/federations have suffered losses due to internal factors such as lack of professional management, overstaffing, poor capacity utilization and external factors such as the negative impact of government pressures to increase milk procurement prices, withhold upward revision in sale prices, increased competition and restrictive cooperative legislation. Their turnaround seems possible with the infusion of external financial assistance since they are endowed with significant procurement and marketing potential. It is necessary to put in place a mechanism that can regularly collect reliable data on the performance of the organized private sector dairy industry of the country to enable the cooperatives to compete with private companies.

e) The crucial agenda is to devise ways to ensure that the sector globalises in a participatory format; that it grows fast but with active and gainful participation of the resource poor and women throughout India. And, in achieving this aim, strong producer co-operatives can be the best possible answer.
f) It is certainly necessary for the Government to take initiative not only to radically reform the co-operative act to facilitate business performance and concerned success but also to turn the dairy co-operative movement over to its members.

g) As an organisation, which has steered India’s dairy development over the past three decades, the NDDB is in many ways best placed to lead the globalisation of Indian dairying. To do this, it needs to redefine its charter: it needs to swiftly remove the bugs from the Anand pattern so that at least half – but preferably many more – of the co-operative unions put their act together for the global market place: it then needs to lead the co-operative dairy sector to the global platform by a series of swift and proactive moves to set up plants in several Asian countries. While in their current State, producer co-operatives face many odds against national and global competition; their unique potential strength is in the area of quality. Dairy co-operative members are accustomed to supplying milk on the basis of fat and SNF tests for decades, but attach little or no premium on bacteriological quality. This cannot be said about a majority of private operators even in the organized sector, leave alone the informal sector. If India has to meet high quality standards that global competition will imply, co-operatives will find it the easiest to meet them, especially if they can translate better quality into higher income for their members.

h) The co-operative sector’s other major strength is the NDDB, with its technical, managerial and marketing capability and its ability to build farmer-to-farmer alliances in other countries. Keeping these in view, the NDDB should aggressively seek and establish an early foothold in overseas markets. The Government can assist the NDDB to perform this role in a number of ways but firstly by making the changes necessary in the legal and regulatory framework so that the NDDB-supported co-operatives can operate freely as farmer owned businesses.

i) Use of synthetic milk should be banned in view of health hazards and in order to enhance demand for genuine milk from the rural areas, which would in turn mean higher incomes for farmers.
BOX-I

Poultry Farming

Poultry farming has become one of the fastest growing sub-segments in the agricultural sector. Poultry industry contributes Rs. 35,000 crores to the GNP and provides employment to over 3 million persons, and is the only segment of the Agriculture economy, which is growing at about 17 per cent per annum. Some of its features are:

a) It is an efficient converter of maize and soyabean into nutritious animal protein feed.

b) Poultry litter is excellent manure, containing 4.8 per cent nitrogen, 2.8 per cent phosphorous and 2.3 per cent potash. 40 birds kept in deep litter for a year can produce one tonne of manure to fertilize one hectare of paddy or maize, two-hectare sorghum or half hectare of intensively cultivated vegetables.

c) Poultry farming is labour intensive, needs comparatively little capital and provides quick returns. It has great potential for non-farm employment and for retardation of rural migration.

d) India with its strong agrarian base and favourable climate is a highly economical location for poultry production.

e) Forward looking private companies like Shri Venkateswra Hatcheries have contributed substantially to breed improvement and spread of poultry farm through a package of services. Similarly, a consortium of private stakeholders has self-regulated the industry and performed substantial marketing functions through the National Egg Coordination Committee. Such initiatives are unique to poultry in the animal husbandry segment.

Problems

a) There is a severe shortage of major feedstuff viz. maize, which accounts for 50 per cent of all feedstuff and 75 per cent of the total cost of production of eggs and boilers. Profitability of the sector, therefore, is highly sensitive to price fluctuation in maize.

b) There is a substantial infrastructure constraint for storage, distribution, marketing and export including a shortage of refrigerated road transport and efficient cold chain. In addition there is a shortage of a proper testing system and hence pesticides/anti-biotic/hormone residuals cannot be tested sufficiently to meet the requirements of the exporters.

c) Even though poultry sector is a sub-segment of the agriculture sector, it is subject to restrictions on use of agricultural land and also attracting high electricity tariff and sales tax and is also subject to different land and labour laws compared to Agriculture based industry.

d) Poultry industry faces a dangerous future due to the threat of totally unrestricted free trade and the challenge posed by producers like Brazil with their low prices for “whole chicken/chicken products” in view of their large farms. India is ranked number one in competitiveness for egg production and number two for chicken production.

e) The threat due to lower prices of chicken meat is also due to the fact that “chicken legs” considered as delicacy in India are treated as dark meat and dumped at a low price by foreign countries in India. EU and US provide large subsidies to their farmers and the prices of maize there also are lower leading to cheaper feed prices.

Mention however, must be made of the threat posed by unknown and known diseases like Avian Flu through H5N1 and other viruses, through imports. Such diseases can cause extensive damage to health of flocks and the economy of farmers. Above all, it can cause a substantial reduction in demand for poultry and egg causing steep fall in prices. The best option is to prevent such diseases through establishment of testing in analytical laboratory at important ports and facility for quick analysis, quarantine and deportation. While import of vaccines for H5N1 virus is banned, it is felt that the ban should continue, because we do not have the facility for check of isolation and testing of the vaccine. H5N1 is an unstable, mutating and very fragile virus and the entire issue of the need desirability and implications of vaccination should be thoroughly studied by a team of scientists.

Source: Dr. Anuradha J. Desai
j) In US and Europe, consumers prefer the breast and breast meat of chicken, as it is considered as “white meat” or lean meat. The legs, which are considered as dark meat, or red meat, have no demand there. Due to the strength of export subsidies chicken legs were exported by US to Philippines and Sri Lanka at ridiculously low prices, thereby ruining thousands of poultry farmers in those countries. If chicken legs or legs meat is imported into countries like Sri Lanka and Nepal which have Free Trade Area (FTA) with India and re-exported to India, after a token value addition – at zero duty under the FTA - that could cause enormous damage. Therefore, the extreme cautions and vigilance are necessary to ensure that prescribed value addition norms should be strictly adhered.

k) Our layers yield a Hen-Housed production of 320 eggs; and our broilers attain a bodyweight of 1.7 kg in 37/38 days with a feed conversion ratio of 1.7 – and that too, with a feed containing 2800/2900 kilo.cal energy, as compared to 3200 kilo.cal in USA/Europe. This superior productivity makes India one of the least cost producers of eggs and poultry in the world. Therefore, with a level playing field Indian can compete with any country, not only in the Indian market but even in International market.

3.5.12.0 Disease Control Issues

a) The spread of Veterinary dispensaries and the availability of medicines are grossly insufficient.

b) The cost of veterinary medicine is fairly high with very little production in the public sector to keep a check on the prices fixed by the private drug companies, particularly multi nationals.

c) A separate Veterinary Drug Controller should be appointed since the Drug Controllers are too busy with medicines meant for humans.

d) Poor infrastructure and communication facilities make prompt access to veterinary services difficult.

e) Emphasis should be placed on disease prevention rather than curative treatment. Vaccine development, production and complete protection of the animal population using all available vaccines are absolutely necessary. International
collaborations and linkages should also be developed for diseases that are of concern in other countries also and where expertise or facilities available within the country are inadequate. The ICAR should give the highest priority to developing new vaccines against diseases such as bluetongue and contagious caprine pleuro pneumonia. Once developed, the technology should be transferred immediately to a mix of public veterinary biological institutions and private entrepreneurs, so that the vaccines can become available to Livestock keepers straightaway. In recent times, this development path was followed most successfully by IVRI with the PPR vaccine and the vaccine became available within minimum time after its development. Teams of scientists from public institutions making such important achievements should be given appropriate incentives.

f) The State Governments’ Veterinary biological manufacturing units should be strengthened with adequate funding.

g) There should be quality control agency in place, monitoring the quality of all vaccines produced all over the country.

h) The State Governments should have a separate cadre for the disease diagnostic laboratories and vaccine-manufacturing units. Experts should always head these units.

i) Foot and Mouth Disease, which causes heavy economic losses to the farmers needs priority.

j) Government should provide total disease prevention and control cover area- wise, followed by a public notification so that private industries could set up processing units in such disease controlled areas and meet export requirements as well as benefit farmers of the local areas.

k) In view of the recent WTO regulations, sanitary and phytosanitary provision and risk analysis, it has now become important to achieve harmonization in the vaccine production for live stock and poultry. The Standardization Division at Indian Veterinary Research Institute, Izatnagar should be upgraded as National Veterinary Biological Product Quality Centre. Twelve-selected biological units of the country should develop their infrastructure, meeting GLP (Good Laboratory practice) requirements. All these units should have autonomy.
l) Animal Quarantine Certification Station (AQCS) needs upgradation in the country. The Animal Quarantine, Certification and Enforcement Authority should be created and necessary autonomy/authority to function as an independent body should be empowered with appropriate authority so that the movement of animals with risks of infection/disease could be adequately controlled through important airport, seaport, international land routes and movement within the States. Border posts at land routes on western and eastern international borders and small quarantine stations at seaports like Mumbai, Chennai, Kolkata and Goa can be created. In addition interstate check posts be strengthened and more created, if necessary.

m) Animal disease diagnosis and accreditation as per the international standards, development of an effective surveillance and monitoring system for animal diseases, animal quarantine, certification and enforcement are the function and duty of the Central Government. Keeping in view the importance of animal health control in the post-WTO era, these functions of the Department should get top priority.

n) The prevention and control strategies require promptness in action which can be achieved when the gap between the outbreak and its reporting to planners is reduced. To reduce the gap, there is a need to have a computer based national disease surveillance and monitoring system with intra and inter-district linkages so that proper control of disease could be achieved at a time and forecasting and appropriate measures could be taken to the remaining parts of the district, state and country.

o) Arrangements should be made for immediate transfer of information in the form of reports on WTO agreements, emerging diseases, disease surveillance, etc. so that country could be prepared for any change at short notice.

p) Strengthening of quarantine system with attention to Bio-safety and Bio-security is necessary: All five quarantine stations should be strengthened with diagnostic laboratory facilities for sampling and adequate provision for animal/poultry space, feeding, management, etc. made.

q) Establishment of a National Bio-security Resource Centre to enable government, commodity groups, veterinarians, and producers to meet the challenges of animal health emergencies.
r) Government should put an effective disease reporting and surveillance system and an Emergency Preparedness Plan to counteract outbreak of contagious diseases.

3.5.13.0 Input Issues

a) Most farmers cannot afford stall-feeding in view of high cost of feed supplied by private producers.

b) Area specific mineral mixtures based on locally available and affordable raw materials should be suggested by Agricultural Universities for production in the public/private sector.

c) There is insufficient production and supply chain facility from the public sector to keep the prices in check.

d) Due to shrinkage of common lands due to encroachment etc. and non-management of wasteland, as well as shortage of fast growing fodder tree species, our Livestock is grossly under-fed.

e) There is insufficient extension effort for popularisation and planting of nutritious tree species like Subabul for supply of proteins to the Livestock.

f) There is a shortage of fodder baling machines for efficient management of fodder, especially for transportation.

g) Likely future scenario of demand and supply position in relation to forages is given below. It reveals a huge deficit (prevailing and expected) in green fodder in the country. The available fodder can meet the demand of only 46.7 per cent of total Livestock.
Table 4: Supply and demand of green and dry fodder – projected estimated

<table>
<thead>
<tr>
<th>Year</th>
<th>Supply</th>
<th>Demand</th>
<th>Deficit as percent of Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Dry</td>
<td>Green</td>
</tr>
<tr>
<td>2005</td>
<td>389.9</td>
<td>443</td>
<td>1025</td>
</tr>
<tr>
<td>2010</td>
<td>395.2</td>
<td>451</td>
<td>1061</td>
</tr>
<tr>
<td>2015</td>
<td>400.6</td>
<td>466</td>
<td>1097</td>
</tr>
<tr>
<td>2020</td>
<td>405.9</td>
<td>473</td>
<td>1134</td>
</tr>
<tr>
<td>2025</td>
<td>411.3</td>
<td>488</td>
<td>1170</td>
</tr>
</tbody>
</table>

Source: Report of the Working Group on Animals Husbandry and Dairying for Tenth Five Year Plan

Projected balance between demand for and supply of green and dry fodder presents a challenge for fodder production in the coming years. While the deficits are anticipated to increase as a proportion of the requirements in both the cases, the situation appears grimmer in case of green fodder. Focused strategies and concerted efforts are the need of the hour to face up to this challenge.

Table 5: Availability, requirements and deficit of concentrates for Livestock

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Available</td>
<td>43.14</td>
<td>44.35</td>
<td>45.63</td>
<td>48.27</td>
</tr>
<tr>
<td>Required</td>
<td>120.52</td>
<td>123.59</td>
<td>127.09</td>
<td>130.55</td>
</tr>
<tr>
<td>Deficit (percent)</td>
<td>64.21</td>
<td>64.12</td>
<td>64.10</td>
<td>63.03</td>
</tr>
</tbody>
</table>

Source: Report of the Working Group on Animals Husbandry and Dairying for Tenth Five Year Plan

a) There is a need for Livestock Feed Corporation and fodder security including creation of feed and fodder banks at convenient location. The cultivated fodder production is limited to less than 4.5 per cent of the area under cultivation and it is estimated that dry matter availability is short of the requirement by 30 per cent and concentrate ingredients are also deficit to the tune of over 80 per cent.

b) There is need of extension effort for popularisation of quality enrichment of fodder through treatment with molasses etc.

c) Cost issues also often prevent quality enhancement of feed and fodder.
d) The poor quality and insufficiency of feed has led to insufficient tapping of the resources available in the form of improved varieties of animals.

e) Taxation on veterinary medicines and semen and other veterinary equipments should be abolished in order to benefit the farmers in the Livestock sector.

f) Subsidy in the Livestock sector is meagre. Against Rs. 300 crores of direct subsidies in the Livestock sector, agriculture gets Rs. 16,000 crores as direct subsidy from the Central Government alone.

g) Immediate and long-term loans in the Livestock sector amount to Rs.2,500 crores, which are around 5 per cent of the total credit of the agriculture sector.

h) Cash credit cards and micro credit are virtually unheard of in Livestock production and the scheme of Kisan credit card does not cover Livestock credit. Consequently, more than half of the farm level credit for Livestock production comes from moneylenders, affecting the viability of the Livestock sector for the farmers.

i) Livestock risk is a major issue for farmers considering that the Livestock sector contributes nearly 26 per cent of the agricultural GDP and Livestock distribution is more egalitarian than land. Livestock provides a much-needed diversification of farmers’ income as also a regular cash flow in contrast to seasonal inflow from crops and hence it is critical to ensure affordable, cost effective and efficient Livestock insurance.

j) Notwithstanding the problem of designing and integrated insurance product, in view of the multiplicity of animals in terms of types, breed, age group and quality etc., the work on providing affordable insurance policies, which would be easy to administer and operate and which would result in prompt verification of claims and their settlements, should be taken up with a greater sense of urgency. The Union Cabinet has recently approved a Livestock Insurance Scheme in 100 selected districts. The scheme has been formulated to insure 15 lakh animals with 50 per cent subsidy from the Central Government towards the premium. The scheme should be expanded and implemented actively to benefit farmers.

k) Thousands of tonnes of fodder grasses from common lands go waste every year in the rainy season. Therefore, research and development efforts must be made for better harvesting of fodder resources (especially pasture grasses) when it is
abundant in rainy season. Efforts should also be made for improvement in bailing and storage of this fodder for better utilization during lean season.

1) There is an urgent need to re-evaluate and re-orient the government’s current strategy for the delivery of veterinary services. Greater role for private veterinary service providers and out-sourcing of these services to a certain extent, while optimising the existing service delivery system and manpower for vastly enhanced coverage and sustainable delivery of services, should be the goal in future.

**BOX II**

Some feedback from farmers and other stakeholders on Livestock Service Delivery System (LSD) in Andhra Pradesh

1. Set up community driven Livestock service delivery system for first aid, vaccination, de-worming, AI, etc. outside the government. Also establish community driven LSD in tribal areas, initially paid for by the Government.
2. A large majority of farmers expressed willingness to pay for medicines and services.
3. Animal health & breeding services, even by Govt. staff, should be home delivered. Some also recommended free door delivery of Vet. Services by qualified Vets.
4. Encourage ‘Gopalmitra’ (Para-vet.) system for delivery of AI and minor Vet. Services (MVS). Gopalmitras should be selected from amongst Livestock farmers.
5. Organise regular Vet. Camps in all Mandalas to address breeding problems of bovines.
6. Promote preventive veterinary care on cost sharing between Govt. and farmers.
7. Provide regular subsidized vaccinations and de-worming for small ruminants and back yard poultry through skilled, village based Lady Animal Health Workers (LAHW).
8. Build capacity of shepherds to select, multiply & use improved Rams and Bucks.
9. Provide a package of assistance to encourage stall-feeding of small ruminants.
10. Encourage production and use of fodder, grasses and their seeds by farmers.
11. Provide special packages to improve subsistence livelihoods of tribal communities through training, capacity development, technology transfer and service support.
12. Assign high priority to provision of credit for Livestock production.
13. Promote women self help groups in tribal areas. Impart skill training to farmers to promote self-help and self-reliance.

* Under the project ‘Assessment and Reflections on LSD System in AP’ a collaborative project taken up with the Dept. of AH, GoAP (2003-05).

**3.5.14.0 Marketing**

a) There is a general shortage of appropriate and conveniently located marketing network and itinerant traders often exploit the farmers.
b) Due to poor infrastructure of roads and transport facilities the farmers are not tapping the best markets for prices, even though milk and poultry are exceptions where an efficient marketing network has sprung up in the cooperative and private sectors.

c) Retail marketing outlets in urban areas are still deficient in terms of space and hygienic location.

d) Domestic demands are constrained by religious issues e.g. Muslims do not consume pigs and the Hindus do not consume bovines, particularly cows.

e) Efficient and modern abattoirs, barring exceptions, often do not conform to hygienic and quality control regulations and insufficient attention is paid to the disposal of refuse.

f) Better machinery/containers need to be diversified for transportation of milk, particularly by women to save them from the traditional and tiring methods of carrying milk as head loads. Similarly better transportation vehicles should be designed to enable easier transportation of milk containers.

g) There is no well-organized marketing system for Livestock and meat in India. Since sheep are mostly raised by poor farmers, there is need to organize them into cooperative groups so as to operate organized selling. This should prevent exploitation by traders and help them to get appropriate share of consumer's price.

h) Bullocks would continue to be used in selected areas for haulage where buses/tractors are not available for transportation purposes.

i) In India food consumption basket is also diversified in favour of non-food grain items like milk, meat, egg and fish. The consumption of animal origin food is, however, small as per ICMR norms.

j) Ever increasing demand for Livestock products is the basis for future ‘Livestock Revolution’.

k) There is little meaning in enhancing milk productivity without providing marketing facilities. A good year of milk production would bring cheer to the dairy farmers of Gujarat (which has an effective marketing network under AMUL for milk collection), but not in States like Orissa, Bihar, Kerala and Karnataka because the
excess supply would lead to prices falling or the Milk Unions in these States suffering losses. NDDB could initiate a programme for creating a buffer stock for milk powder during the flush season.

i) The fine wool production in the country is around 4 million kg and the demand from the industry is around 35 to 40 million kg of fine wool, which is mainly imported from countries like Australia. Attempts are also made to utilize the short staple fine wool in cotton system and the trials undertaken are quite successful and they are inviting the attention of the industry.

m) There is a crucial need to effectively implement the relevant provisions of the MMPO to ensure food safety, quality and hygiene. A mechanism has to be evolved for accelerated growth of dairy industry in both public and private sector.

n) Pig rearing has largely remained with the weaker sections of the society, especially scavengers, both as a source of income and a choice of meat for consumption. Cost of inputs and returns were not a serious concern in this system. However, availability of quality pork for a variety of consumers is a scarce item. In the recent years, entrepreneurs have shown interest in pig production, processing and marketing activities as an organized enterprise. Pork products industry has to develop to meet the requirements of the three categories of consumers - traditional consumers, local area consumers (small scale pork processing units) and elite consumers, hotels, restaurants, etc. (Modern processing units on a factory scale). India could consider exporting pork products, as potential markets exist in Southeast Asian countries. Bacon factories have to be brought under private management for improving piggery prospects.

o) The development of live animals’ market information system is vital, as data is a key input to well-informed planning and decision-making. Thus, it is virtually a public good and the Government should actively support this activity. Appropriate scheme should be formulated to strengthen the market facilities and introduce a scientifically managed market for conducting marketing operations as well as collecting proper data on Livestock marketing. No such effort was made in the previous plans and hence need to be given priority.

p) Although the organized sector has shown fast growth in the last three decades, it still accounts for only 30-35 per cent of the total milk marketed in the
country. On the other hand, a far larger proportion of milk continues to be marketed by the unorganized sector – comprising innumerable vendors, small processors, merchants, manufacturers and retailers of indigenous milk products.

q) In the case of milk production, unlike grain production, there is no system of subsidized procurement by the Government. Therefore, any attempt to accelerate the growth rate should be linked with corresponding increase in demand. Measures are needed to increase the purchasing power of the rural and urban poor and also to exploit the market of Indian dairy products for both internal and external consumption.

r) There is a need to transform the national and global market pull into an engine for generating sectoral and national competitive advantage, that is, to create conditions which relentlessly propel – and enable – sectoral decision-makers to creatively utilize the opportunities offered by the new economic environment to establish competitive advantage not only at the firm level but also at industry and sector levels, making India a leading player in global Livestock product markets through sustained and all-round improvements in quality and efficiency.

3.5.15.0 Quality Control Issues

a) Control issues both for domestic consumption and export need substantial improvement.

b) Meat exporters have to adopt Hazardous Analysis Critical Control Point (HACCP) standards. This involves the adoption of quality standards from the stage of production to the stage of export, including processing en-route. This naturally requires substantial awareness generation among producers of the primary product, processors and exporters.

c) Modern abattoirs also have to adopt good manufacturing practices and monitoring of toxic residues, specially pesticides, heavy metals and antibiotics in meat.

d) Quality control of the frozen semen as well as day old chicks of poultry is necessary although this is not yet practiced adequately.
e) Quality control at affordable prices is of utmost importance and there is a need for efficient quality check for the feed being made available to the farmers.

f) Quality control also needs to be strengthened at the processing stage not only for meat but also for animal products like egg powder, cheese pork products etc.

g) Quality standards need to be revisited in consultation with processors and exporters in order to prepare standards, which are implementable, affordable and acceptable, both to domestic and foreign buyers.

h) Looking to the large consumption in the domestic market since 65 per cent of our population is non-vegetarian, difference of standards could be prescribed for domestic and export markets.

i) Revise and redraft the Milk and Milk Products Order for effective implementation of quality standards: carefully review the current apparatus of enforcing these standards in collaboration with the industry and restructure them, if necessary, for greater effectiveness and industry participation.

j) Above all, quality control of Livestock education has to be ensured in order to tap the advances in this sector globally.

### 3.5.16.0 Utilization of Waste

a) Livestock would also be an essential component of the mixed crop Livestock marketing system, particularly for organic farming. Livestock also is necessary for many innovative practices like bio-dynamic fertilisers etc.

b) Pigs continue to be used as natural scavengers and cow dung is the basic feedstock for the gobar gas plant, which would be increasingly needed in the country in view of the dwindling fuel resources in the rural areas.

### 3.5.17.0 Processing Issues

a) In spite of substantial advancements, Livestock offers scope for improvement in processing.

b) Quality of finished leather depends substantially on the efficiency and technology for treatment of the carcass. This, however, is a major constraint since
there is insufficient dissemination of technology and technique in the rural areas for treatment of carcass.

c) Most of the value addition takes place in the industrial sector, while there is a need for encouraging technology for **value addition at the farmer’s level** for enhancing his income.

d) There is a need for greater research for development of technology, processing and machines which could enable farmers to produce semi-processed/processed products for the market for supply to more sophisticated processing industries.

e) Policies are needed for greater integration of production and processing.

f) Policies are also needed for attracting more private sector investment for handling of animal products and setting up of processing units for domestic consumption and exports. This could be in the form of earmarked sub-zones within industrial areas or creation of exclusive Livestock industry processing zones with sufficient infrastructure for common facilities like washing, disposal of waste, cold storage etc.

g) Greater attention needs to be paid for processing milk for more diversified milk products/cheese.

h) Processing of meat from goats and other under-processed animals would be necessary.

i) There is a need to encourage sophisticated processing in speciality meats needed abroad.

j) In view of increasing demand in the urban areas for popular Indian meat dishes, in the wake of rising incomes, processing should increasingly focus on “ready-to-eat” meat and egg preparations featuring the various regional cuisines of India.

k) Wool processing from sheep to produce speciality woollens offers another promising area for processing. Similarly, pig, rabbit and camel skin products, if processed appropriately, can fetch higher earnings for processors and ultimately for the farmers.
1) The Angora rabbit production is popular in hilly areas of H.P., U.P., Eastern region and Tamil Nadu. One Angora rabbit can give net income of Rs. 150 to 200 per year. Such successful experiences should be widely adopted through creation of grass root institutions and public-private linkages.

m) Technological progress in the production, processing & distribution of Livestock products will be central to the positive outcome of the ‘Livestock Revolution’.

n) The poultry processing industry is still in a nascent stage of growth. Presently 97 per cent of the production is sold as live birds. Only 3 per cent is processed and sold as chilled/frozen. One of the obstacles in the way of growth of poultry processing industry is high incidence of duties and taxes – both on the processed products as well as on the equipment for processing e.g. the cumulative impact of Excise Duty Sales Tax, Surcharge on Sales Tax, Octroi and turn over Tax. If the processing industry has to expand, it would be necessary to reduce the burden of duties and taxes substantially, at least until such time as the market’s share of the processed products grows to a level of 25-30 per cent of the total volume of the production.

o) Although the organized sector has shown fast growth in the last three decades, it handles only about 30-35 per cent of the milk marketed and about 65-70 per cent of the market share is still in the hands of unorganized sector. This sector is characterized by innumerable vendors, small processors, merchants, manufacturers and retailers of indigenous milk products. So far, the Government efforts for dairy development are restricted to cooperative sector only. Time has come to bring about structural changes in the unorganised sector. In order to achieve this, the following programmes should be undertaken:

p) Processing at the village level: Since the production is primarily through small producers, it makes collection of milk twice daily cumbersome and uneconomical in remote areas. Primary processing and manufacture of milk products can be taken up at village level. This would, however, require development and standardization of technology.

q) Quality upgradation in small sector manufacture: The small manufacturer of indigenous products viz. Halwai should be assisted to upgrade his processing and
improve quality of the products through use of hygienic practices and improved equipment.

3.5.18.0 Contract Farming

a) Individual Livestock farmers are often exploited by middlemen in view of lack of bargaining and absence of economies of scales.

b) There is a good possibility for encouraging contract farming in the Livestock sector where individual farmers contract with large producers/processors for regular supply and pre-determined prices. Large processors can provide good quality frozen semen/feed/disease control and other veterinary services to farmers to ensure a win-win situation.

c) NDDB pattern has shown efficacy of this system for milk and this can be extended to the entire Livestock sector provided adequate incentives are given to the industry to encourage them to invest in this profitable but risky field.

d) Small farms, which were set up under various self-employment schemes were not so successful – mainly due to lack of technical and marketing support. This obstacle can be removed, if we encourage the concept of poultry estates – comprising of a central unit, or a “mother unit”, and a number of producers attached to it. The mother unit rears the birds up to point of lay; takes care of all the critical aspects like brooding, vaccination etc. It supplies feed and other inputs to the producers and also takes care of marketing and repayment of loans out of the sale proceeds. The producers will be required to handle only the simple operation of feeding and watering the birds and collection of eggs etc. Such poultry estates can be successfully operated by rural women – and can play a very important role in economic empowerment of women.
BOX III

Contract Farming

The Nestle India Limited – one of the largest and oldest firms in dairy business in India sources nearly 250 million kg milk annually through contract farming from over 85000 producers spread over more than 1500 villages in Punjab. With an assured market at their doorsteps the producers could save transaction costs to the extent of 90 per cent and reaped double the profits than the non-contract producers selling directly in the market. The price received by the contract producers was no less than the market price. Besides, they also received feed, medicines, fodder seed etc., and veterinary and agronomic services. Nearly 60 per cent of the producers had 5 or less dairy animals.

The case of contract farming in broiler production relates to Venkateshawara Hatcheries Limited in Andhra Pradesh. The firm shares nearly 80 per cent of the cost of production (chicks, feed and medicine) and provides veterinary services to the contract producers with buyback of entire production. The producers receive fixed remuneration on per bird basis for their contribution to production costs. The transaction costs to the producers are not much as the entire costs related to supply of chicks, feed and medicines is borne by the firm. The major benefits for the contract producers were assured returns, and transfer of production and market risks to the firm. On an average, contract producers received 13 per cent higher profits compared to non-contract producers. About one-third of the producers were small (<5000 birds).

Source: P.S. Birthal et.al, NCAP, New Delhi, 2005

3.5.19.0 Commercialisation

a) Slowly but surely, the farmers would have to move from mere subsistence rearing to more profitable but more risky and more costly production systems. This can be done when feed and management system help to augment the productivity in terms of quicker weight gain, better food efficiency, increased yields and reduced incidence of disease and mortality.

b) NGOs and research institutions / universities / State departments need to substantially enhance their efforts to provide training to young and educated farmers. They could be provided technology, financial incentives and handholdings through the initial years to act as role models.

c) Employment in Animal Husbandry sector was 9.8 million in major States (out of which 7.90 million were in rural areas) and 8.6 million in subsidiary States. Women constitute 71 per cent of the labour force in Livestock farming. In dairying, 75 million women are engaged as against 15 million men.
d) Diversification of a crop based rural economy into a crop-livestock mixed farming system must be encouraged for rapid economic development and generating equitable income and employment in the country.

e) It is estimated that more than 25,000 people in different parts of the country are directly dependent for their livelihood on layer farming. Similarly broiler farming provides direct sustenance to more than 1 lakh farmers. In addition, more than one million people are directly or indirectly dependent on poultry farming. Thus, it is estimated that the poultry sector is providing direct and indirect employment to about 1.6 million people in the country. It is also important to note that unlike other industries, the Poultry sector provides employment opportunities even to unskilled labourers and women. Employment generation in the Poultry sector can, therefore, be comparatively easily achieved through enhancement of demand for eggs and poultry meat. Considering the protein deficiencies in our country, lower cost of poultry compared to mutton and the health benefits of ‘white’ meat, this should not be difficult, in spite of the temporary scare created by Avian Flu.

f) As per the opinion of the World Bank experts, with an initial investment of Rs. 200 crores in Operation flood II, the net return/year to the rural economy has been Rs. 24,000 crores. No other major development programme all over the world has matched this input-output ratio.

### 3.5.20.0 Exports

a) India still accounts for miniscule part in the world trade in livestock products and there is a great scope for prosperity both for the farmers as well as for the processors and exporters if due attention is given to efficient monitoring and stringent quality control.

b) WTO has led to opportunities as well as threats in the Livestock sector. India with its large Livestock population and farmers need to increase the domestic demand as well as opportunities by streamlining the supply chain and attention to HACCP standards as well as Codex Alimentarius standards.

c) There is a great need for strengthening of the cold chain through encouragement to the construction of the cold storages and refrigerated vans for transportation of meat instead of live animals.
d) Dairy products accounted for the largest expenditure on export subsidies in the post-WTO period. In 1998, the US provided export subsidies on dairy and poultry meat with dairy reaching 90 per cent of the US volume limit. The level of subsidies offered by the US and the EU for SMP and Butter respectively account for 55-65 per cent of the domestic price of these commodities in India.

e) Indian tariffs for dairy products are low as compared to major countries. For SMP, the bound tariffs are 237 per cent in Canada and 176 per cent in Korea - as against the renegotiated 15 per cent on the first 10,000 MT and 60 per cent thereafter for India. For Butter the bound tariff works out to a phenomenal 648 per cent in Japan, 351 per cent in Canada, 113 per cent in the EU and 100 per cent in the US - as against 40 per cent in India. These computations are based on current international prices, exchange rates and other relevant assumptions. The tariff on butter/butter oil and cheese needs to be increased from 40 per cent to at least 75 per cent.

f) The infrastructure in handling of Livestock products also needs to be modernized at the ports in view of the highly perishable nature of the commodity. Such credit arrangements need to be worked out by the EXIM Bank in consultation with exporters to cater to the realities with international trade in this sector.

g) The extensive use of export subsidies (mainly, the EU and the US) in world trade in dairy, meat and poultry products depresses the world market prices and makes the products from all non-subsidizing exporting countries such as India uncompetitive. The size of export subsidies and the high proportion of world trade to which exports subsidies are applied both suggest that there is a need to strongly negotiate complete elimination of export subsidies in the upcoming WTO rounds.

h) Ministry of Commerce should collect the data on global trade, production and demand, global prices and subsidies provided and analyze them to project the future global market situation in respect of Livestock products.

i) There are many competitive advantages for India in dairy products trade such as higher quantum of production and lesser cost of production than any other countries. India enjoys competitive advantage over New Zealand, Australia and USA (Average cost of production-US dollars 0.32 per litre) of being able to produce milk at a lower cost (US dollars, 0.16 per litre).
j) India’s international trade in Livestock and Livestock products is mainly in live animals (17 per cent), meat and meat products (82 per cent), dairy products and eggs (1 per cent). At the global level, India’s exports and imports account for only 0.17 per cent of each. Meat and meat products have dominated the exports from Livestock.

(k) Domestic Market Intelligence should be collected and disseminated by the Department of Animal Husbandry, Dairying and Fisheries (DAHDF) on production, demand, import and export, future projections domestic prices and projections and concerns on Bio-diversity.

(l) The DAHDF should also coordinate with the Ministry of Commerce, DGCIS and other relevant organizations on important issues arising out of the International regulatory system (WTO/SPS) with reference to Livestock products like WTO provisions, analysis of Indian trade intelligence, non-tariff export barriers, global market intelligence, Indian trade intelligence, Import management, Export management, SPS notifications, SPS gaps and concerns, etc.

Government departments and other organizations are discharging most of the above-mentioned functions currently, but there is a lack of coordination and unified policy direction. An Advisory Committee on International Regulatory Matters (WTO/SPS) pertaining to Livestock Products could be set up to take an integrated, prompt and pro-active view.

3.5.21.0 Pastoral Community

a) Pastoralists are people who predominantly depend upon Livestock for livelihood and graze their animals on common property resources. They are often nomadic. These communities use indigenous knowledge in animal breeding; adopt seasonal and spatial grazing systems which are holistic, complementary to forest ecology and symbiotic with agro-eco system. They benefit farmers by supplying organic manure, plough bullocks or means of local transport of agriculture produce. Pastoral livestock is linked to the conservation of wild animal species. Survival of pastoralism is crucial for sustainable land use, conserving domestic biodiversity and providing means of producing food in dry lands without depleting ground water
resources. Livestock breed are linked to cultural diversity and there is a link between ethnic / social groups and specific breeds. For Livestock only in situ conservation achieves all conservation goals with ex situ conservation only as a back up. Unfortunately, in India, a major factor for reduction in animals of indigenous breeds is the closure of forest for declaration as a Sanctuary / National Park and harassment from Forest Department staff.

b) The livelihoods of pastoralists and smallholder farmers are threatened by the progressive loss of grazing land for their animals, limitations to mobility, inadequate or inappropriate government policies, and lack of animal health and other services. These developments are also causing the progressive loss of the Livestock breeds and species that provide rural livelihoods and life-style options. The problems of the pastoral community can be listed as under:

i. Grazing permits are denied in traditional grazing sites.

ii. Original pasture land/drinking water ponds are encroached or converted for other purposes.

iii. Common property resources or grazing lands are sometimes allotted to corporations, thereby leading to a shortage of vital grazing areas for sustainable Livestock production.

iv. Pastoralists are excluded from forestry programme like Joint Forest Management and Biodiversity Conservation.

v. Forests are closed completely for tree planting and rotational grazing system is not adhered to for providing alternative grazing sites in a participatory mode.

vi. Pastoralists are conservers of domestic animals biodiversity, contributing to ecology and economy. They should be integrated in forestry programme in a holistic manner, utilizing their traditional knowledge.

vii. The proposed Scheduled Tribes (Recognition of Forest Rights) Bill should provide restoration of traditional grazing / camping rights in forest areas to formalize their entitlements through issue of permanent grazing cards. A tree planting programme must be accompanied with alternative grazing land/drinking water provisions.
viii. In-depth documentation and characterization of indigenous Livestock breed should be carried out to recognize and protect the rights of local community.

ix. Common land assigned to Forest department and unutilised or encroached land should be retrieved and brought under the control of Gram Sabhas for pasture land development.

x. Camel milk should be included in Dairy Acts of States like Rajasthan in order to encourage demand and ensure a remunerative price for the pastoralists and farmers maintaining camels.

xi. An effective system of transfer of know-how directly to the camel-breeders should be put in place through extension of the activities of the National Research Centre on Camels.

xii. There should be a total ban on slaughter of fertile and healthy female camel.

xiii. Rajasthan’s camel population has shown a steep decline of 24 per cent since 1997 and many promising indigenous breeds are getting lost. There should be a National Policy on Camels in view of their socio-economic value and their contribution to the bio-diversity, particularly for the pastoralists and others in States like Rajasthan.

xiv. Mechanisms should be put in place to protect pastoralists from unscrupulous elements/officials when they migrate with their camel and sheep across States.

xv. Sheep, goat and camel should be included in the Famine Code.

3.5.22.0 Miscellaneous

a) Land should be provided to every below-poverty line family but holding some land, for purchasing a basic unit of cows/buffalo/poultry etc.

b) The conjunctive use of Livestock, therefore, should be studied at greater detail to ensure that they are not only treated as raw-material for industries consuming milk for their requirement of milk and meat but are also developed for meeting these requirements of rural areas.
c) The productivity of our milk cattle is very low (1.5 lit animal/day). Artificial insemination facilities have not reached the doorstep of farmers. Animal health coverage should be given greater priority in State budgets.

d) The AH extension has been not given its due in previous Plans. There is great scope of AH extension to contribute towards poverty alleviation and self-employment scheme being implemented in the country.

e) Technology supported and demand driven Livestock revolution will be the future engine for growth that could ensure nutritional security, livelihood of rural poor and women empowerment.

f) Sustainable and financially viable Livestock and poultry farming, which will generate wealth and self-employment through entrepreneurship, is the need of the day.

g) External markets are an extremely important source of demand and these should be tapped much more aggressively.

h) Public sector lending in Livestock sector is very low leading to poor capital formation.

i) There is a need for consolidation and convergence of all animal husbandry related activities and schemes operated by different ministries.

j) Animal husbandry services need to be delivered at farmers’ door and linked with cost recovery for economic viability.

k) DAHDF should play the role of a regulatory authority, particularly for quality control, more actively.

l) Commission on Agricultural Costs and Prices (CACP) could be asked to undertake estimation of cost of production of various Livestock products also and suggest reasonable prices.

m) Livestock extension is primarily based on providing services and goods; it needs to be treated differently from crop related extension activities.

n) An integrated approach is necessary for regeneration of the grazing lands.
o) To promote animal care and well being, veterinary institutions like universities, colleges, hospitals, dispensaries and NGOs working on Livestock care system need to be strengthened.

p) The delivery and input cost of all the services need to be recovered, from the resource rich farmers on commercial basis in order to be sustainable.

q) NDDB should focus on the dairy development activities all over the country, both in organized and unorganized dairy sectors.

r) In the short run, in zones with high incidence of poverty and low resource endowments, emphasis should be on research strategies that are less capital intensive, have higher probability of success that are well accepted by the clientele and yield a good rate of return. Animal nutrition and health fall in this category.

s) In the long run, genetic research would be a key factor in growth and development of the Livestock sector. Development should focus on upgrading the native breeds of cattle and buffalo since the poor keep them for various functions.

t) The Policy needs to focus on improving the basic conditions through improved management of land and water resources in the drought prone regions. This would imply a shift from techno-managerial approach towards dairy development to a more holistic approach, which simultaneously helps regeneration of land and water resources and at the same time improves the share of the poor in the Livestock sector, especially in the drought prone regions where it is needed the most. At present, the dairy sector has moved into the areas where the basic conditions with respect to land, water and other agronomic features are relatively more favourable. The next stage, however, will have to be significantly different where regeneration of land and water should become an integral part of the dairy development.

u) The dairy development programmes, therefore, need to take the imitative for pasture development and thereby strengthen the backward linkages covering a larger number of households and area.

v) In this respect the dairy development agencies might be in a better position to shoulder the responsibility of developing pastureland. It could offer direct incentives in terms of increased returns from such activities. The watershed programmes devoid of these linkages might find it difficult to involve people in
development of CPRs. The need, therefore, is to co-ordinate the activities whereby the dairy development agencies may take the major lead towards regeneration of the community pastures and water resources. This is essential if the benefits are to reach the poor in drought prone regions.

w) Regulated grazing requires community effort. The present laws and people do not feel concerned about the conditions of CPR’s. Therefore, transfer of ownership or some mechanisms to make people feel concerned about village resources can be a point for action. Though presently they have grazing rights in forest and grazing lands but they are using these in negative ways leading to collapse of traditional systems of management.

x) It has to be recognized that in the general field of agriculture 70 per cent of the farmers are small and marginal farmers, and they have access to a total of 30 per cent of the land in this country. Of these, 67 per cent own Livestock and the general pattern is that these Livestock units are very small and financially non-viable. These people are also poorest of the poor. Bulk of them live below the poverty line without any access to normal channels of credit and are unable to take advantage of government’s benevolence through its various schemes. Despite the efforts of the government during last five decades, these poor are in continuous penury, as they did not get a chance for making some marginal improvement in their lives. They remain poor because they have no access to the presently available technologies nor to the credit regimes; consequently they cannot increase their assets. What they market is perishable and, therefore, the middlemen and traders exploit them by offering low prices, which are invariably below the cost of production. Traders fix farm gate prices and these are quite often below the production cost.

y) There is urgent need for Livestock owners to be provided with relevant literature in Hindi and local language regarding the common diseases of Livestock, their diagnosis and control procedures.

3.5.23.0 Specific Issues for North-Eastern States

a) Quality pigs are not available for breed improvement and pork has to be imported from other States. This problem can be tackled through establishment of nucleus pig breeding farms in each State with exotic Hampshire pigs and indigenous
strains. Similarly, one nucleus farm in each district headquarter should be established for produce of pig with 75 per cent exotic inheritance. Further, a breeding unit should be established at the block level with capacity to produce improved pigs for distribution to farmers at village level at the rate of 5-6 pig per farm family. Briefly, a graded pig programme should be taken up for breed improvement over time.

b) Due to logistic problems government machinery is unable to provide effective and timely delivery of services like feed, vaccination, artificial insemination etc. while NGOs / SHGs/ Cooperatives should be increasingly involved in this task. Research findings on use of locally available feed for location specific pig rations need to be disseminated. Sweet potato based pig feed should be encouraged because of its local availability. Similarly processing units should be established for utilizing groundnuts cake for pig feed. SHGs/Cooperatives/unemployed youth need to be trained in delivering artificial insemination services to pig growers.

c) A Regional Research Laboratory for animal diseases diagnosis using conventional and molecular techniques needs to be established. SHGs/Cooperatives should be trained for vaccination to supplement the efforts of the Government.

d) In view of popularity of the pork and its value added produce in the region, one modern abattoir should be set up in each capital city with processing facilities. Existing butchers with traditional skills should be employed in these abattoirs, after skill upgradation through training. Facilities for processing of non-edible offals from these abattoirs should be provided to optimise utilization of resources.

e) Poultry also presents great scope for exploitation and income generation. A Nucleus Breeding unit with grandparent lines needs to be established in each State. Backyard poultry should be encouraged through promotion of varieties like Vanaraja, Giriraja, Gramapriya etc with collaboration of various stakeholders.

f) In respect of Piggeries, existing integrated progeny development scheme should be carefully assessed to identify regions for poor utilization in spite of the vast potential for progeny in the North East. Apparently, farmers are unwilling to relocate to areas with poor availability of water and electricity, mainly to Farmers’ piggery villages. Further, piggery villages would not succeed without active base farms. Lastly, the programme has concentrated on passage of subsidy without adopting a holistic approach involving backward and forward linkages, specially marketing.
The programme is also constrained with low level of entrepreneurship due to the limited risk taking capacity of the farmers, inadequacy of parent stock, poor infrastructure at farm level for rearing pigs, poor outreach of veterinary services, low value addition and processing facilities etc. The scheme should be restructured, with focus on the poorer section of the society who is deficient in financial resources, scientific knowledge and efficient rearing practices. Instead of piggery villages, it may be desirable to adopt cluster approach at village level for pig production, covering all aspects of supply, fattening and marketing. It would be desirable to develop successful models of crop-dependent piggery development and in their popularisation through demonstration by KVKs. Participatory research and development on piggery practices and management with focus on the felt technological needs of the pig farmers should be ensured. Differential implementation strategy should be planned for upland and higher uplands. A simple preventive disease control programme should be implemented through village youth, especially for control of diarrhoea, in weaning pigs and parasitic diseases.

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CHAPTER 3.6

GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

AGROFORESTRY: INTEGRATING THE NEEDS OF TODAY AND TOMORROW

3.6.1.0 Definition and Concept of Agroforestry

3.6.1.1 “Agroforestry is a sustainable management system for land that increases overall production, combines agricultural crops, tree crops and forest plants and/or animals simultaneously or sequentially and applies management practices that are compatible with the cultural patterns of local population” (Bane et al., 1977).

3.6.1.2 Agroforestry, the word coined about three decades ago, is now seen as a science-based pathway to achieve natural resource management and poverty alleviation addressing several of the Millennium Development Goals. It has emerged as an efficient multi-functional land use and management system that optimises land productivity on a sustainable basis by involving positive interactions between its components in time and space where woody perennial, trees or shrubs, are grown with arable crops. In operational terms, it satisfies three basic conditions: (1) there exist at least two plant species that interact biologically, (2) at least one of the plant species is a woody perennial and (3) at least one of the plant species is managed for forage, annual or perennial crop production.

3.6.1.3 The escalating worldwide interest in tree planting activities during the past three decades (1970 onwards) resulted in the emergence and popularization of several terms ending with word ‘forestry’ viz., Community forestry, Farm forestry, and Social forestry. In all these one thing is common i.e., people’s participation in tree planting activities – not necessarily with agricultural crops or animals as is in Agroforestry. The social forestry is considered to be the practice of using trees or tree
planting specifically to pursue social objectives, to help the poor people to improve their living conditions and meeting their routine requirements of fuelwood and fodder. The purpose of all these forestries is growing trees and using them to provide fuel, medicine, minor timber and fodder. The major distinction between Agroforestry and the above other terms is that Agroforestry emphasizes the interactive association between woody perennials and agricultural crops and animals for multiple products and services, whereas the other terms simply refer to planting the woodlots.

3.6.1.4 The Agroforestry System is capable of yielding timber, fuelwood, biofuels, food, fodder, feed, and medicinal and industrial non-timber products, and conserve and rehabilitate ecosystems. However, in recent times it is often equated with the timber production on the farm, particularly in northern India. It is estimated that about half of the country’s timber requirement is produced through the Agroforestry systems. There is a need to recognize that Agroforestry in India has numerous forms and combinations – ranging from timber based systems in the north to Kerala home gardens, Khejari systems in semi arid/ arid regions of Rajasthan, and so on.

3.6.2.0 Need and Scope of Agroforestry

3.6.2.1 Relationship of man with trees and the land use systems is as ancient as the very evolution of human civilization and use and domestication of plants. Tree-based farming systems integrating trees into agriculturally productive landscape - a practice known as Agroforestry, is an age old practice. In India, Agroforestry has been a way of life for over 5000 years. Shifting cultivation in India is prehistoric and partly a response to agro-ecological conditions in the region. Horticulture as co-existent with agriculture is found to have been prevalent in India from early historic period (500 B.C. to 1st century A.D.). References occur in different texts of the Vedic literature. The cultivation of date palm, banana, pomegranate, coconut, jujube, aonla, bael, lemon and many varieties of other fruits and requirement of livestock in agriculture and mixed economy of agriculture and cattle breeding may be traced in proto-history chalcolithic periods of civilization. The role of many common trees such as Khefri or sami (Prosopis cineraria), aswattha (Ficus religiosa), palasa
(Butea monosperma) and varana (Crataeva roxburghii) in Indian folk life has been mentioned in ancient literature of Rig Veda, Atharva Veda, and other Indian scriptures. Traditional Agroforestry systems manifest the rural people's knowledge and methods to benefit from complementary uses of annuals and woody perennials on a sustained basis. It also indicates that the farmers have a closer association with trees than any other social group and promoters of forests.

3.6.2.2 The farmers and land owners in different parts of the country integrate a variety of woody perennials in their crop and livestock production systems depending upon the agro-climatic conditions and local needs. Most of these practices are however, very location specific and information on these are mostly anecdotal. Therefore, their benefits have remained vastly under-exploited and unextrapolated to other potential sites. It has now been well recognized that Agroforestry can address some of the major land-use problems of rainfed and irrigated farming systems in India and that a great deal can be accomplished by improving the indigenous systems. With the current interest in Agroforestry worldwide, attempts are being made in India to advance the Agroforestry techniques using indigenous and exotic multipurpose and nitrogen-fixing woody perennials.

3.6.2.3 One of the important criteria that should guide the Agroforestry efforts in India is the “high-value low volume system concept.” The other criteria should be that the post harvest, value addition, packaging and marketing are made as an integral part of the system as a whole; a broadened approach from just production, as has been in the past. Another important consideration is the recognition of the fact that Agroforestry systems also provide environmental services (which are often overlooked) in addition to the economic gains and other contributions. It is worth mentioning here that Agroforestry systems are probably the only means for getting the desired tree cover in the country, especially in States that have low forest area.

3.6.2.4 Currently, of the nearly 300 million ha arable land in the country, including about 68 million ha under forests, a little over 25 million ha are under tree plantations (Table 1). Of this, 1.24 million ha are under farm forestry/Agroforestry. However, as
projected by the Planning Commission (2001) under the Greening India programme, additional 28 million ha can be brought under Agroforestry in a 10-year period, increasing the total Agroforestry area to over 50 million ha.

Table 1. Area under Tree Plantations in India

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Plantation type</th>
<th>Area (million ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agroforestry and Social forestry</td>
<td>23.00</td>
</tr>
<tr>
<td>2</td>
<td>Externally aided Social Forestry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Farm Forestry/Agroforestry</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>b) Village woodlots</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>c) Strip plantations</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>d) Rehabilitation of degraded forests</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total</strong></td>
<td><strong>2.06</strong></td>
</tr>
<tr>
<td>3</td>
<td>By NGOs/VAs</td>
<td>0.04</td>
</tr>
<tr>
<td>4</td>
<td>Tree growers co-operatives</td>
<td>0.04</td>
</tr>
<tr>
<td>5</td>
<td>Conservative forestry</td>
<td>0.19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25.32</strong></td>
</tr>
</tbody>
</table>

Agroforestry for Food, Fuel and Fodder Needs

3.6.2.5 It is important to note that there will be a further significant decline in crop land per head by the middle of this century due to population increase. There being no scope for increasing the area under cultivation, additional food production must accrue through increased productivity or from land not conventionally considered arable. A management system, therefore, needs to be devised that is capable of producing food from marginal agricultural land and is also capable of maintaining and improving the quality of producing environment.

3.6.2.6 Fuel wood is one of the established sources to meet energy requirement. At present we are utilizing 60-80 million tonnes of dry cowdung, equivalent to 300-400 million tonnes of freshly collected manure. The Agroforestry has both productive and
protective potential, and it can play an important role in enhancing the productivity of our lands to help meet the demand of ever-growing human and livestock population.

3.6.2.7  **Food**

1. Enhanced sustainability of cropping systems through soil and water conservation by arrangements of trees to control run-off and erosion.
2. Enhanced food and feed production from crops associated with trees through nitrogen fixation, better access to soil nutrients brought to the surface from deep tree roots, improved availability of nutrients due to high cation exchange capacity of the soil and its organic matter and mycorrhizal associations.
3. Food for man from trees in the form of fruits, nuts, cereal substitutes etc.
4. Feed for livestock from trees.
5. Micro-climate improvement due to trees, particularly shelter-belts and wind-breaks in arid and coastal areas.

3.6.2.8  **Water**

1. Improvement of soil-moisture retention in rainfed croplands and pastures through improved soil structure and micro-climate effect of trees.
2. Regulation of stream flow, reducing flood hazards and a more even supply of water through reduction of run-off and improvement of interception and storage in infiltration galleries.
3. Improvement in drainage from waterlogged or saline soils by trees with high water requirements.
4. Bioremediation of water by sequestration of heavy metals and other toxic wastes by trees.

3.6.2.9  **Energy**

1. Fuel-wood for direct combustion.
2. Pulp wood for paper industry.
3. Pyrolytic conversion products such as charcoal, oil and gas.
4. Ethanol produced from fermentation of high-carbohydrate fruits.
5. Oils, latex and other combustible saps and resins.
6. Waste wood for wood based power plants to generate electricity in a decentralized manner.

3.6.2.10 Shelter

1. Building materials for shelter construction.
2. Shade trees for people, livestock and shade-loving crops.
3. Wind-breaks and shelter-belts for protection of settlements, crop lands, pastures and roadways.

3.6.2.11 Raw Material for Industries

1. Raw material for pulp and paper industry.
2. Tannins, essential oils and medicinal ingredients.
3. Wood for agricultural implements and various crafts.
4. Fibre for weaving.

3.6.2.12 Cash

1. Direct cash benefits from sale of tree products.
2. Indirect cash benefits from increased productivity.

3.6.3.0 Types of Agroforestry Systems and Steps for Developing Agroforestry Technology

3.6.3.1 Agroforestry systems have been classified on the basis of structure, function and socio-economic aspects. The structure of the Agroforestry system can be defined in terms of its components and the expected role or function of each. In this system the type of components and their arrangement are important.

Nature of Components

3.6.3.2 On the basis of nature of components following common Agroforestry systems / practices are prevailing in different agro-ecological regions of India:
1. Agri-silviculture (trees + crops)
2. Boundary plantation (trees on boundary + crops)
3. Block plantation (block of trees + block of crops)
4. Energy plantation (trees + crops during initial years)
5. Alley cropping (hedges + crops)
6. Agri-horticulture (fruit trees + crops)
7. Agri-silvi-horticulture (trees + fruit trees + crops)
8. Agri-silvipasture (trees + crops + pasture or animals)
9. Silvi-olericulture (trees + vegetables)
10. Horti-pasture (fruit trees + pasture or animals)
11. Horti-olericulture (fruit trees + vegetables)
12. Silvi-pasture (trees + pasture/animals)
13. Forage forestry (forage trees + pasture)
14. Shelter-belts (trees + crops)
15. Wind-breaks (trees + crops)
16. Live fence (shrubs and under-trees on boundary)
17. Silvi or Horti-sericulture (trees or fruit trees + sericulture)
18. Horti-apiculture (fruit trees + honeybee)
19. Aqua-forestry (trees + fishes)
20. Homestead (multiple combination of trees, fruit trees, vegetable etc).

Besides these common Agroforestry systems, there are many more component combinations followed in different agroecological regions of India.

**Arrangement of Components**

3.6.3.3 The arrangement of components gives first priority to the plants. Even in Agroforestry system involving animals, their management according to a definite plan, e.g. a rotational grazing scheme, gives precedence to the plants over animals. Such plants arrangements in multi-species combinations involves the dimension of space and time.
Functional Classification of Agroforestry Systems

3.6.3.4 Two fundamental attributes of all Agroforestry systems are productivity and sustainability.

1. **Productive Functions:** The various productive functions (producing one or more products) of Agroforestry systems are food, fodder, fuel-wood and other woods, besides other products.

2. **Protective Functions:** The protective functions (protecting and maintaining production systems) of Agroforestry systems are wind-break, shelter-belt, soil conservation, moisture conservation, soil improvement and shade (for crops, animals and man) and nutrient cycling.

Socioeconomic Classification of Agroforestry Systems

3.6.3.5 Based on such socio-economic criteria as scale of production and level of technology input and management, Agroforestry systems are grouped into three categories.

1. **Commercial System:** The term commercial is used whenever the scale of the production of the output (usually a single commodity) is the major aim of the system: the scale of operations is often moderate to large and ownership may be government, corporate or private; labour is normally paid or otherwise contracted. Examples include commercial production of agricultural plantation crops, other crops or pasture animals; with permanent under planting of food crops, or pasture/animals; commercial production of shade-tolerating plantation crops such as coffee, tea and cocoa under overstorey shade trees; rotational timber or food crops system in which a short phase of food-crop production is used as a silvi-cultural method to ensure establishment of timber species (various forms of *taungya*); commercial grazing and ranching under large-scale timber and pulp plantations etc.

2. **Intermediate Agroforestry System:** Intermediate Agroforestry systems are those between commercial and subsistence scales of production and management, production of perennial cash crops undertaken on medium to small scale, wherein
the cash crops cater for cash needs, and the landowner or those with long-term tenancy rights to land, reside and work themselves on the land, supplemented by paid temporary labour. Various Agroforestry systems in many parts of the world can be considered intermediate systems, especially those based on plantation crops such as coffee, cocoa, numerous fruit trees and short-rotation timber species.

3. **Subsistence Agroforestry System:** Subsistence Agroforestry systems are those wherein the use of land is directed towards satisfying the basic needs, and are managed mostly by the owner or occupant and his family. Cash crops including sale of surplus production of commodities, and all forms of traditional shifting cultivation are the most widespread examples.

3.6.3.6 The words ‘systems’ and ‘practices’ are often used synonymously in Agroforestry literature. However, an Agroforestry system is a specific local example of a practice, characterized by environment, plant species and their arrangement, and socioeconomic functioning. An Agroforestry practice denotes a distinctive arrangement of components in space and time. The most common Agroforestry practices that constitute the diverse Agroforestry systems throughout the tropics along with their main characteristics are listed in **Annexure I**. The essential characteristics of the different regions in India and the major Agroforestry emphasis in each are summarized in **Annexure II**. The major types of Agroforestry systems found in different agro-ecological zones along with the nature of their main benefits and role have been summarized in **Annexure III**.

**Suitable areas for Agroforestry**

3.6.3.7 The following type of land can be assigned for Agroforestry:

- Cultivable land
- Field boundaries
- Along with farm roads and *nallah* sides affected by erosion.
- Pockets within cultivated holding where cultivation is not possible
- Old fallows
• Cultivable waste
• Other areas like community or panchayat land etc. in which Agroforestry can be incorporated.

Suitable Tree Species for Agroforestry

3.6.3.8 The following considerations should be kept in view while selecting the species.
• Suitability for growing under the prevalent agro-climatic conditions.
• Utility of trees for meeting the needs of farmers for timber, fodder, fuel, fruit and fibre etc.
• Preference may be given to indigenous and fast-growing species, and leguminous and other nitrogen-fixing species. Species that provide raw material for cottage industries should be encouraged.

Type of Tree Species

3.6.3.9 Though the primary concern is to keep up the production level of the arable crops, the following criteria are worth considering for planting trees under the Agroforestry system:
• Non interference with arable crops;
• Easy establishment;
• Fast growth and short gestation period;
• Non-allelopathic effects on arable crops;
• Ability to fix atmospheric nitrogen;
• Easy decomposition of litter;
• Ability to withstand lopping;
• Multiple use and high return; and
• Ability to generate employment.

3.6.3.10 It is extremely difficult to select species having the ability to fulfill all these criteria. Therefore the researcher and extension workers can allot some points for each criterion, in consultation with the farmers who are directly taking part in
adopting Agroforestry on their fields and select the species that score the most points. It is truly a participatory and decentralised decision-making process.

3.6.3.11 **Tree Species based on Specific Utilization Purpose**

1. **Fodder-cum-fuelwood Species**: Albizia amara, Albizia procera, Albizia lebbeck, Erythrina indica, Gliricidia sepium, Hardwickia binata, Leucaena leucocephala, Pithecellobium dulce, Prosopis cineraria, Sesbania grandiflora, Sesbania sesban.

2. **Fuel-wood and Timber Species**: Acacia nilotica var. cupressiformis, Acacia nilotica, Albizia lebbeck, Albizia procera, Azadirachta indica, Cassia siamea, Casuarina equisetifolia, Dalbergia sissoo, Dendrocalamus strictus, Pongamia pinnata, Melia azaderach, Parkinsonia aculeate, Thespesia populnea.

3. **Softwood and Pulpwood Species**: Ailanthus excelsa, Ailanthus tryphysa, Bombax ceiba, Paraserianthes falcatoria, Populus deltoids, Bamboo species

4. **Fruit and Vegetable Species**: Annona reticulata, Annona squamosa, Artocarpus heterophyllus, Emblica officinalis, Moringa oleifera, Zizyphus mauritiana.

**Priority for Selection of Species**

3.6.3.12 After the screening of the species to suit the agro-climatic conditions, the next aspect is profitability. Ideally, the production of agricultural crops should not be affected. But in reality, farmers want to earn higher total returns. Uncertainties about the marketing of wood can be greatly reduced by establishing a suitable marketing network to handle the Agroforestry produce. Varying agroclimatic regions (15) require different types of trees to suit them. The species priority of MPTS based on research experience has been worked out. Names of five MPTS based on priority for each region are presented in **Annexure IV**. One may find that the species of *Eucalyptus* sp., *Acacia nilotica*, *Casuarina equisetifolia*, *Dalbergia sissoo*, *Gmelina arborea*, *Populus deltoides*, *Leucaena leucocephala* are prominently common in
many regions. Emphasis on research on these species in these regions is required. However, considering the country’s needs of industry and domestic sectors six species were considered by the Task-Force on Agroforestry for according top priority in research and development of Agroforestry in the country. These species are *Acacia nilotica*, Bamboo, *Casuarina equisetifolia*, *Populus deltoides*, *Eucalyptus* sp. and *Prosopis ceneraria*. Thus, system and species priorities are indicated to emphasize the future direction of research on Agroforestry in the country. The choice of MPTs for different rainfall patterns and rotation cycles are presented in Annexures V and VI, respectively. The priority ratings for different Agroforestry systems are also given to focus on those modes for optimizing the resources (Annexure VII), and described later in Section 3.6.5.0.

**Steps for Developing Agroforestry Technology**

3.6.3.13 The following questions (check list) should be kept in mind for establishing appropriate Agroforestry system:

1) For what sites is it appropriate?
   i. What kinds of soil, rainfall, slope?
   ii. For what size and type of farm, in what landscape niche?

2) For what functions is it intended?
   i. What can farmers use it for?
   ii. What are the trade-offs between functions?

3) Which species or varieties are recommended?
   i. Which multipurpose trees and shrubs? Which varieties?
   ii. Which associated crops or livestock species can be used?

4) Which arrangements are recommended?
   i. How many of each component, in what configuration and spacing?
   ii. What kind of tree or crop rotations can be used over time?

5) What management practices are recommended?
   i. How and when should trees be established?
   ii. How and when should trees be trained, pruned, pollarded etc.?
   iii. How should associated crops be managed?
iv. How and when should different tree products be harvested?
v. How and when should tree products be removed or replaced?

6) What technology performance can be expected?
   i. What yield of tree products can be expected and when?
   ii. What yield of associated crops can be expected?
   iii. What service functions will be performed (e.g. erosion control)?
   iv. What economic returns can be expected? How do risks change?

7) What inputs are required?
   i. How much planting material, labour, cash and land are needed?
   ii. What management skills are needed?
   iii. What infrastructure is needed for inputs, training or marketing?

3.6.4.0 Agroforestry Applications

Farming System

3.6.4.1 Agroforestry is a way of natural resource management towards sustained livelihood security. Hence, the resource management issues must be influenced by other available production systems. A major shift might be expected in agricultural production through diversification. These shifts in production system will get further boost because of integration of world markets, urbanization and rising personal incomes. Further, to design appropriate farming systems suited to diverse farming situations, farmers’ participation beginning from planning till execution of research and development programmes will be inevitable and they would actually participate in research and extension efforts as foremost partners. In rainfed arid ecosystems, integration of livestock and horticultural crops with annual crops, especially their organic production, is expected to emerge as a major Agroforestry system.

3.6.4.2 Multipurpose Trees are more or less integral part of Agroforestry farming systems. These have been defined as trees and shrubs which are deliberately grown or kept and managed for preferably more than one intended use, usually economically and/ or services in any multipurpose land use system, especially Agroforestry systems. Multipurpose trees provide various uses such as food, fodder, timber,
fuelwood, medicines, resins, gums, etc. Besides, these also provide some indirect benefits such as biological nitrogen fixation, Vascular Arbuscular Mycorrhizal symbiosis, reduction in soil erosion, increase in water percolation etc. in the form of environment improvement. India is characterized by having wide range of rainfall patterns. As mentioned earlier, suitable multipurpose tree species according to rainfall distribution are given in Annexure V and classification of multipurpose trees based on rotation cycle is given in Annexure VI.

3.6.4.3 Feeds providing energy, protein, fat, carbohydrate, vitamins and minerals to animals, derived from grasses, tree foliage, straw, tuber etc. grown in Agroforestry systems are fundamental to livelihood security in arid zones. Besides tree fodder, some other Agroforestry products are also used as components of feed formulations and many of these are not yet properly evaluated for their potential to become a part of regular diet of animals/poultry birds. It has been estimated that fallen leaves, flowers, fruits, seeds, etc. available in various Agroforestry systems can make up to more than 50% of the complete feed for ruminants and about 10% of the feed of non-ruminants. Tree fodders are able to provide the fodder in terms of the amount and the nutrients, but the presence of antinutritional factors in many of them makes them unfit for sole use. There is a need to utilize tree fodder/feed optimally and in combination with other commonly used fodder/feed. Systematic research is needed to reduce the antinutritional factors to manageable levels. Extension agencies and animal feed suppliers should be aware of the use of the balanced animal feed and inform the farmers accordingly. Each KVK should have trained staff in animal nutrition and production and impart necessary trainings to the farmers and other stakeholders.

Resource Conservation

3.6.4.4 Water is a critical element for reclamation of degraded lands for sustainable biomass production, ultimately leading to a better quality of life and enabling conditions. Watershed management is an approach for area planning of natural resources, especially land, water and plants, to meet socio-economic needs of human society. Emphasis should be on micro-watershed management plan integrating
protection of the resource base and creation of assets, improvement of productive systems, generation of employment opportunities and ensuring higher income on a recurring basis. Degraded lands because of many limitations can only be improved through Agroforestry, which control erosion, reduce run-off, improve in-situ soil-moisture conservation, increase water-table but also improve productivity as well as profitability. Researches involving Agroforestry are required on many areas like watershed hydrology, control of sedimentation, situation-specific cost-effective technologies, production of fodder, forages, industrial grasses and medicinal plants for quick-return and livestock improved production for harnessing maximum benefits from limited biomass.

3.6.4.5 The power of trees in bringing changes can be illustrated by one simple study. Between 1991-92 and 1997-98, canal side plantations in Jaisalmer (Rajasthan) were undertaken on a total of 401 sites covering an area of 9,271 ha. These plantations have brought significant reduction in blown sand deposition in canal (Table 2). Consequently, the cost of desiltation was greatly reduced. For instance, for the Sagarmal Gopa Sakha, the net saving on desiltation had increased from Rs. 12,886/ km in 1997 to Rs, 19,755 in 1999.

Table 2. Reduction in Blown Sand Deposition in Canal (m3 Km⁻¹) after Canal Side Plantation

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sagarmal Gopa Sakha</td>
<td>4125</td>
<td>2877</td>
<td>2079</td>
<td>1269</td>
</tr>
<tr>
<td>Mandau Distributary</td>
<td>2296</td>
<td>777</td>
<td>373</td>
<td>718</td>
</tr>
<tr>
<td>Sankla Minor</td>
<td>1949</td>
<td>1165</td>
<td>1009</td>
<td>388</td>
</tr>
<tr>
<td>Tibrewala Minor</td>
<td>1875</td>
<td>563</td>
<td>1250</td>
<td>1250</td>
</tr>
</tbody>
</table>

Carbon Sequestration

3.6.4.6 The Inter-Governmental Panel on Climate Change (IPCC) has been asserting that the earth’s climate is changing and that its impact will be great on developing countries. To meet this global challenge of climate change, many
countries and institutions have been working with a focus on analyzing the impacts, prospects for adaptation and opportunities for mitigation. India is a signatory to the Kyoto Protocol (1997), which asserts that the country will play an important role in mitigating the effects of global warming. Use of Agroforestry systems, as a mitigation strategy, is a key through a major opportunity for carbon sequestration. Concerted efforts are required to identify practical cost effective means through changes in land-use practices using Agroforestry as an option. India must be able to clearly demonstrate that, with the use of appropriate Agroforestry and other agricultural production systems, the country has improved the carbon balance and atmospheric health and should seek necessary rewards in the global market.

Bio-diversity Conservation

3.6.4.7 India is an important centre of biodiversity, housing over 45,000 plant species and 810,000 animal species, representing 7% of the world’s flora and 6.5% of the world’s fauna. The UN Convention on Biological Diversity calls for conservation of the biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the utilization of genetic resources. Agroforestry innovations contribute to bio-diversity conservation through integrated conservation-development approach. Forest degradation has caused immense losses to the bio-diversity, which can be conserved through Agroforestry by adopting a strategy of conservation through use. The bio-diversity thus conserved shall help in the development or improvement of new varieties or populations and provide new Agroforestry options.

Improvement in Soil Fertility and Structure

3.6.4.8 Plantation of compatible and desirable species of woody perennials on farmland results in an improvement in soil fertility. There are several possible mechanisms of this, which include:

1. Increase in organic matter content of the soil through the addition of leaf litter and other plant parts;
2. More efficient nutrients cycling within the system and consequently more efficient utilization of nutrient that are either inherently present in the soil or externally applied;
3. Biological nitrogen fixation and solubilization of relatively unavailable nutrients, e.g. phosphate through the activity of mycorrhiza and phosphate-solubilising bacteria;
4. Increase in the plant-cycling fraction of nutrients, with their resultant reduction beyond the nutrient-absorbing zone of the soil;
5. Complementary interaction between the component species of the system, resulting in a more efficient sharing of nutrient resources among the components;
6. Enhanced nutrient economy, because of different nutrient-absorbing zones of the root system of the component species; and

3.6.4.9 Improvement in the organic matter status of the soil can result in an increased activity of the favourable microorganisms in the root zone. Inclusion of trees and woody perennials on farm lands can, in the long run, result in marked improvements in the physical conditions of the soil, e.g. its permeability, water-holding capacity, aggregate stability and soil-temperature regimes.

3.6.4.10 The role of trees in soil conservation and erosion control is one of the most widely acclaimed and compelling reasons for including trees on farm lands prone to erosion hazards. The influence of trees on hydrological characteristics can extend from the microsite to the farm and regional levels.

3.6.5.0 Agroforestry Systems in the Country

3.6.5.1 Agri-silviculture, agri-horti-silviculture, agri-horticulture, hortipastoral, silvipastoral and some other specialised combinations for specific conditions are the major Agroforestry systems practised in varying intensities in different agro-climatic
zones (Annexure VII). Agrisilviculture and agihorticulture are the overall most popular Agroforestry systems. The detailed situation in different agro-ecological regions is described below.

**Eastern-Himalayas**

3.6.5.2 The indigenous tribes like Lepcha and Limbu used to collect large cardamom from natural forests, which were later on domesticated. Among three dozen shade tree species in large plantation areas, alder (*Alnus nepalensis*) is most abundant and preferred tree, which is a non-leguminous nitrogen fixing tree. Besides large cardamom, many food crops like maize, millet, potato, barley, chillies and colocasia are grown with alder. The tree not only provides shade to arable crops, timber and fuelwood but also ameliorates the soil and protects it from erosion on hilly slopes. A yield of 400-500 kg ha\(^{-1}\) of cardamom has been reported in a year under shade trees. If a village with 100 families could set aside about 120 ha of land to grow alder trees, all families would be able to get sufficient fuelwood every year and at the same time raise crops under the alder in about 30 ha area every year. Cultivation of coffee, ginger, cardamom, turmeric and medicinal plants under the shade of naturally growing trees in Meghalaya is one of the best examples of successful combination of trees with annual crops.

3.6.5.3 Besides the above system, many trees are lopped for their green fodder which is rich in crude protein and calcium. These are found grown on terraces which are widely spaced, thus causing least yield reduction of inter-crops. Different trees provide fodder at different times of the year sustaining the supply of fodder throughout the year. Among the introduced tree species, *Leucaena leucocephala* (var. S 11) does well at low to mid hills and it could produce 9 t ha\(^{-1}\) dry foliage annually under the stocking density of 2500 trees ha\(^{-1}\). In low to mid hills, mandarin orange is a commercial fruit crop which is intensively intercropped with annual food crops, mainly maize. In Meghalaya, pear, plum and peach, and in Sikkim, apple are intercropped with food crops like potato, maize, vegetables, peas and mustard. At some places pineapple is also grown as an intercrop. Among monocrops, tea plantation is common in pockets but now cherry (*Prunus cerasus*) is also planted as
live fence. Shade trees like *Albizia chinensis* may be grown for desired quality of tea which has been reported to add 2.5 to 5.0 t ha\(^{-1}\) organic matter to the soil annually containing 63-126 kg N, 18-36 kg P\(_2\)O\(_5\), 22-44 kg K\(_2\)O, 32-64 kg CaO and 16-32 kg MgO per ha. Department of Agriculture in Mizoram has developed its own contour trench-farming for jhum areas on hills where top portion is of undisturbed forest, middle portion is with horticultural crops and down the hill, terraced rice is cultivated with pineapple and grasses on contours. Many species of bamboo, palms (coconut, arecanut and species of *Licuala, Phoenix, Wallichia, Corypha, Caryota*) and rattans (*Calamus* spp.) are cultivated widely in north-eastern areas as mixed or boundary plantations. Pasture in forests is also a common practice. In Sikkim on hilly areas, Nevaro (*Ficus auriculata*) based silvipastoral systems have shown production potential of 15.6-51.6 t ha\(^{-1}\) annually and goats could be reared successfully.

3.6.5.4 It has been found that sericulture based system is highly relevant for these areas. Mulberry with frenchbean-groundnut followed by mustard is a profitable cropping system with mulberry, guava/lemon/pear and pineapple in paired rows and grasses on the bunds is an ideal system for silk production and additional income from fruits and cattle rearing. Pedi-cum-sericulture is said to be more viable as the cash returns are more frequent.

**Western Himalayas**

3.6.5.5 In the Western Himalayas, 60 to 70% requirement of the firewood is met from the arboreal components and several MPTs along the bunds of agricultural lands or scattered trees on the pasture lands were developed depending upon the needs, economics and environmental status of the land. High rate of net primary productivity has been reported in agri-hortisilvicultural systems (206 t ha\(^{-1}\) yr\(^{-1}\)) or agri-horticultural systems (23 t ha\(^{-1}\) yr\(^{-1}\)) and the species number in these systems is as high as 15 tree species. Generally 50 to 100 trees are planted in a hectare for fulfilling a part of the fodder and fuelwood requirements. *Grewia optiva, Celtis australis, Bauhinia variegata, Albizia chinensis, Bombax ceiba, Melia azedarach* and *Toona ciliata* are common MPTs while plum (*Prunus domestica*), apricot (*P.
armeniaca), peach (P. persica), almond (P. dulcis) and pear (Pyrus communis) are common fruit trees of these systems. Hedge-row intercropping is feasible and important on sloping hilly lands when pruned biomass during cropping season can be used for fodder and fuelwood. Kinnow based horti-silvi-agricultural system at Dhaulakuan, kinnows planted at a spacing of 5m x 5m, has been highly successful. The inter-row spaces were utilized for sowing Leucaena leucocephala in the form of hedge rows or scattered trees and maize, soyabean, vegetables and wheat were grown as annual crops. To accommodate the demand for wood for packing of horticultural produce in the region, a horti-silvi-pastoral system was also developed growing trees of Santa Rosa plum at a spacing of 8m x 8m and the interspaces and field boundary were utilized for growing Populus deltoides with excellent economic returns. The strategy to develop Agroforestry systems in Western Himalayas should be based on the economy of fruits supplemented with cattle, keeping in view the soil conservation aspect. Therefore, fruit trees must be grown with forages, crops, vegetables and MPTs on small watershed basis. The timber woodlots for supporting cottage industries may help to improve the socio-economic status of rural people.

Indo-Gangetic Plains

3.6.5.6 This region contributes 51.9% to the national food grain output. Farmers use trees according to their need as well as suitability of the species. Many common trees such as Azadirachta indica, Acacia nilotica, Dalbergia sissoo, Prosopis cineraria, Eucalyptus tereticornis and Populus deltoides are found grown very frequently on farm lands particularly along crop-field boundaries. Some of the common systems found in this region are briefly described below:

Agroforestry Systems for Salt Affected Soils

3.6.5.7 A sizable area in the Indo-Gangetic plains is salt-affected. A package of afforestation techniques has been developed by the Central Soil Salinity Research Institute, Karnal. To rehabilitate alkali soils, augerhole technique is used for planting the saplings of salt tolerant species using 8Kg FYM + 3 Kg gypsum + 10 g ZnSO$_4$ and insecticide powder for controlling termites. In long-term experiments it has been
found that on highly alkali soil (pH>10) *Prosopis juliflora*, *Acacia nilotica* and *Tamarix articulata* can be grown with success. On soil of moderate alkalinity (pH 9-10), species like *Eucalyptus tereticornis*, *Parkinsonia aculeata*, *Terminalia arjuna*, *Pithecellobium dulce* can successfully be grown. Among fruit trees, aonla (*Emblica officinalis*), guava (*Psidium guajava*), ber (*Zizyphus mauritiana*), Karonda (*Carissa carandas*), Jamun (*Syzygium cumini*) and pomegranate (*Punica granatum*) on raised bunds may be grown applying higher doses of gypsum and farm yard manure. These species may be blended with forage grasses like *Leptochloa fusca*, *Brachiaria mutica* and *Chloris gayana*. Among herbs of industrial application, species like *Matricaria chamomila*, *Cymbopogon martinii* and *Plantago ovata* may be grown on moderate alkali soils.

3.6.5.8 On saline soils furrow-method of planting trees has been found successful. *Acacia nilotica*, *A. farnesiana*, *A. tortilis*, *Prosopis juliflora*, *Parkinsonia aculeata*, *Casuarina glauca*, *C. equisetifolia*, and *Tamarix tropii* have been found most suitable. *Eucalyptus camaldulensis* is also quite successful. On partially reclaimed lands, *Populus deltoides* and *Eucalyptus tereticornis* are grown as boundary plantations. *Populus deltoides* is preferred on agricultural lands also.

**Agroforestry Systems for Soil Conservation**

3.6.5.9 In ravine lands, trees like *Acacia nilotica*, *A. aburnea*, *A. catechu*, *Prosopis juliflora*, *Dalbergia sissoo*, *Azadirachta indica* and *Pongamia pinnata* are most effective in association with forage grasses like *Dichanthium annulatum*, *Bothriochloa pertusa*, *Cenchrus ciliaris*, *Chrysopogon fulvus*, *Cynodon dactylon*, *Sehima nervosum* and *Panicum spp*. *Eucalyptus* – Bhabar grass (*Eulaliopsis binata*) system has been found quite efficient in the Shivaliks which showed the highest economical returns and negligible soil loss (0.07 t/ha) followed by *Acacia catechu* – forage grass (0.24 t/ha) followed by *Leucaena* – napier grass (0.28 t/ha) system. Besides less soil loss, runoff and nutrient losses were also less under Agroforestry systems as compared to those under arable crops. *Vetiveria zizanoides* is also an excellent soil binder.
Agroforestry for Controlling Seepage from Canals

3.6.5.10 Seepage from unlined canals results in waterlogging and salinization. For example, in Hisar Agricultural University Farm, water table has been reported to rise from 15.92 m in 1967 to 1.56 m depth in 1982 after the introduction of Bhakra canal in 1963. A wide belt of trees such as *Eucalyptus tereticornis*, *Populus deltoides*, *Syzygium cumini*, *Pongamia pinnata*, *Terminalia arjuna*, *Dalbergia sissoo*, *Acacia auriculiformis* and *A. nilotica* on both sides of the canal may be created to utilize the seepage water for biomass production. Perennial grasses like *Brachiaria mutica*, *Coix lachryma-jobi*, species of *Paspalum*, *Echinochloa colonum* and *Leptochloa fusca* may be grown in waterlogged areas and may be used for forage. *Phragmites australis* a weed grass is also found growing in stagnant water.

Horti-pastoral and Agri-horticultura Systems

3.6.5.11 Mango (*Mangifera indica*), guava (*Psidium guajava*), Jamun (*Syzygium cumini*), and ber (*Zizyphus mauritiana*) are the important fruit yielding trees in the entire Indo-Gangetic plains. In Bihar region Litchi (*Litchi chinensis*) is important fruit species. In all these plantations in earlier years of their growth arable crops may be taken. In some areas these are left open for grazing of cattle. But the grazing should be stopped and forage grasses may be cultivated. Several Multi purpose species like *Madhuca indica* and medicinal neem (*Azadirachta indica*) have also shown their preference in most of the region.

Agroforestry in Humid and Sub-humid Region

3.6.5.12 In Tripura tree component is used along with livestock and poultry component, whereas in irrigated areas fish component is also incorporated. Agrisilviculture is common in Raipur and Ranchi areas. *Acacia nilotica*, *Terminalia arjuna*, *Butea monosperma*, *Albizia* spp. are grown in Raipur area while *Zizyphus mauritiana*, *B. monosperma*, *Aegle marmelos*, *Mangifera indica*, *Schleichera oleosa* (Kusum) in Ranchi area. Homestead Agroforestry is also being practised using *Gmelina arborea*, *Artocarpus heterophyllus*, *Madhuca latifolia*, *Zizyphus mauritiana*
etc.. In Bhubaneswar area agrisilviculture (*Cocos nucifera* for boundary plantation, block plantation of *Casuarina equisetifolia*, *Anacardium occidentale*) and homesteads are being practised. At both the centres (Raipur and Ranchi) *Gmelina arborea* is also used as timber while *Tectona grandis*, *Acacia nilotica* are used as timber trees at Raipur and *Shorea robusta* at Ranchi. *Leucaena leucocephala* is used at Raipur and Ranchi for fodder and *Pongamia pinnata*, *Acacia nilotica* and *Dalbergia sissoo* are also used as fodder at Raipur. *Mangifera indica* and *Artocarpus heterophyllus* are grown for fruits. Other fruit trees are *Moringa oleifera* and *Syzygium cumini*, in Raipur area and *Psidium guajava*, *Carica papaya* in and around Ranchi. *Terminalia arjuna* for raising silk worm and *Butea monosperma*, *Schleichera oleosa* for Lac cultivation are being used by the farmers in Ranchi area.

**Agroforestry in Arid and Semi-Arid Regions**

### 3.6.5.13

In most of the arid region of the north-western India, Khejri (*Prosopis cineraria*) based silvi-agriculture system is prominent. Almost in all the fields most useful khejri trees and small fruit yielding *Zizyphus nummularia* are found grown in association with rainfed crops. *Zizyphus nummularia* is used for its leaves as fodder for camel and goats and berries for edible purposes. *Acacia tortilis*, *A. nilotica*, *A. senegal*, *A. leucophloea*, *Capparis decidua*, *Tecomella undulata*, *Salvadora persica* and *S. oleoides* are other common trees found on various grazing lands or as sand stabilizers. *Calligonum polygonoides* is another interesting bush in Bikaner region. *Lasiurus sindicus* and *Cenchrus ciliaris* are prominent grasses in grazing fields as well as in sand dunes.

### 3.6.5.14

It has been found that besides above native species many woody perennials such as *Acacia albida*, *Hardwickia binata*, *Colophospermum mopane*, *Holoptelea integrifolia* and *Zizyphus rotundifolia* may form the constituents of silvi-pastoral or agrisilvicultural systems in these regions. Studies on the effects of native Khejri and exotic *Acacia albida* on grain production of moongbean and clusterbean, when planted in a space geometry of 5m x 5m, 10m x 10m, and 10m x 5m, showed that the average mean increment in height was 108.2 cm/tree/yr in case of *A. albida* and 14.5
cm/tree/year in *P. cineraria*. The latter did not show any interference in crop yield at any stage. However, *A. albida* during third year showed yield reduction of clusterbean. In wider spaces of 10m x 10m the yield was 1280 kg/ha which reduced to 650 kg/ha and 760 kg/h in spacing of 5m x 5m and 5m x 10m, respectively. Based on a long-term study it has been reported that *Zizyphus rotundifolia* did not show any negative effect on production of cluster beans, pearl millet, moongbean and moth bean, while *Acacia tortilis* had significant negative effect on crop yield. When fodder grasses were grown in combination with ber plants as well as *A. tortilis* tree, the fodder yield and seed production of crops were higher than the yield and seed production of crops in isolation. In Arid regions of Western India, introduction of compatible fuel, fodder and fruit trees in pastures as in agricultural fields acts as an insurance against frequent crop failures, and trees play a pivotal role towards peoples’ survival and sustenance in such fragile ecosystems.

3.6.5.15 In Central India, *Dalbergia sissoo, Acacia nilotica, A. eburnea, A. leucophloea, A. catechu, Albizia lebbeck, Azadirachta indica, Butea monosperma, Pongamia pinnata, Holoptelea integrifolia, Balanites roxburghii* and *Dichrostachys cinerea* form important constituents of a silvi-pastoral system. In black cotton soil region very tall grasses supporting this system include *Heteropogon contortus, Chrysopogon fulvus, Themeda triandra, Iseilema laxum, Dichanthium annulatum* and the industrial grass *Cymbopogon martinii*. These can make a sustainable silvi-pastoral system. During the assessment of the soil conservation values of some grasses and forbs in two phases it was found that *Dichanthium annulatum* showed maximum conservation value (upto 89) followed by *Cynodon dactylon* and *Bothriochloa pertusa*. In second phase, *Dichanthium caricosum* showed maximum value (94.4) followed by *Sehima nervosum, Cymbopogon martinii, Chrysopogon fulvus, Iseilema laxum* and *Heteropogon contortus* (all having conservation value of more than 83).

3.6.5.16 In semi arid regions of Peninsular India the systems are more complex as the problem of frost does not exist, therefore, a vast number of trees (both fruit yielding and MPTs) exist on agricultural fields. *Borassus flabellifer, Tamarindus
indica, Acacia leucophloea, A. catechu, Casuarina equisetifolia, Cassia siamea, Eucalyptus tereticornis, Albizia lebbeck, and many others are frequent trees on farms. *Leucaena leucocephala* has also been adopted as a common hedge-row-crop in many areas.

**Agroforestry Systems for Coastal and Island Regions**

3.6.5.17 Low lying water logged marshy areas, flood plains, and ill-drained lands are the common features in the coastal areas swamps and river banks are occupied by the mangroves and associate halophytes. Other natural vegetation includes evergreen, semi-evergreen and deciduous forests on uplands and grazing lands in pockets. Plantation crops integrated with livestock and poultry and rice fields are main features of this region.

3.6.5.18 The systems and practices of Agroforestry range from apparently ‘simple’ forms of shifting cultivation and farming in forests to sophisticated hedgerow intercropping systems, from systems involving sparse stands of trees on farm lands to high density, complex multistoreyed homegardens of lowland; and from systems in which trees play a predominantly ‘service’ role (e.g. shelterbelts) to those in which they provide the main commercial product (e.g. intercropping with plantation crops). Most of the systems are site-specific with very few examples of their extrapolatibility.

3.6.5.19 Though many scientific inputs are given to plantation crops and multiple cropping systems are adopted but quite large areas under coconut plantation are still neglected and remain open for grazing. These areas may be brought under multistoreyed cropping systems. Spices like clove and cinnamon may be planted as middle storey crops and pineapple or forage grasses like hybrid napier (*Pennisetum purpureum*), kazungula (*Setaria anceps*) and guinea (*Panicum maximum*) and legumes like *Stylosanthes guianensis* or industrial grasses like lemon grass (*Cymbopogon fulvus*) may be grown as cover crops. Rubber and red oil palm plantations may also be integrated with other spice or forage crops particularly the legume covers. Monoculture of plantation crops should be discouraged and a multi-
storeyed plantation system should be raised as has been demonstrated in Jirka Tang Farm in Andaman where even the forest-trees are retained in multi-storeyed plantations and almost all plantations including spices, coffee and fruit trees have been accommodated as under-storey crops.

### 3.6.6.0 Socio-Economic Aspects

#### 3.6.6.1 The main socio-economic outcomes of Agroforestry development programmes in the country may be summarised as below:

- Rehabilitation of >1 million ha salt affected wastelands through Agroforestry.
- Eucalyptus plantations in over 3.1 million ha.
- Indo-gangetic region having > 1 mililiion ha Poplar/ Eucalyptus- 6-8 years rotation; 108 personday/ha post-harvest employment in Poplar (See Box I).
- Small holders emerging as the timber suppliers of the 21st century.
- 30 million trees of poplar producing 1.125 million m³ industrial wood annually are standing in Uttar Pradesh, Haryana, Uttaranchal, Punjab, Himachal Pradesh and Jammu and Kashmir with agricultural crops (equivalent to 60,000 ha pure plantation @ 500 trees ha⁻¹).
- 25000 ha equivalent plantation of Poplar are now being established every year under Agroforestry situation with 6-8 year rotations.
- >10 million ETPs (Entire transplants)/year grown in nursery; against this, current requirement is > 15 million ETPs/year.
- >7000 ha of degraded forest lands in Andhra Pradesh planted with improved Eucalyptus clones; >35000 ha marginal lands/year being planted in Andhra Pradesh.
- **Prosopis juliflora-based** fuel and charcoal making; in Tamil Nadu alone 6.34 million mandays and 7.03 million womandays employment created by using this system.
- TBOS (Tree Bearing Oil Seeds) potential in India is 52.33 lakh MT with employment to 0.44 million people.
- Silvipastoral system on an average cycle of 10 years could generate 120 mandays/ha/year employment.

**Box I. Post Harvest Employment in Poplar/ha (108 personday/ha)**

3.6.6.2 The Planning Commission Report of “The Task Force on Greening India for Livelihood Security and Sustainable Development” (2001) provides economic analysis of 24 Agroforestry models being practiced in different agroclimatic conditions of the country. They all reflect a high Benefit / Cost ratio (1.5 to 3) and Internal Rate of Return (15 to 40%). An ICAR study has revealed a B:C ratio of 3.0 in case of Poplar based agrisilvipasture in Western Uttar Pradesh. The other findings from the region with major policy implications are as follows:

3.6.6.3 *Traditional Agroforestry sub-region*

- The bound/border system of Agroforestry was the most common practice in the region with tree species like *Azadirachta indica* and *Acacia nilotica*. The tree stock was 15.6 per farmer and the tree density was inversely proportional to the land holding.
- The fuel wood needs prompted majority of the farmers (50.6%) to patronize the trees on farmlands. The other major reason was supplementary income (24.4%).
• The annual mean wood produced and harvested worked out to 0.42 t /farm household. Out of this the marketed surplus was almost 49 per cent. While 51 per cent of the farmers harvested some tree/tree produce in the past three years, only 37 per cent of such farmers had marketed surplus. The tree/tree produce was mostly disposed off by the farmers to the local traders. Often the village traders bought the same and the tree produce reached the nearby urban markets for processing and consumption.

3.6.6.4  Intensive Agroforestry sub-region

• Field bound/boundary plantations of trees was predominant (78.1%) followed by agrisilviculture (21.9%). The most common tree species are Poplars (Populus deltoids) and Eucalyptus tereticornis hybrids. While the former was seen on bunds and under agrisilviculture, the latter was solely seen on bounds/boundaries of agriculture fields.

• The tree density worked out to 146 trees/ha under bund system with 64 per cent of Poplar and 33 per cent of Eucalyptus tress on an average. The tree density was 481 trees/ha in case of Poplar - based agrisilviculture.

• Private nurseries accounted for majority source (40.7%) of planting material for Agroforestry. The forest department and the corporate sectors extended the technical know-how (68.1%) for tree cultivation under Agroforestry.

• Monetary considerations mostly dominated (88.8%) the decision making in favour of Agroforestry by the farmers.

• The Benefit Cost Analysis indicated that higher B:C was in case of Poplar - based agrisilviculture with 3.00 followed by bund system with Poplar at 2.84.

• There is general decline in the prices of wood especially Poplar by about 14-30 per cent over the period 1996-2000. This decline was further alarming in the next couple of years. This is mainly due to decrease in demand for the plywood as well as increase in Poplar area. The same has to be checked may be by announcing a minimum support price, as the same would reduce the drain of foreign exchange in the form of reduction in timber imports to some extent.
3.6.6.5 **Boxes II and III** give socio-economic profile of a Poplar-based Agroforestry project in Yamunanagar (Haryana). It may be seen from the **Box II** that the adoption rate of the technology is extremely high, especially in irrigated lands, and the average income of the adopters is almost three times of that of the non-adopters. As seen from **Box III**, when Agroforestry households were located close to forest, the income was almost proportional to farm size, but if located far away from forest, the income of small households almost tripled and those of medium and large households increased only by about 15 and 3 percent, respectively. Inclusion of livestock in Agroforestry systems increased the income considerably and the increase was almost proportional to the number of animals owned by the households, and the increase was much larger when the farming households were away from forest.

**Box II. Poplar Based Agroforestry in Yamunanagar (Haryana)**

- Agroforestry is more popular in the villages which are far away from the forest area. Around 61% households of the villages away from the forests received their income from the trees of Agroforestry whereas only 35% in the villages near the natural forests.
- Landless farmers get equal benefit from Agroforestry. The average annual income of the households from the trees of Agroforestry and natural forests increases as the holding size increases in both the groups of villages.
- Economic dependence on trees income increases with increasing family size and number of animals in both the groups of villages (near and away from the natural forests). But the trend is reverse in case of natural forests.
- Rate of adoption in the villages far away from forests is 94% as compared to households of the villages near the forest boundaries.
- Around 48% households use Agroforestry for getting wood as a source of cooking.
- The overall percentage of farmer households adopting Agroforestry for the irrigated land increases with increasing holding size i.e., from 87.61% to 99.14%, whereas, for unirrigated land this percentage of households is comparatively low i.e., from 69.81% to 95.65%.
- Level of education plays a dominant role in increasing income from the Agroforestry. Percentage contribution is slightly higher 80.63% in case of educated farmers whereas it is 79.02% in case of illiterate farmers.
- Most of the medium and large farmers adopted Agroforestry as a major source of income.
- The overall income from Agroforestry in villages away from natural forests is more (86.5%) compared to villages near to forests (76.41%). The overall annual income from trees of Agroforestry is Rs. 8377 for adopted households whereas corresponding income for non-adopted households is only Rs. 2638.

*Source: Rai et.al.(1999)*
3.6.6.6 A study on economic impact of Subabul (*Leucaena leucocephala*) based farming system (Agroforestry) was undertaken in four districts viz., Khammam, Krishna, Guntur and Prakasham of Andhra Pradesh. Three land uses and land cover changes were type I- Subabul for pulp wood; type II- Subabul with intercrops; and type III- Subabul with animal husbandry and intensive fodder use. Their adoption rates are, 29.7, 23.3 and 47.1 per cent, respectively. The economic analysis indicates that Type III farmers earn higher returns, B: C ratio of 3.67 as compared to B: C ratio of 1.88 to 2.58 in Types I and
II (Table 3). As suggested by the study, several of the type-I and type-II farmers are shifting to the type-III system for better cash flow. Subabul leaf meal production was identified as another significant opportunity to supply the fodder from areas like Guntur and Khammam to fodder deficit areas like Praksham districts with intensive fodder use. This activity can provide employment opportunity to the unemployed youth on the one hand and better resource use along with nutrition on the other. The role of institutional credit support and an effective extension system was substantial in achieving the success. Such experiences should be replicated widely.

3.6.6.7 With the fossil fuel prices soaring so high, jeopardising overall economic growth in petroleum importing countries, the country must develop its own renewable energy production and use system, of course, consistent with economic viability and technological feasibility. The agro-technological and socio-economic prospects of some of the potential species, especially *Jatropha* for fuel and *Prosopis juliflora* for bio-energy, should critically be examined and timely necessary actions should be taken to harness the potential. The All India Coordinated Research Project on Agroforestry centres at their Andhra Pradesh, Tamil Nadu and Karnataka Agricultural Universities have collected germplasm of *Jatropha*, Karanj and other biofuel species and are evaluating them. Agrotechniques for improved production of the selected genotypes are being standardised.

3.6.6.8 In fact, *Jatropha* plantations are being raised in several States, mainly in Chhattisgarh, Uttaranchal, Andhra Pradesh, Tamil Nadu, Karnataka and Haryana. But, often, the quality of the planting materials is poor and the expected results in terms of yield and income are not being realised. Efforts should be focused on developing superior and stable genotypes (high yielding varieties). Nurseries should be established at strategic locations for production and distribution of quality planting material. In vitro culture facilities should also be available to hasten the pace of multiplication of elite materials.
Table 3: Relative Economics of Raising Subabul (3 Year Rotation) in Different Typologies of Andhra Pradesh

<table>
<thead>
<tr>
<th>Type –I Direct Seeding</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>13393</td>
<td>685</td>
<td>-12708</td>
<td>2.55</td>
</tr>
<tr>
<td>2</td>
<td>3625</td>
<td>1815</td>
<td>-1811</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14950</td>
<td>79100</td>
<td>64150</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>31968</td>
<td>81600</td>
<td>49632</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seedlings through transplanting</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>19534</td>
<td>548</td>
<td>-18986</td>
<td>2.25</td>
</tr>
<tr>
<td>2</td>
<td>3158</td>
<td>1452</td>
<td>-1707</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15857</td>
<td>84750</td>
<td>68893</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>38549</td>
<td>86750</td>
<td>48201</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type II: Subabul + Cotton (During 1 year only)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>40893</td>
<td>32185</td>
<td>-8708</td>
<td>1.90</td>
</tr>
<tr>
<td>2</td>
<td>3625</td>
<td>1815</td>
<td>-1811</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14950</td>
<td>79100</td>
<td>64150</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>59468</td>
<td>113100</td>
<td>53632</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subabul + Black gram (During 1 year only)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>18893</td>
<td>15685</td>
<td>-3208</td>
<td>2.58</td>
</tr>
<tr>
<td>2</td>
<td>3625</td>
<td>1815</td>
<td>-1811</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14950</td>
<td>79100</td>
<td>64150</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>37468</td>
<td>96600</td>
<td>59132</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subabul + Tobacco (During 1 year only)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>62893</td>
<td>72685</td>
<td>9793</td>
<td>1.88</td>
</tr>
<tr>
<td>2</td>
<td>3625</td>
<td>1815</td>
<td>-1811</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14950</td>
<td>79100</td>
<td>64150</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>81467.5</td>
<td>153599.5</td>
<td>72132</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type III Subabul + sheep farming</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Input (Rs)</td>
<td>Output (Rs)</td>
<td>Benefits (Rs.)</td>
<td>B:C ratio</td>
</tr>
<tr>
<td>1</td>
<td>24393</td>
<td>50685</td>
<td>26293</td>
<td>3.67</td>
</tr>
<tr>
<td>2</td>
<td>13625</td>
<td>51814.5</td>
<td>38189.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>24950</td>
<td>129100</td>
<td>104150</td>
<td></td>
</tr>
<tr>
<td>Total (Rs)</td>
<td>62968</td>
<td>231600</td>
<td>168632</td>
<td></td>
</tr>
</tbody>
</table>

Source: P.S.Pathak, 2005

3.6.6.9 A refinery is being set up by ‘D’- Oils - a British Company in Chennai with 8000 t / yr production capacity. The refinery is expected to start functioning by
2007. As we know, in Karnataka, biodiesel is used in generators for supplying electricity to a number of villages since 1998. This model of decentralized production of energy is ideally suited for Indian conditions for linking agricultural production with agroprocessing and value addition, besides generating additional rural employment. It is estimated that Tree Borne Oil Seeds (TBOS) potential in India is over 5 million tonnes with an additional employment potential of 0.44 million people.

3.6.6.10 As regards bio-energy, *Prosopis juliflora*, which was considered as an abnoxious weed in certain areas, is now being cultivated as an Agroforestry species in large areas in Andhra Pradesh, Gujarat and Karnataka. The total area in three districts of Gujarat (Bhuj, Patan and Surendranagar) is 1.71 lakh ha (2005), with a potential of 1.53 lakh t of charcoal production and 18.55 lakh mandays per rotation employment generation. For fuel and charcoal making, employment was generated for 6.34 million mandays and 7.03 million womandays in Tamil Nadu. *Prosopis juliflora* is a major source of fuel for boilers of the power generation plants in Andhra Pradesh. Rs. 700-1300 /t is the price offered for its wood at factory gate depending on the season and moisture. Three plants in A.P. have developed captive plantations of *Prosopis juliflora*. Commissioned biomass-based power plant capacity in Karnataka and Andhra Pradesh was 266 MW with 46 power generation units in operation, with almost 78% in Andhra Pradesh alone.

3.6.6.11 In coastal zones, mangroves are the most important bioresource and their use as a major source of bio-energy should be promoted through suitable institutional supports, while ensuring their comprehensive conservation and sustainability as bio-shield. A time-frame programme must be chalked-out for rehabilitation of mangroves along coasts. Techniques are available for planting of mangroves, a massive programme should be framed and implemented without further waste of time. More agro-based industries should be developed in coastal areas to create more employment through value addition to products based on coconut, oil palm, honey, cashewnut, rubber, fruit, fish & shrimp, milk, beverage, medicines, poultry, sea food and mangrove products.
3.6.6.12 The total CO$_2$ emission reduction potential (as a consequence of not using
the coal in thermal plants) of the biomass based power plants (on account of 16000
MW potential/yr) is 35.3 million t/yr. Although many plants have been
commissioned, they are yet to be registered with the UNFCC. As on March 6, 2006
only 2 plants from A.P. (18 MW) have been registered with UNFCC for a saving of
39670 t of CO$_2$ per annum. India should position herself effectively to harness the
environmental costing provisions under Kyoto Protocol.

3.6.6.13 Agroforestry will play a decisive role not only in supply of timber
products, thus saving the forest, but would also be extremely effective in meeting the
paper, pulp and viscose requirements. Per caput paper consumption per year in India
is less than one-sixth of that in China (Table 4). The demand is growing annually at 7
per cent and our capacity is growing at a rate of 4 to 5 per cent, necessitating huge
annual import. Agroforestry plantations could be expanded at wasted and degraded
lands through a Nucleus - Estate arrangement to meet this demand. The private sector
must play a proactive role in filling this gap.

Table 4. Relative Paper Consumption (kg/year)

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Kg/Year/Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>4.5</td>
</tr>
<tr>
<td>China</td>
<td>28.3</td>
</tr>
<tr>
<td>Asia</td>
<td>26.9</td>
</tr>
<tr>
<td>World</td>
<td>52.6</td>
</tr>
</tbody>
</table>

3.6.7.0 Agroforestry Research and Technology Development

3.6.7.1 India has been at the forefront of Agroforestry research. Although
Agroforestry research in the ICAR system and other Indian institutes and universities
has been in progress since early 1950s, the Council launched the All India
Coordinated Research Project on Agroforestry in 1983. Presently, 36 centres (11
ICAR Institutes + 25 SAUs) representing all ago-climates in the country are involved.
The National Research Centre on Agroforestry, one of the ICAR Centres, was
established at Jhansi in 1988. The Indian Council of Forestry Research and Education
ICFRE) also supports Agroforestry research in education in various parts of the country. A number of State Agriculture Universities (SAUs) are also having focused research activities and education in the field of Agroforestry. Private sector initiatives in Agroforestry such as those by WIMCO, BAIF, IFFDC, ITC are worth mentioning. In all, more than 2000 scientists and technicians are engaged in Agroforestry research, development and education in the country. The main research and development outcomes are listed below.

- Characterisation of Agroforestry systems in different agroclimatic zones of the country; by developing a diagnosis and design approach and using them for survey, a benchmark information for major Agroforestry systems has been prepared.
- Collection and evaluation of multipurpose tree species – creation of arboretums in different agro-climatic zones.
- Tree selection and improvement particularly of Poplar, Shisham, Neem, Semal, Subabul and Eucalyptus.
- Priority Agroforestry tree species were identified for different agroclimates.
- Management practices for different Agroforestry systems were standardized and their efficacies and economic returns (B:C ratios) were worked out to show the usefulness of the systems under specified agro-ecological and socio-economic settings.

3.6.7.2 The ICAR system has analysed the strength, weaknesses and opportunities of Agroforestry research and development system in the country (Table 5). Based on this analysis and keeping in mind the new national and international developments, increasing domestic demand for pulp and paper and other forest products, the overall objectives of the Agroforestry Research and Development Programme of the ICAR, announced recently, are quite sound, as given below:

i. Enhancing the output of specific products such as fodder, fuelwood, pulp wood, small timber and crop yield;

ii. Improving the overall productivity of small farms with minimum external inputs in different agro-ecological regions;
iii. Devising management techniques that can facilitate profitable use of degraded and unproductive land; and
iv. Providing environmental amelioration through watershed protection, soil conservation etc.

Table 5. SWOT analysis of Indian Agroforestry Research and Technology Development

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry as a phytoclimate</td>
<td>Location specific research needs</td>
<td>Exploiting /rich biodiversity</td>
<td>Bird damage to crop and the unchecked growth of wild life.</td>
</tr>
<tr>
<td>High Biodiversity</td>
<td>Lack of Wood based enterprises affecting farmers income</td>
<td>Developing Linkage with institutions and SAUS</td>
<td>Illicit/Over grazing by the livestock</td>
</tr>
<tr>
<td>Carbon fixation and sequestering potential of trees</td>
<td>Long gestation period of the woody crops</td>
<td>Small scale tree based industries and employment generation</td>
<td>Pest and disease complexes due to secondary hosts.</td>
</tr>
<tr>
<td>Well trained manpower</td>
<td>Lack of Transferable technologies</td>
<td>Sustainable production system to improve farmer’s economy and quality of life</td>
<td>Changing Government forest policy, especially pertaining to leasing of forests land, and forest products, which have a bearing on Agroforestry production.</td>
</tr>
<tr>
<td>Vast network of 35 AICRPAF Centres for coordination and consultation</td>
<td>Quality seed and planting material</td>
<td>Bio-remediation for improvement of the soil and environment quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Policy about tree felling</td>
<td>Improving nutrient base of the human food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Market imperfections and financial support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: ICAR, 2005
3.6.7.3 In order to achieve the above objectives, the following thrust areas have been identified:

- Increase wood resources to meet the growing needs of households and industries.
- Environmental amelioration through the carbon sequestration, bioremediation and resource conservation.
- Enhance livelihood and employment avenues.
- Technology transfer and human resource development.

3.6.7.4 In addition, the following specific areas deserve attention:

- Aqua-culture research keeping mangroves intact.
- Genetic improvement of identified potential multi-purpose trees.
- Organic farming, mycorrhizae in relation to Agroforestry and integrated pest-management in Agroforestry.
- Developing net-works for transferring proven technologies to the farmers.
- Developing decision support systems for replication of successful Agroforestry systems/practices.
- Exploring unexploited and under-exploited species of high economic value, such as medicinal, aromatic, oil-yielding plants etc.
- Exploring marine algae or sea weeds for food, medicine and green manure.
- Viable techniques for rehabilitation of degraded salt-affected areas involving good quality forages, MPTs, plantation crops and plants of industrial application, with due attention to quality assessment of the products obtained from saline habitats.
- Saline agriculture, including conjunctive irrigation with saline water, developing halophytic crops involving fish, shrimp culture and poultry with Agroforestry
systems, genetic improvement of salt-tolerant plants, raising nursery with saline water and multiplication and conservation of useful genetic material.

- Promotion of national and inter-national collaborative research programmes.

3.6.7.5 Analogous programmes are being pursued by other concerned agencies such as the Indian council of Forestry Research and Education, Wasteland Development Board, the Ministry of Environment and Forest etc, including the initiatives on biofuel and bioenergy in several Departments. However, there is little convergence and coordination among the various programmes. The Planning Commission may evolve an effective mechanism for synergistically linking and managing the linkages among the various programmes.

3.6.7.6 An integrated approach is necessary for research and development of coastal zone agriculture and Agroforestry which can impart sustainability to the productivity and save the fragile coastal ecosystems from degradation. A national information system may be launched to serve as the data bank of coastal zone planning. Environmental laws should be followed strictly in coastal zones to check the over exploitation of land, water and vegetation, particularly the mangroves.

3.6.8.0 Policy and Institutional Supports

3.6.8.1 The country’s mission on Agroforestry must be to advance the science and practice of Agroforestry towards a massive increase in the use of working trees on working landscapes, especially by smallholders rural households, to help achieve sustained livelihood security. Agroforestry efforts at the national level should strategically focus on tackling poverty, food security and environment through the following four channels:

i. Overcoming natural resource degradation in intensive productive irrigated systems;

ii. Arresting land degradation and productivity loss in small holder farms in sub-humid and semi-arid areas;
iii. Searching for sustainable alternatives to slash and burn in tropical humid areas;

iv. Providing shelter belt and livelihood security in coastal areas.

All the above issues can be addressed through the following four interdependent approaches:

- By seeking to understand the basis for sound land management, and then quantifying the long term consequences of Agroforestry practices on small scale agriculture so as to develop locally relevant land management options. Thereby, it should provide innovations that built a sustainable platform for achieving food security and income through increased production of Agroforestry products for home consumption and sale.

- By delivering approaches, strategies and methods for product development, tree domestication and access to high quality germplasm, and diversification of integrated farming systems in response to farmers’ needs. Agroforestry efforts at the national level should, therefore, be able to provide innovations that enable farmers to diversify their enterprise to capture market opportunities and provide nutritional and health benefits.

- By examining the role of Agroforestry and landscape mosaics in generating environmental services, reducing deforestation and aiming to improve related institutions and incentive and reward systems. This way we should be able to open up broader market linkages between farms and society’s needs for a better environment, as also to buffer farmers against the effects of climate change, and facilitate appropriate recognition of social costs and benefits.

- By strengthening of Agroforestry R and D institutions, and human resources development and education, we should be able to build institutional capacity in generating and applying innovations.

3.6.8.2 Appropriate policies and their effective implementation (governance) is important for realising benefits of Agroforestry. Many rules, regulations, tariffs and conflicts between States and communities have been major hurdles in the growth of tree culture. Enabling mechanisms and services, such as land rights, appropriate
technologies, credit support and market access must be synergistically intertwined with the production systems.

**Regulatory Aspects of Tree Felling and Transport**

3.6.8.3 State regulations and permit systems for felling of trees and for timber transportation have been main interferences in marketing of timber grown on farmers’ land by private investment and have been major discouragement to the expansion of Agroforestry. The rules and procedures for felling, transport and sale of major farm forestry species should be totally liberalised, and the local Panchayati Raj institutions should be delegated with powers to issue necessary permits, if any at all. At present, there is wide variation in the initiatives taken by different States. It is high time to evolve common guidelines on these issues, simplify the process and remove red tapeism. Policies on inter-state transport of farm forestry produce also require simplification and streamlining. This will facilitate easy movement of farm forestry produce from production to consumption areas. The existing state monopoly on trade of commercially important non-timber forest products (NTFPs) should be reviewed with a view to promote greater private sector participation in NTFP production.

3.6.8.4 The practice of supply of forest produce to industry at concessional long term leases should cease as it distorts the market and works against the interest of private Agroforestry. Import of pulp and timber was placed in open general licence (OGL) list and tariffs are not applicable since 1985. This was done to prevent deforestation in the country. While the deforestation continues unabated, the price distortions negate private efforts. Out of over 270 paper mills, hardly eight are producing or procuring pulp locally and desired private investments are not forthcoming to raise soft wood on wastelands and agricultural fields.

3.6.8.5 Raising of agro forestry species on forest lands by the government should be discontinued as the same can be grown more easily and efficiently by the farmers on their farmlands. Apart from directly affecting the farmers’ market, this also acts as a hindrance to liberalisation of felling and transit rules pertaining to these species.
The government should consider revoking the ban on export of wood-based products and imposing a higher duty on import of wood-based raw material to safeguard the interest of the domestic producers. Further, the industry may be given some concessions in excise or sale tax. In this way, domestic production will be encouraged and industries will also have greater incentive for improving wood conversion ratios and overall efficiency and competitiveness.

3.6.8.6 Availability of quality seedlings, seed and other planting materials and their initial establishment in the field resulting in recommended population density are fundamental to productive Agroforestry. Often, the quality and success rate of seedlings supplied by the government either free or at heavily subsidised rates is low, thus is a drain to the public funds meant for Agroforestry promotion. There is an urgent need to review this policy. Part of the resources should be reallocated for developing and producing high quality clones and seedlings which may be supplied on reasonable rates to farmers and backed up by suitable extension efforts, including setting up of demonstration plots and Farm Schools. The farmers will not mind procuring the planting materials at reasonable rates as long as these are certified stocks of high quality.

Marketing Infrastructure and Economic Incentives

3.6.8.7 Marketing of farm forestry produce is not organized. No forest-based industries, except that at the village or cottage level should be permitted in the future unless it has been first cleared after a careful scrutiny with regard to assured availability of raw material. In any case, the fuel, fodder and timber requirements of the local population should not be sacrificed for this purpose.

3.6.8.8 As more farmers take to Agroforestry, a system of market regulation along the lines of agricultural markets needs to be put in place. In the absence of such a regulatory mechanism, the volatility of markets may result in collapse of the Agroforestry industry. While the Agricultural Marketing Cooperative system introduced in Andhra Pradesh is a laudable first step, it is required to adequately
regulate the farm forestry markets and to protect the interest of both the producers and consumers.

3.6.8.9 In addition to the regulation of wood markets, a suitable market information system along the lines of agricultural markets is called upon to inform the farmers regarding major buyers, prevailing prices at different places, trends and procedures, etc. The Village Knowledge Centres should play a proactive role in collecting and disseminating necessary market information.

3.6.8.10 Introduction of positive incentives can go a long way in popularising tree farming. The Chandi Prasad Bhatt Committee, set up by the Ministry of Environment & Forests (November 1998) recommended introduction of national tradable afforestation credits to encourage tree planting by private land owners. These credits will allow tax benefits to the farmers. The small land owners who do not have any tax liability could sell these credits to others.

3.6.8.11 The standing trees on farm lands are exempted from wealth tax. It is an incentive to farmers for maintaining valuable trees on farms. However, the trees are not taken as collateral for grant of loan. The financial institutions should consider the issue of treating trees as collateral for grant of loan. Joint Pattas for trees should be issued to women farmers. NABARD should facilitate implementation of Agroforestry projects by private sector and rationalise the procedure for timely and adequate flow of credit to farmers specially smallholders, and livelihood financing should be extended to SHGs.

**Equity, Empowerment of Landless and Disadvantaged Groups through Cooperatives**

3.6.8.12 Improvement of degraded lands, poverty alleviation, productive employment generation, fuel, timber and fodder production by the active participation of women, landless and disadvantaged sections of society was launched from 1986-87 by the Indian Farmers Fertilizers Cooperative (IFFCO). A subsidiary called Indian Farm Forestry Development Cooperative (IFFDC) was floated. Leased
wastelands of Revenue Department of Government of Madhya Pradesh, democratically elected village bodies (Panchayats) of Rajasthan and private lands in Uttar Pradesh were managed by the cooperatives. Even a landless or socially disadvantaged wage earner engaged for planting Agroforestry spares a part of his/her wage to buy shares. In this process he or she becomes a permanent stakeholder of Agroforestry which provides much needed or most effective social protection. Demands of human-being or livestock pressure during early phases of plantations is minimized by setting up other micro-enterprises. During 1995-2001, about 20,397 ha of wastelands was planted with multipurpose trees and 2.87 million person days employment was generated with 45% being women beneficiaries. A total of 107 Primary Farm Forestry Cooperative Societies with a membership of 21,753 and 518 Self Help Groups were registered. A revolving fund of Rs.4.58 million was circulated among 663 Self Help Groups. Availability of fodder and credit-promoted livestock rearing, conservation and amelioration of soil, water and biodiversity were encouraged. Similar institutions (National Tree Growers Cooperatives) floated by the National Dairy Development Board are also promising initiatives for raising equitable Agroforestry by communities. The membership is gender neutral and is pro-poor with more than 76% being landless. The programme is socially equitable since 88% members belong to socially disadvantaged groups of people. These experiences should be widely replicated and further strengthened by linking them with Bharat Nirman, National Horticulture Mission, the National Rural Employment Guarantee Programme and other such programmes.

Kyoto Protocol

3.6.8.13 This is an important agreement of the United Nations Convention on Climate Change for promoting trading in greenhouse emissions. Agroforestry systems planted on abundantly available wasted or degraded lands can sequester carbon and other emissions. Soil organic stocks have improved in most of the Agroforestry systems established in the recent past. However, benchmarking of Agroforestry based stocks prior to 1990 and inventorization as well as certification of additional sequestrations is called upon to get into trading in emissions. Trained and
highly motivated cadre of technicians should be organized to take advantage of this provision and also to register India’s leadership in capturing new global opportunities when climate change is already a reality.

**Promotion/Participation of Industry**

3.6.8.14 Demand of soft wood by paper mills, match, plywood, chips, packing cases and supports goods industry is on the rise. Most of the grass based pulp and paper mills are shifting to soft wood. Ban on felling in natural forest in many areas has been imposed by Hon’ble Supreme Court of India. Similarly, many pharmaceutical, drugs, natural medicinal and energy generating companies are interested in the promotion of Agroforestry. Poplar based Agroforestry in North India was promoted by WIMCO Company by making available new clones, healthy nursery plants, customized plantations and signing of buy back agreements. Nearly 200 poplar wood based industries emerged during the last two decades in the twin city of Jagadhari and Yamuna Nagar of Haryana State with an annual turn over of about Rs.1000 crores. Large amount of financial resources were mobilized by selling public shares with attractive returns by many plantation companies. Teak plantations were raised on degraded leased lands by some of them. However, unfortunately, land use was ultimately diverted for the construction of tourist resorts or motels by some of them whereas most of the other companies disappeared. Corporate sector was offered some financial grants by the Ministry of Rural Development for raising pulp and wood industry based raw material during the Ninth Plan (1997-2002), but the overall outcome was rather discouraging. Leasing and contracting of land, including wasteland, to the corporate sector must be done carefully. Instead, landless and near–landless farmers should be allotted surplus and waternads and organised in groups. The corporate sector could join these small farmers’ estates as their nucleus under a Nucleus-Estate contractual arrangement.

**Strengthen Extension and Public-Private Linkages**

3.6.8.15 The extension agencies should be supported by a strong research unit which would identify suitable species, prepare yield and volume tables, fix rotation,
and in a participatory mode establish demonstrations and collect useful data for the user farmers. Research and technology outcomes should be strengthened to a level so as to become a real motivating force. Agroforestry and Farm forestry extension is a specialized activity and needs a separate infrastructure and human resources with a systems bias. Training of agroforestors as well as of trainers should regularly be organised. Strategically-located KVKs and ATMAs of the Ministry of Agriculture and similar outfits of the Ministry of Environment and Forests, particularly the Indian Council of Forestry Research and Education and the counterpart State institutions and organisations should regularly organise the training programmes and also establish system-based demonstrations,

3.6.8.16 Some of the wood-based integrated pulp and paper mills such as WIMCO, ITC, are promoting Agroforestry plantations by supplying Eucalyptus, Casuarina, Leucaena, Poplar and Acacia hybrid seedlings for pulp wood production. These companies have opted to promote Agroforestry plantations on marginal lands by providing high quality seedlings, technical extension services and buy back guarantee at remunerative prices to farmers. Fast growing, high yielding and disease resistant Eucalyptus clones with 3 to 4 times higher productivity have been developed by ITC Bhadrachalam Paper Board Limited. They have also selected ten promising Casuarina clones. WIMCO has developed their own poplar clones. Keeping in view size and diversity of India, these are very small and limited initiatives which require replication and scaling up. In addition, farmer-friendly Contract Farming should also be promoted. The public sector should essentially be involved as a facilitator in providing regulatory and services supports to strengthen production – processing – marketing chains.

Financial Requirement

3.6.8.17 The working group of the Greening India Programme of the Planning Commission, 2001, had estimated that 28 million ha additional land could be brought under Agroforestry in a ten year period. This is doable, hence should be implemented. The financial requirement for the Greening Programme would be of the order of Rs
48,000 crore in 10 years. The annual requirement would be Rs 4,800 crore against the current availability of Rs 1,601 crore. Bharat Nirman, National Rural Employment Guarantee Programme (NREGP) and “Food for Work” scheme should meet most of the expenses for this task. Additional funds, if needed, could be met from the plan budgets of Central and State Governments under various schemes of afforestation/tree planting, desert development, drought-prone area development, watershed development, command area development, settlement of shifting cultivation, wasteland development, National Horticulture Mission and other schemes of rural development. Externally-aided projects should also be formulated for availing assistance from various sources.

3.6.8.18 Institutional finance should be mobilized through normal run schemes of NABARD but should reach the farmer as directly as possible. Industries should also be enthused to participate in the Greening Programme through transfer of technology, supply of quality planting material and a captive market for the growers. Institutional funding is very important in areas where a farmer-industry nexus is to be established. However, the experience in the last 10-15 years shows that the flow of institutional finance into forestry programmes has been minimal and this malady should be rectified. Grassroot institutions, Panchayats and Gram Sabhas must play leading role in mobilising village communities, District Consortia on Agroforestry, involving public private, farmer and nongovernmental organisations should be constituted to provide collective technological and management support and for ensuring appropriate utilisation of resources.

Synergy

3.6.8.19 In order to contribute to the gigantic task of Greening India and harnessing the power of trees in 10 years timeframe, it is proposed to set up an Agroforestry Authority of Indiaby synergising the efforts of concerned Ministries and Departments for effective implementation, alliance, cooperation, partnership, monitoring and evaluation of the programme. The Agroforestry Programme will ensure environmental, food and livelihood securities, alleviate poverty and mitigate the adverse impacts of pollution and health hazards. It will reduce regional disparity,
bring desirable peace, prosperity and happiness and ensure an optimistic future for generations to come.

Acknowledgement

National Commission on Farmers expresses its gratitude to Dr. P. S. Pathak, Former Director, National Centre for Agroforestry Research (NCAFR) Jhansi, for his substantial inputs. Grateful thanks are also due to Dr. J. S. Samra, DDG, NRM, ICAR and Dr. Dhyani, Director, NCAFR, Jhansi and Dr. V. Pal Singh, ICRAF, New Delhi, and Dr. K. D. Singh, Former Forestry Advisor, FAO, for their contributions.
Annexure I
Major Agroforestry Practices and their main Characteristics.

<table>
<thead>
<tr>
<th>Agroforestry practice</th>
<th>Brief description (of arrangement of components)</th>
<th>Major groups of components</th>
<th>Agroecological adaptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrisilvicultural systems (crops – including shrub/vine/tree crops – and trees)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Improved fallow</td>
<td>Woody species planted and left to grow during the ‘fallow phase’</td>
<td>w: fast-growing preferably leguminous h: common agricultural crops</td>
<td>In shifting cultivation areas</td>
</tr>
<tr>
<td>(2) Taungya</td>
<td>Combined stand of woody and agricultural species during early stages of establishment of plantations</td>
<td>w: usually plantation forestry spp. h: common agricultural crops</td>
<td>All ecological regions (where taungya is in practices); several improvements possible</td>
</tr>
<tr>
<td>(3) Alley cropping (hedge-row intercropping)</td>
<td>Woody species in hedges: agricultural species in alleys in between hedges; microzonal or strip arrangement</td>
<td>w: fast-growing, leguminous, that coppice vigorously h: common agricultural crops</td>
<td>Subhumid to humid areas with high human population pressure and fragile (productive but easily degradable) soils</td>
</tr>
<tr>
<td>(4) Multilayer tree gardens</td>
<td>Multispecies, multilayer dense plant associations with no organized planting arrangements</td>
<td>w: different woody components of varying form and growth habits h: usually absent; shade tolerant ones sometimes present</td>
<td>Areas with fertile soils, good availability of labour, and high human population pressure</td>
</tr>
<tr>
<td>(5) Multipurpose trees on crop lands</td>
<td>Trees scattered haphazardly or according to some systematic patterns on bunds, terraces or plot/field boundaries</td>
<td>w: multipurpose trees and other fruit trees h: common agricultural crops</td>
<td>In all ecological regions esp. in subsistence farming; also commonly integrated with animals</td>
</tr>
<tr>
<td>(6) Plantation crop combinations</td>
<td>(i) Integrated multistorey (mixed, dense) mixtures of plantation</td>
<td>w: plantation crops like coffee, cacao, coconut, etc. and fruit trees, esp.</td>
<td>In humid lowlands or tropical humid/subhumid</td>
</tr>
<tr>
<td>(2)</td>
<td>crops</td>
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<td>-----</td>
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<td></td>
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<tr>
<td>(ii)</td>
<td>Mixtures of plantation crops in alternate or other regular arrangement</td>
<td></td>
<td></td>
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<tr>
<td>(iii)</td>
<td>Shade trees for plantation crops; shade trees scattered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv)</td>
<td>Intercropping with agricultural crops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in (i) fuelwood/fodder spp., esp in (iii) h: usually present in (iv), and to some extent in (i); shade-tolerant species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>highlands (depending on the plantation crops concerned); usually in smallholder subsistence system</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>(7)</th>
<th>Home gardens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intimate, multistorey combination of various trees and crops around homesteads</td>
<td></td>
</tr>
<tr>
<td>w: fruit trees predominate; also other woody species, vines, etc. h: shade tolerant agricultural species</td>
<td></td>
</tr>
<tr>
<td>In all ecological regions, esp. in areas of high population density</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>(8)</th>
<th>Trees in soil conservation and reclamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees on bunds, terraces, raisers, etc. with or without grass strips; trees for soil reclamation</td>
<td></td>
</tr>
<tr>
<td>w: multipurpose and/or fruit trees h: common agricultural species</td>
<td></td>
</tr>
<tr>
<td>In sloping areas, esp. in highlands, reclamation of degraded, acid, alkali soils, and sand-dune stabilization</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>(9)</th>
<th>Shelterbelts and windbreaks, live hedges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees around farmland/plots</td>
<td></td>
</tr>
<tr>
<td>w: combination of tall-growing spreading types h: agricultural crops of the locality</td>
<td></td>
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<tr>
<td>In wind-prone areas</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(10)</th>
<th>Fuelwood production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interplanting firewood species on or around agricultural lands</td>
<td></td>
</tr>
<tr>
<td>w: firewood species h: agricultural crops of the locality</td>
<td></td>
</tr>
<tr>
<td>In all ecological regions</td>
<td></td>
</tr>
</tbody>
</table>

**Silvopastoral systems (trees + pasture and/or animals)**

<table>
<thead>
<tr>
<th>(11)</th>
<th>Trees on rangeland or pastures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees scattered irregularly or arranged according to some systematic pattern</td>
<td></td>
</tr>
<tr>
<td>w: multipurpose; of fodder value f: present a: present</td>
<td></td>
</tr>
<tr>
<td>Extensive grazing areas</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(12)</th>
<th>Protein banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production of protein rich tree fodder on farm/rangelands for cut-and-</td>
<td></td>
</tr>
<tr>
<td>w: leguminous fodder trees h: present</td>
<td></td>
</tr>
<tr>
<td>Usually in areas with high person : land ratio</td>
<td></td>
</tr>
<tr>
<td>(13) Plantation crops with pastures and animals</td>
<td>Example: cattle under coconuts in south-east Asia and the south pacific</td>
</tr>
<tr>
<td>(14) Homegardens involving animals</td>
<td>Intimate, multistorey combination of various trees and crops, and animals, around homesteads</td>
</tr>
<tr>
<td>(15) Multipurpose woody hedgerows</td>
<td>Woody hedges for browse, mulch, green manure, soil conservation, etc.</td>
</tr>
<tr>
<td>(16) Apiculture with trees</td>
<td>Trees for honey production</td>
</tr>
<tr>
<td>(17) Aquaforestry</td>
<td>Trees lining fish ponds, tree leaves being used as ‘forage’ for fish</td>
</tr>
<tr>
<td>(18) Multipurpose woodlots</td>
<td>For various purposes (wood, fodder, soil protection, soil reclamation, etc.)</td>
</tr>
</tbody>
</table>

Note: w = woody; h = herbaceous; f = fodder for grazing; and a = animals.
Main Characteristics and Agroforestry Emphasis in the Major Agroecological Regions of India.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Himalayan region</th>
<th>Indo-Gangetic alluvial plains</th>
<th>Arid and semi-arid region</th>
<th>Humid and sub-humid region</th>
<th>Tropical coastal and Island region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Varies from temperate cold alpine to sub-tropical; rainfall 8 to 350 cm in west, 200-400 cm in east</td>
<td>Very hot summer and cold winter; rainfall 30 to 200 cm; ground frost common in winter</td>
<td>Dry-humid to very hot, sub-humid; rainfall in arid 40-65 cm; in semi-arid 70-125 cm.</td>
<td>Humid to sub-humid; hot; rainfall 100 to 400 cm, monsoonic</td>
<td>Tropical humid, lowlands; rainfall 60-310 cm</td>
</tr>
<tr>
<td>Geographic spread</td>
<td>Extreme northeastern to northwestern regions covering parts of Sikkim, Arunachal Pradesh, Assam, Nagaland, Manipur, Meghalaya, Mizoram, U.P., Himachal Pradesh, Jammu and Kashmir; elevation 1000-3000 m</td>
<td>Below foot hills of Himalaya covering about 47 million ha of Punjab, Haryana, Delhi, U.P., Bihar, Parts of W. Bengal; elevation 150 to 600 m.</td>
<td>Spreads over Rajasthan, Gujarat, Punjab, Haryana; parts of U.P., M.P., A.P., Maharashtra, Karnataka and T.N.</td>
<td>Spreads over parts of Assam, Meghalaya, Mizoram, Tripura; West Bengal, Orissa, M.P., and the Southern states; elevation 150 to 1500 m</td>
<td>Coastal regions of West Bengal, Orissa, A.P., T.N., Kerala, Karnataka, Maharashtra and the Islands</td>
</tr>
</tbody>
</table>

Soils and vegetation

<p>|            | Light to heavy | Mostly alluvial with patches of saline and | Sandy to clay loam; | Alluvial to clay loam; Oxisols; | Entisols, Oxisols, |</p>
<table>
<thead>
<tr>
<th>Main land-use systems</th>
<th>Grazing lands, forestry, horticultural and forestry species with agricultural crops, shifting cultivation in NE.</th>
<th>Agricultural crops (Wheat, pulses, sugarcane, oil seeds), commercial wood lots, MPTS with crops and along boundaries, degraded grazing lands.</th>
<th>Trees and shrubs in crop fields and along boundaries permanent grazing lands having trees and shrubs with stunt growth.</th>
<th>Cash crops (tea and large cardamom), agricultural crops, shifting cultivation, forests.</th>
<th>Plantation crops and multistory eyed cropping, field crops, fish culture, forestry.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main land-use and ecological problems</td>
<td>Excessive deforestation, degraded lands, over-grazing, land sliding and shortage of fuel and fodder.</td>
<td>Soil salinity, water logging, decline in soil fertility due to over-cultivation, fuel and fodder shortage.</td>
<td>Drought, overgrazing, salinity, extension of sand dunes, low water table, soil erosion, degraded lands.</td>
<td>Deforestation, soil erosion, soil acidity and consequent problems, decline in soil fertility, shortage of fuel and fodder, shortening of fallows.</td>
<td>Deforestation and degradation of environment, coastal erosion, acid-soils and related soil problems, soil erosion along slopes, shortage of fodder.</td>
</tr>
<tr>
<td>Major Agroforestr</td>
<td>Planting woodlots on Soil reclamation using MPTS, NFTs, Raising shelter belts, wind</td>
<td>Intercropping with nitrogen</td>
<td>Afforestation of coastal regions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
y emphasis on emphasis hills, contour contour farming blending blended with mpts, management management of pastures, raising raising orchards. suitable grasses; growing NFTs/shrubs with crops along field boundary, raising woodlots on degraded lands. breaks; growing NFTs in field, raising woodlots (NFTs) on degraded lands. fixing trees, alley cropping, improved fallows. with littoral and mangrove species, aquaculture with mangroves, multistoreyed cropping system; alley cropping.

Annexure III

Major Types of Agroforestry Systems and the Nature of their Benefits in different regions of India.

<table>
<thead>
<tr>
<th>Major types of existing AF systems</th>
<th>Major types of benefits / social attributes of systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Himalayan Region</strong></td>
<td></td>
</tr>
<tr>
<td>1. Shifting cultivation</td>
<td>Major requirements of food for the family, leads to soil deterioration</td>
</tr>
<tr>
<td>2. Taungya</td>
<td>Food for family, soil conservation, timber</td>
</tr>
<tr>
<td>3. Fruit trees in combination with agricultural crops and fodder trees</td>
<td>Production of fruits, food crops, fodder and fuel wood.</td>
</tr>
<tr>
<td>4. Fodder trees with pastures</td>
<td>Fodder, fuel, cattle rearing</td>
</tr>
<tr>
<td>5. Seasonal grazing in forests</td>
<td>Fodder, cattle rearing</td>
</tr>
<tr>
<td>6. Trees and grasses for soil conservation</td>
<td>Soil conservation, fuel, timber, fodder</td>
</tr>
<tr>
<td>7. Fruit trees in combination with pastures and fodder trees</td>
<td>Fruit, fodder, fuel</td>
</tr>
<tr>
<td>8. Cash crops in forests/shade of trees</td>
<td>Cash, spices, fuel, fodder</td>
</tr>
<tr>
<td><strong>B. INDO-GANGETIC PLAINS</strong></td>
<td></td>
</tr>
<tr>
<td>1. Trees for rehabilitation of degraded lands (saline/sodic/eroded)</td>
<td>Reclamation of degraded lands, fuel, fodder</td>
</tr>
<tr>
<td>2. Fodder trees in degraded grazing land</td>
<td>Fodder, fuelwood, soil conservation</td>
</tr>
<tr>
<td>3. Commercial trees on slopping land with commercial or forage grasses</td>
<td>Cash, soil conservation, forage, fuel</td>
</tr>
<tr>
<td>4. Trees on boundaries of agricultural fields</td>
<td>Food crops, fuel, timber, cash crop protection</td>
</tr>
<tr>
<td>5. Fodder banks</td>
<td>Fodder, soil conservation, fuel</td>
</tr>
<tr>
<td>6. Block plantation</td>
<td>Cash, lumber, fuel</td>
</tr>
<tr>
<td>7. Industrial plantation with crops</td>
<td>Cash, food crops</td>
</tr>
<tr>
<td>Section</td>
<td>Activity</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>8.</td>
<td>Fruits Orchards and multi purpose trees</td>
</tr>
<tr>
<td>9.</td>
<td>Fruit or shade-trees on agricultural farms</td>
</tr>
<tr>
<td>10.</td>
<td>Trees along canals, road sides</td>
</tr>
<tr>
<td>11.</td>
<td>Trees on community grazing land</td>
</tr>
<tr>
<td>C. ARID &amp; SEMI-ARID REGION</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MPTs on agricultural fields</td>
</tr>
<tr>
<td>2.</td>
<td>Trees for soil reclamation/ sand dune stabilization</td>
</tr>
<tr>
<td>3.</td>
<td>Wind breaks</td>
</tr>
<tr>
<td>4.</td>
<td>Fruit trees with MPTs</td>
</tr>
<tr>
<td>5.</td>
<td>Trees on pasture/grazing lands</td>
</tr>
<tr>
<td>D. HUMID AND SUB-HUMID REGIONS</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Home gardens</td>
</tr>
<tr>
<td>2.</td>
<td>Plantation-crop combination</td>
</tr>
<tr>
<td>3.</td>
<td>MPTs on agricultural fields</td>
</tr>
<tr>
<td>4.</td>
<td>Trees and grasses for soil conservation</td>
</tr>
<tr>
<td>E. COASTAL AND ISLAND REGION</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Plantation crop combination</td>
</tr>
<tr>
<td>2.</td>
<td>Multistoreyed cropping</td>
</tr>
<tr>
<td>3.</td>
<td>Home gardens/steads</td>
</tr>
<tr>
<td>4.</td>
<td>MPTs with aquaculture</td>
</tr>
<tr>
<td>5.</td>
<td>Trees on pasture lands</td>
</tr>
<tr>
<td>6.</td>
<td>Grasses under plantation crops</td>
</tr>
<tr>
<td>7.</td>
<td>Shelter belts and wind breaks</td>
</tr>
<tr>
<td>8.</td>
<td>Boundary trees on agricultural crops</td>
</tr>
<tr>
<td>9.</td>
<td>Mangrove plantation</td>
</tr>
<tr>
<td>10.</td>
<td>Mangrove with fish, prawn, pearl Culture etc.</td>
</tr>
</tbody>
</table>
Annexure IV

Multipurpose Trees' Priority in Different Agroclimatic Regions

<table>
<thead>
<tr>
<th>Agro-climatic regions</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1. Western Himalayan Region</td>
<td>Grewia optiva</td>
</tr>
<tr>
<td></td>
<td>Populus ciliata</td>
</tr>
<tr>
<td></td>
<td>Toona ciliata</td>
</tr>
<tr>
<td></td>
<td>Casuarina australis</td>
</tr>
<tr>
<td></td>
<td>Acacia catechu, Robinia pseudoacacia</td>
</tr>
<tr>
<td>2. Eastern Himalayan Region</td>
<td>Michelia champaca</td>
</tr>
<tr>
<td></td>
<td>Alnus nepalensis</td>
</tr>
<tr>
<td>3. Lower Gangetic Plains Region</td>
<td>Eucalyptus hybrid</td>
</tr>
<tr>
<td></td>
<td>Acacia auriculiformis</td>
</tr>
<tr>
<td>4. Middle Gangetic Plains Region</td>
<td>Populus deltoides</td>
</tr>
<tr>
<td></td>
<td>Anthocephalus cadamba</td>
</tr>
<tr>
<td>5. Upper Gangetic Plains Region</td>
<td>Populus deltoides</td>
</tr>
<tr>
<td></td>
<td>Eucalyptus hybrid</td>
</tr>
<tr>
<td></td>
<td>Dalbergia sisso</td>
</tr>
<tr>
<td></td>
<td>Anthocephalus cadamba</td>
</tr>
<tr>
<td>6. Trans-Gangetic Plains Region</td>
<td>Populus deltoides</td>
</tr>
<tr>
<td></td>
<td>Eucalyptus hybrid</td>
</tr>
<tr>
<td></td>
<td>Dalbergia sisso</td>
</tr>
<tr>
<td></td>
<td>Melia azedarach</td>
</tr>
<tr>
<td>7. Eastern Plateau and Hills Region</td>
<td>Gmelina arborea</td>
</tr>
<tr>
<td></td>
<td>Tectona grandis</td>
</tr>
<tr>
<td>8. Central Plateau and Hills Region</td>
<td>Acacia nilotica</td>
</tr>
<tr>
<td></td>
<td>Leucaena leucocephala</td>
</tr>
<tr>
<td>9. Western Plateau and Hills Region</td>
<td>Acacia nilotica</td>
</tr>
<tr>
<td></td>
<td>Leucaena leucocephala</td>
</tr>
<tr>
<td></td>
<td>Tectona grandis</td>
</tr>
</tbody>
</table>
### Agro-climatic regions

<table>
<thead>
<tr>
<th>Priority</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Southern Plateau and Hills Region</td>
<td>Ailanthus excelsa</td>
<td>Eucalyptus camaldulensis</td>
<td>Tamarindus indica</td>
<td>Ceiba pentandra</td>
<td>Casuarina equisetifolia</td>
</tr>
<tr>
<td>11. East Coast Plains and Hills Region</td>
<td>Casuarina equisetifolia</td>
<td>Gmelina arborea</td>
<td>Acacia mangium</td>
<td>Tectona grandis</td>
<td>Dalbergia sissoo</td>
</tr>
<tr>
<td>12. West Coast Plains and Ghats Region</td>
<td>Casuarina equisetifolia</td>
<td>Eucalyptus hybrid</td>
<td>Acacia mangium</td>
<td>Terminalia tomentosa</td>
<td>Artocarpus heterophyllus</td>
</tr>
<tr>
<td>13. Gujarat Plains and Hills Region</td>
<td>Prosopis cineraria</td>
<td>Eucalyptus hybrid</td>
<td>Ailanthus excelsa</td>
<td>Dalbergia sissoo</td>
<td>Leucaena leucocephala</td>
</tr>
<tr>
<td>14. Western Dry Region</td>
<td>Prosopis cineraria</td>
<td>Acacia nilotica</td>
<td>Azadirachta indica</td>
<td>Ailanthus excelsa</td>
<td>Dalbergia sissoo</td>
</tr>
<tr>
<td>15. The Islands Region</td>
<td>Casuarina equisetifolia</td>
<td>Gmelina arborea</td>
<td>Gliricidia sepium</td>
<td>Samanea saman</td>
<td>Terminalia catapa</td>
</tr>
</tbody>
</table>

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**Annexure V**

**Suitable Multipurpose Tree Species for Locations having Different Rainfall Distribution.**

<table>
<thead>
<tr>
<th>Locations with good annual rainfall (Bhubneswar, Ranchi, Rewa, Varanasi)</th>
<th>Locations with moderate annual rainfall(Akola, Anantpur, Bangalore, Bellary, Hyderabad, Indore, Solapur)</th>
<th>Locations with poor annual rainfall (Dantiwada, Hisar, Hoshiarpur, Jhansi, Jodhpur, Rajkot)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alnus nepalensis, Bauhinia purpurea, Casuarina equisetifolia, Dalbergia sissoo, Emblica officinalis, Gmelina arborea, Grewia optiva, Hardwickia binata, Melia azaderach, Morus alba, Populus species, Sesbania species, Terminalia species</em></td>
<td><em>Acacia nilotica, Ailanthus excelsa, Albizia lebbeck, Butea monosperma, Casuarina equisetifolia, Dalbergia sissoo, Eucalyptus species, Leucaena leucocephala, Tamarindus indica, Tamarix articulata</em></td>
<td><em>Acacia albida, Acacia catechu, Acacia aneura, Acacia nilotica, Acacia senegal, Colophospermum mopane, Eucalyptus camaldulensis, Parkinsonia aculeata, Pithecellobium dulce, Prosopis cineraria, Prosopis juliflora</em></td>
</tr>
</tbody>
</table>

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## Annexure VI

### Classification of Some Multipurpose Trees Based Upon Rotation Cycle

<table>
<thead>
<tr>
<th>Classes</th>
<th>Multipurpose trees</th>
<th>Rotation period (life cycle in years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very short</td>
<td><em>Casuarina, Eucalyptus, Lantana, Leucaena, Gliricidia sepium, Lawsonia, Moringa, Parkinsonia, Sesbania, Vitex, Bamboos</em></td>
<td>Less than 5 years</td>
</tr>
<tr>
<td>Short</td>
<td><em>Casuarina, Eucalyptus, Erythrina, Gmelina, Inga, Leucaena, Morus, Parkinsonia, Populus, Zizyphus</em></td>
<td>6-15</td>
</tr>
<tr>
<td>Medium</td>
<td><em>Acacia, Albizia, Azadirachta indica, Cassia, Grevillea, Gmelina, Mangifera indica, Pinus, Robinia,</em></td>
<td>16-25</td>
</tr>
<tr>
<td>Long</td>
<td><em>Alnus nepalensis, Borassus flabellifer, Cocos nucifera, Dalbergia, Grevillea, Ficus, Juglans, Madhuca, Pinus, Tamarindus indica, Tectona grandis</em></td>
<td>26-60</td>
</tr>
<tr>
<td>Very long</td>
<td><em>Cedrus, Ficus, Shorea,</em></td>
<td>61-100</td>
</tr>
<tr>
<td>Extremely long long</td>
<td><em>Ficus bengalensis, Ficus religiosa</em></td>
<td>More than 100 years</td>
</tr>
</tbody>
</table>
# Annexure VII

## Agroforestry Systems Priority in Different Agroclimatic Regions of India

<table>
<thead>
<tr>
<th>Agro-climatic zones</th>
<th>Agroforestry Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agri-silviculture</td>
</tr>
<tr>
<td>1. Western Himalayan Region</td>
<td>4</td>
</tr>
<tr>
<td>2. Eastern Himalayan Region</td>
<td>5</td>
</tr>
<tr>
<td>3. Lower Gangetic plains Region</td>
<td>5</td>
</tr>
<tr>
<td>4. Middle Gangetic plains Region</td>
<td>4</td>
</tr>
<tr>
<td>5. Upper gangetic plains Region</td>
<td>5</td>
</tr>
<tr>
<td>6. Trans-gangetic plains Region</td>
<td>5</td>
</tr>
<tr>
<td>7. Eastern Plateau &amp; Hills Region</td>
<td>5</td>
</tr>
<tr>
<td>8. Central Plateau and hills Region</td>
<td>4</td>
</tr>
<tr>
<td>9. Western Plateau and hills Region</td>
<td>4</td>
</tr>
<tr>
<td>10. Southern Plateau and hills Region</td>
<td>5</td>
</tr>
<tr>
<td>11. East Coast plains and hills Region</td>
<td>4</td>
</tr>
<tr>
<td>12. West Coast plains and Ghats Region</td>
<td>4</td>
</tr>
<tr>
<td>13. Gujarat plains and hills Regions</td>
<td>4</td>
</tr>
<tr>
<td>14. Western Dry Region</td>
<td>5</td>
</tr>
<tr>
<td>15. The Islands Regions</td>
<td>4</td>
</tr>
</tbody>
</table>

No. 1-5 indicate the priority practiced mode 1= Least and 5= Highest
CHAPTER 3.7

GUIDING PRINCIPLES UNDERLYING THE DRAFT NATIONAL POLICY FOR FARMERS

PRO-SMALL FARMER AGRICULTURAL RESEARCH AND TECHNOLOGY POLICY

3.7.1.0 The Agrarian Distress

3.7.1.1 The Green Revolution, ushered in the country in 1968, has been heralded as one of the two most important achievements in the post-Independence era (the second being the country emerging as the largest functional Democracy in the world). It has helped India almost triple its foodgrains production, mostly through yield increases, and halve the percentages of rural poverty and food insecurity between 1968 and 2000. The Revolution was triggered by the development and large-scale adoption of High Yielding Varieties (HYVs) of rice and wheat, based on technology packages comprising improved seeds, increased fertilizer-use and assured water supply (irrigation). The process was duly supported by the provisions of inputs, marketing linkages and remunerative prices – the three support pillars of success of the Green Revolution. Above all, the necessary political will and farmers’ enthusiasm and commitment were there in plenty.

3.7.1.2. Despite the Green Revolution and satisfactory overall National GDP annual growth rate of about 7 percent in recent years (now over 8 percent), the country is home to one-fourth of the World’s hungry and poor. Worst, the number of hungry had increased from 203 million in 1995-97 to 221 million in 2000-02. To put faces behind figures, nearly 15 percent of our children are “wasted” and over 60 percent of the pregnant women and lactating mothers are anemic. Inadequate purchasing power is the main cause of the hunger at household and individual levels. Over 400 million children, women and men belonging to families with small and
marginal holdings as well as landless labour families are in deep distress. India is far off the track in achieving most of the Millennium Development Goals.

3.7.1.3. The agricultural growth rate during the past five years has decelerated to about 1.5 percent from about 3 to 3.5 percent during the preceding 20 years, thus dropping below the population growth rate, for the first time during the past 40 years. Capital formation in agriculture at 1.3 percent of the GNP is also one of the lowest in recent decades, adversely affecting irrigation and rural infrastructure development, whereas agriculture accounts for about 20 percent of the national GDP and 60 percent of the employment. Unemployment has increased to 9.1 percent, thus we have many more mouths to feed than hands working. The rural-urban divide (the Bharat-India divide) and regional imbalances have further widened and threaten national integration. The per capita income disparity between the farm and non-farm sectors has more than doubled from 1:3 to 1:6 during the last 30 years, threatening the social fabric and peace in rural India, especially in the chronically depressed regions.

3.7.1.4. The average farm size is going down and nearly 80% of the farm families belong to the marginal and small farmer categories. Fortunately, the ownership of livestock is more egalitarian. Enhancing small farm productivity, and increasing small farm income through crop-livestock integrated production systems and multiple livelihood opportunities through agroprocessing and biomass utilization, are essential both to meet food production targets and for reducing hunger, poverty and rural unemployment.

3.7.1.5. Our farm and fisher families have often been subjected to the fury of nature in the form of drought, unseasonal and heavy rains and floods, and climate change. Institutional support to small farmers is weak. The same is true of post-harvest infrastructure. The spoilage losses can be as high as 30% in the case of vegetables and fruits. Institutions, which are supposed to help farmers, such as research, extension, credit and input supply agencies, are by and large not pro-poor and pro-women. Mechanisms for risk mitigation are poor or absent. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance. There is no Agricultural-Risk Fund. Both risk mitigation and price stabilization are
receiving inadequate policy support. The cost of production is often higher than the minimum support price, due to ever-increasing prices of diesel and other inputs. The cost-risk-return structure of farming is becoming adverse, resulting in growing indebtedness in rural areas and number of suicides among farmers. No wonder, a recent NSSO survey revealed that nearly 40 percent of farmers would like to quit farming, if they have the option to do so. Unfortunately, there is little option for them except moving into urban slums.

3.7.1.6. Technology fatigue in agricultural development is being felt widely. The total factor productivity growth rate particularly in the main Green Revolution belts of rice-wheat or rice-rice systems has decelerated. The huge foodgrain buffer stock (about 60 million tonnes) built a few years ago has almost disappeared and the government has decided to import about 2 million tonnes of wheat to rebuild the stock to the minimum desired level. This may push up international prices of wheat and of other foodgrains, and, if domestic prices and public foodgrain distribution system are not regulated and controlled, the price hike may benefit traders/hoarders and access to food on part of the poor may further deteriorate.

3.7.1.7. Green Revolution technologies are scale neutral but not resource neutral, since inputs are needed for output. Hence they have generally bypassed the vast rainfed areas and resource-poor farmers. A large number of crops and cropping systems were not touched by the Green Revolution process. The faulty use of inputs in Green Revolution areas has not only reduced the production efficiency, but also caused environmental and economic losses. For instance, the excessive drawl of underground water for irrigation has resulted in drastic drop of water table and uncontrolled flooding of fields uncoupled with drainage has caused serious waterlogging and salinity problems. Likewise, unbalanced use of fertilizers has adversely impacted soil health and lowered fertilizer productivity.

3.7.1.8. The problem of technological fatigue is further compounded with huge technology transfer gaps at various levels. Average national yields of most agricultural commodities in India are about 40 to 50 percent of the corresponding World averages. The gaps between potential and realizable and between realizable
and average realized yields in the country are generally around 50 to 100 percent, respectively. The existing exploitable yield gaps should be seen as an opportunity for future growth that is consistent with agro-ecological, environmental, socio-economic, political and technological settings in the major production regimes. With newly-improved methodologies for systems analysis, and greater access to relevant data, reliable estimates of potential yields in specific agro-ecological regimes are increasingly available. Such estimates will assist in estimating more reliably the gaps between actual and potential yields, and will assist also in charting strategies to bridge yield gaps through mutually reinforcing packages of technology, services and public policies.

3.7.2.0 New Challenges and Opportunities

3.7.2.1. Our Prime Minister has rightly emphasized the need to double annual foodgrain production from the present about 210 million tonnes to 420 million tonnes within the next 10 years. Since land is a shrinking resource for agriculture, the pathway for achieving these goals has to be higher productivity per units of arable land and water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. On an average, rice and wheat yields will need to be enhanced by about 40 percent and pulses, oilseeds, maize, millets, sorghum and horticultural commodities yields by about 50 to 100 percent (Figure 1).

![Figure 1. Required improvement in the productivity over the year 1994-95](image)

3.7.2.2. Gene revolution and ICT revolution are sweeping the world, especially the fast expanding knowledge-rich and knowledge-based economies. The first Green Revolution has failed to connect itself with these revolutions. The powers of biotechnology and ICT have not been internalised in India’s agricultural transformation process, although there are some “islands” of successes, viz Bt cotton hybrids and e-chaupal and sporadic Village Knowledge Centres. The national biotechnology policy is still in the making while area under “illegal” biotech varieties (Bt cotton hybrids) has been expanding fast (alongwith “legal” varieties). On the other hand, the conventional extension system has almost collapsed and there is limited involvement of the private sector in technology generation and transfer, other than that in hybrid varieties.

3.7.2.3. The high priority to achieve the MDGs notwithstanding, opening up of the economy and integration in global market implies dismantling of protective restrictions intended to safeguard national interests, and enhancing our competitiveness. Food self-sufficiency, maintaining low food prices, raising agricultural exports, and investments for upgrading production potential in a cost-effective and sustainable mode are overriding concerns. These have generated a stream of protective and incentive instruments (all bunched in AMS) which need adjustments under the liberalized regime and imply massive restructuring of the price structure. Agriculture is responding to these forces as well as to changing IPR regimes.

3.7.2.4. In the post-WTO era, both export and import of India have increased substantially. However, the increase in imports was relatively higher than that in export, thus bringing down the proportion of surplus to GDP from 3.2 percent in triennium ending (TE) 1995 to 2.7 percent in TE 2004, although there was a hump in the initial post-WTO years. This trend has adversely affected our self-reliance in agriculture. The value of export required to financing imports increased from 32 percent in the pre-WTO era to 57 percent in the post-WTO era. Huge imports of
vegetable oils and of pulses have depressed domestic prices of these commodities and adversely impacted their domestic production and producers’ income.

3.7.2.5. Agricultural growth in recent years has thrown new sectors and regions into prominence. Livestock, fisheries, horticulture, specialty enterprises (spices, medicinal, aromatic, organic) and value-added products illustrate this trend. Market-driven diversification in a global perspective has become the new paradigm driving future agricultural growth. The most profound shift pertains to rapid privatization in all domains - production, consumption, investment, technology, etc. and concomitant decline in State control. Alternative instruments and approaches are evolving to transform agriculture and a very important part of this ‘learning’ phase is a redefinition of the role of the State. Public goods, welfare imperatives, other regulatory needs, and other areas of market failure will continue to need government intervention. A matter of concern globally is shrinking investment in international public goods.

3.7.2.6. Rising capital intensity, particularly in the high-growth sectors of agriculture, has set in motion a new set of forces leading to biased knowledge, technological and market developments and thus exacerbating the problems of poor and small farmers. Declining growth in public investments and eroding institutional infrastructure are other disturbing features of the current trend. World agriculture, particularly trade, places high premium on quality, and public health, food safety and overall agricultural biosecurity concerns have become central themes of global regulatory negotiations. Equally important issues are sustainability of natural resources (particularly land, water and biodiversity) and other environmental externalities including global warming and climate change.

3.7.3.0 The Premise and Needed Paradigm Shifts to Strengthen Technology-led Revitalization of Indian Agriculture

3.7.3.1. Technology is the engine of growth and transformation and must address the above issues and opportunities. In consort with traditional and conventional technologies, cutting edge technologies, such as biotechnologies, ICT, space and
satellite technologies, GIS for land use planning and weather forecasting, etc., should be synergised and channelised to meet the human needs and aspiration with due consideration of equity and food, health and environment safety and ethical aspects. National agricultural research and technology policy and actions should ensure that science and technology, as prime mover of change, must specifically address the needs and prospects of majority small and resource-poor farmers and landless agricultural labour families, and help mainstream the gender concerns. Institutional, human capital and policy supports must capture the positive effects and minimize the negative effects of globalization and liberalization and of revolutions in biotechnology and information and communication technologies. Technology choice should thus be made according to agro-ecological and socio-economic conditions and market demand.

3.7.3.2 Not simply promises, but new science and technologies are already providing us new ways of tackling the difficult challenges. For example, the nutritionally improved rice, potato and cassava will greatly help in achieving nutritional security. Poor man’s crops, such as millets, cowpea, sorghum, chickpea and groundnut are receiving greater research attention. Biotechnologies jointly with Bioinformatics has already helped develop cereal varieties with greater tolerance to soil alkalinity and toxicity and which require less water.

3.7.3.3 Enhanced and sustained farmers’ income must be the main objective. To enhance the income, livelihood, nutrition and health security of farmers through mutually reinforcing packages of technology, techno-infrastructure, services, public policies, home and external trade and global competitiveness.

3.7.3.4 Based on a meaningful interaction between science and policy, relevant policies are needed to promote knowledge economies and to bring the much-needed congruence among productivity, sustainability, profitability and equity. The “Indian Enigma” of the co-existence of enormous technological capability and entrepreneurship on the one hand, and extensive under-nutrition, poverty and deprivation, on the other, must be resolved. Thus, it is not only biological and
physical sciences, but also humanities including economics and social sciences, which must all interact dynamically to yield wholesome results.

3.7.3.5. The following paradigm shifts are needed in technology generation and transfer mechanisms geared to revitalize Indian agriculture, and should be internalized in the national policy:

- The first paradigm shift relates to a shift in research approach from a single commodity based and monodisciplinary to a farming system based and multidisciplinary.
- The second shift demands a change from a top-down (training and visit system) extension approach to a participatory (effective research-extension-farmer-market-consumer interface) approach of technology generation, assessment, refinement and transfer.
- The third shift seeks the integration of molecular biology, bio-technology, bio-informatics, nanotechnology and other cutting-edge technologies with conventional as well as traditional technologies for speedy, more precise and wholesome gains.
- The fourth shift seeks greater congruence between productivity, sustainability and equity and creation of enabling mechanisms and inclusiveness for generation and adoption of new technologies. Cost-effectiveness of production, quality and safety in food and other products, and GMO biosafety and overall agricultural biosecurity, will assume high significance in the globalised and liberalized world.

3.7.4.0 Research and Technology Policy for Agricultural Renewal and Farmers’ Welfare

Towards an Ever-green Revolution

3.7.4.1. The future of our agriculture depends on our ability to increase productivity per units of arable land and irrigation water in perpetuity without associated ecological harm, a process known as “ever-green revolution”. Inaugurating the 93rd
Session of the Indian Science Congress on January 3, 2006, our Prime Minister, Hon’ble Dr. Manmohan Singh had observed that the technologies and the strategies unleashed by the first Green Revolution have run their course. He emphasised that we need a Second Green Revolution, particularly in non-food crops, in horticulture and in new plant varieties, and desired that as our agricultural growth plateaus, there is a need for a renewed thrust on research that can enhance farm productivity and sustainability, especially in rainfed areas. The Prime Minister reiterated that “we need greater emphasis on research that can increase the efficiency of utilization of inputs; that can improve farm management practices; that can reduce post harvest losses through better post-harvest management technologies in storage, transportation and processing; that can, in the final analysis, increase both yields and value addition at the farmer level leading to better incomes, especially of the small and marginal farmers.”

3.7.4.2. Both technology fatigue and technology gap should have no place in the Indian R&D system. In fact, at this juncture, technology should flow faster through the pipeline and more options should be available to users, and agricultural research, education and extension systems should be revitalised. Science and technology development towards an Ever-green Revolution must avoid the shortcomings of and build on the R&D foundation laid during the First Green Revolution. It must concurrently address the following four interrelated groups of technology generation and development priorities and approaches.

- Protecting yield and productivity gains, extending the gains to new areas, and enhancing yield ceilings and achieving new gains; bridging yield gaps; minimizing post-harvest losses, augmenting value addition and improving productivity and farmers’ income; and promoting eco-technologies rooted in the principles of ecology, economics, equity and employment.
- Exploiting the gene revolution (biotechnology); benefiting from information and communication technology revolution, space, nuclear and
nanotechnologies; and promoting knowledge-based precision farming systems, intensification and diversification.

- Protecting and improving natural resources (land, water and biodiversity); addressing environmental concerns, ecological security, agricultural biosecurity and sustainability; and managing climate change and natural disasters.

- Seeking congruence of productivity, profitability, sustainability and equity; addressing gender issues and problems of the poor and the excluded, particularly of small and marginal farmers and land-less agricultural labourers; and managing liberalized trade in the globalized world by addressing issues related to global competitiveness in the context of the WTO/AoA.

3.7.4.3. In particular, the Ever-green Revolution must be inclusive, pro-poor and address the concerns of rainfed and other non-congenial agro-ecological regimes. It must benefit from the latest developments in biotechnology, ICT, and other cutting edge technologies and synergistically link these technologies with conventional and traditional technologies and knowledge. Among other things, the challenges and opportunities arising from globalization and liberalization and the prospects of prevention of post-harvest losses, processing and value addition should be addressed under the Ever-green Revolution.

3.7.4.4. Thus, policy provisions must humanize technologies, and should emphasize:

- Enhancing capabilities for sustainable livelihood, and providing for new livelihood opportunities for the poor,

- Improving the productivity, profitability and sustainability of communities' assets, and establishing effective linkages between community mobilization and the government and other service providers,

- Ensuring the congruence and synergism among environmental, economic and social (gender and other equities) securities, and
• Empowering communities, especially the vulnerable ones, to harness new and appropriate technologies and enabling them to blend traditional local technologies with modern technologies.

3.7.4.5 With the above backdrop, the researchers and technology developers thus must ask themselves the following questions in deciding their research and technology development priorities:

• Will the technology lead to higher productivity across all farms, water regimes (rainfed drylands), soil types and regions, not just large farmers and well-endowed ones?
• How will the technology affect the seasonal and annual stability of production, especially the highly risk prone rainfed areas suffering from high instability?
• How will the technology affect the energy balance, eco-system and the sustainability of farming?
• Who will be the winners and losers from the technology – and how will it affect the majority small and marginal farmers, the poor and deprived ones?

Defending the Yield/Productivity Gains, Extending the Gains and Elevating the Gains: Strengthening Strategic, Anticipatory and Cutting-edge Research

3.7.4.6 A three-pronged iterative and synergistic approach of research and technology development is needed to defend the gains made in the past, to extend/expand the gains to new areas and to elevate the gains to newer heights (breaking yield barriers and achieving higher productivity and farmers’ income).

3.7.4.7 As regards protecting the yield gains, under certain production regimes there are signs of decline in actual yields, which must be arrested. A long-term strategy and a site-specific and knowledge-intensive integrated management of diseases and pests and soil-fertility management and integrated fertilizer use orientation are needed for technology transfer, adoption and monitoring by extension advisory systems and the farmers themselves. Soil-test based balanced fertilizer
application, particularly micro nutrients, real-time nitrogen management by leaf chlorophyll meter or leaf colour chart and soil nutrient budgeting, will be the elements of precision agriculture to sustain high yields and lessen the inputs-related deceleration of partial factor productivity.

3.7.4.8. Anticipatory research, risk assessment and management viz. management of Avian Flu strain H5N1 and prevention of the devastating wheat stem rust strain Ug99 from its entry and establishment in India, coping with climate change and natural disasters, contingency production systems should receive due priority and support. This approach calls for a paradigm shift in the technology transfer approach, based on intensive knowledge and higher capacity of extension agents of both public and private sectors. A District Technology Consortium approach involving scientists, grassroot institutions, corporate sector, NGOs, financial institutions and farmers is urgently needed.

3.7.4.9. Regarding extending the gains to newer areas, research and technology development for non-congenial agro-ecological and socio-economic settings, such as rainfed areas, especially arid drylands, hill and mountain agro-ecological zones, coastal lands and degraded lands should receive much greater priority and support than in the past. It is encouraging that yields of major crops have continued to increase during the past 35 years; they are projected to increase towards 2030, albeit at a decelerating rate, but nonetheless implying the continued need for developing the technologies wherewith to achieve increased yields. For instance, rice, central to the nation’s food security must maintain annual yield growth of about 2 percent towards the year 2020 to meet the demand. As cropping intensity becomes increasingly important, the features of crop duration and high per day productivity become preferred attributes. This calls for focused research and technology development for increasing input and natural resource use efficiency. The proposed National Rainfed Area Authority, describe later, should play a crucial role in promoting participatory research and technology transfer in rainfed areas.
3.7.4.10 As regards breaking yield ceilings, conventional breeding and management practices continue to offer great prospects of developing new super ideotypes, hybrids, and new life forms characterized by greatly enhanced new levels of yield, productivity, and adaptability, such as the Super New Plant Type, Super Hybrid, aerobic and NERICA rices and extra-long-spike, and hybrid wheat cultivars. These will be complemented by various genetically engineered products. Quality, consumer preferences, cost effectiveness, and environmental aspects of production, distribution and consumption of these new types will need to be critically analysed in order to assess efficiency and efficacy of their large scale popularization in the broader context of food security, poverty alleviation, sustainability, equity and agricultural biosecurity. Agro-processing, value addition, efficient marketing and trade and dynamic diversification (including niche production and organic farming) should be judiciously emphasized to enhance productivity, efficiency, competitiveness and income – a win-win situation for all.

**Enhanced and Sustained Productivity and Income**

3.7.4.11. The country may launch a national movement of technological revitalization of agriculture in this fast expanding knowledge society and the NARS comprising all ICAR institutions, Agricultural Universities and private sector institutes may commemorate 2006-07 as the Agricultural Technology Year to mark the 60th anniversary of our Independence. The major aim of this year should be to strengthen participatory research and knowledge management with farming families and the organization of about 60,000 Lab to Land programmes in the area of post-harvest technology and value addition to primary products to enhance farmers’ income through forward linkages, as highlighted in the Third Report of the NCF. There should be a proper match between production and post-harvest technologies and a post-harvest technology wing should be added to every Krishi Vigyan Kendra and KVKs should be redesignated as Krishi Vigyan and Udyog Kendras (KVUKs). Farm Schools should be established in the fields of farmer-achievers in order to foster farmer to farmer learning of new technologies. Value addition to biomass such as through establishing Rice Bio Parks and producing eco-boards from cotton stalks,
will help generate skilled jobs and additional income. Organic Farming and Low External Input Sustainable Agriculture (LEISA) techniques should be promoted along with Integrated Natural Resource Management and Integrated Pest Management (IPM) techniques, and all programmes designed to foster access to technologies must be gender sensitive.

3.7.4.12 Agricultural scientists should state the performance of new varieties and technologies in terms of net income per hectare, and not just in terms of yield per hectare. The aim of technological transformation of farming systems should be to enhance income per hectare on an environmentally sustainable basis. For landless agricultural labour and other unemployed rural youth, the aim should be to convert them into skilled workers, thereby adding economic value to their time and labour. The training should be in skills which can help in organizing market-driven enterprises. The Bharat Nirman and National Rural Employment Guarantee Programme of the GOI should help foster job-led economic growth in villages and bring about a shift from unskilled to skilled work based on new technologies, and stop job-less and job-loss growth.

3.7.4.13. The economic viability of farming depends heavily on assured markets and remunerative prices. The production-processing-marketing-consumption continuum should be rendered farmer-centric and each link in the chain should receive timely and adequate research and technological attention and should be synergized with each other. In this context, Land Use Boards both at Central and State level could play a vital role, but have not done much in the past and need to be suitably restructured, strengthened and activated. There is an urgent need for a National Land Use Advisory Service, linked to State and Block Level Land Use Advisory Services on a hub and spokes model. These can be virtual organizations with the capacity to link land use decisions, especially diversification of farming systems, with ecological, meteorological and particularly marketing factors on a location and season specific basis. The National Land Use Advisory Service can be linked to the proposed Indian Trade Organisation (ITO) as elaborated in the Third Report of the NCF. It should have continuous contact with all credible national and international sources of
information on relevant technologies and resources in all subsectors of agriculture and on domestic and international markets. Without economically, technologically and ecologically sound and proactive advice on land and water use, farmers will have to fend for themselves in taking decisions on what to grow, where to sell and at what price, which may often prove unfriendly.

3.7.4.14. The ‘contract farming’ model of agribusiness is gaining momentum. However, usually devoid of formal contract between the farmers and the prospective buyers, the arrangements could be biased in favour of the agribusiness organization. But, there are beneficial effects of such arrangements to the farmers in the matter of access to adequate/timely credit, good quality inputs, new technology, employment generation, introduction to new crops, separation of production and marketing risks and better farm practices etc. The need is to develop a comprehensive, clean, equitable and farmer-centric model agreement, which cannot be abused against the farmers. Special care needs to be taken regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and arbitration mechanism. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/cooperatives to deal with the agribusiness unit on their behalf, one has to be rather cautious about these arrangements.

3.7.4.15. In a globalised economy, we should develop appropriate institutional instruments and policies to safeguard the livelihood security of nearly 70% of our population who depend on crop and animal husbandry, inland and marine fisheries, forestry and agro-forestry and agro-processing for their work and income security. Risk Mitigation and Price Stabilization Funds will be needed. All Technology Missions and the Small Farmers’ Agri-business Consortium (SFAC) should be restructured and suitably funded under competent professional management. As highlighted in earlier NCF Reports, each Mission should have measurable time-bound goals and should not only be subsidy-rich and primarily concerned with subsidy distribution, but should concentrate on technology-led agricultural transformation.
The Mission Director, an eminent professional, should be in position at least for a period of five years.

**Natural Resources Management**

3.7.4.16. India’s Agricultural Renewal heavily depends on the restoration and enhancement of the health of our soils, water and genetic resources, which have unfortunately been degenerating fast under various pressures. Appropriate crop-livestock-fish-tree integrated farming system should be pursued for sustaining and enhancing the natural resources.

3.7.4.17. **Soil Health**: Establish a National Network of Advanced Soil Testing Laboratories. The existing laboratories should be retooled and reequipped and the staff retrained in order to enable them to provide each farm family with a Soil Health Card, which contains integrated information on the physics, chemistry and microbiology of the soils. The Soil Health Cards should stimulate balanced fertilization, including the amelioration of micro-nutrient deficiencies. In order to improve organic (carbon) balance of soils, through campaigns and demonstrations, the introduction of fodder/grain legumes in the crop rotations as also green manuring as well as composting of all agricultural residues and wastes and the use of microbial fertilizers and farmyard manure should be promoted to the maximum extent possible.

3.7.4.18. Methods of soil health enhancement through integrated nutrient supply will have to be prescribed and farmers should be assisted to adopt the recommendations. A dedicated cadre of soil technicians/scientists for the National Movement on Soil Health Care with defined targets and resources (functioning equipment and trained human resources at the soil testing laboratories) should be created. Community Land Care movements may be launched by Panchayats. Needless to assert, soil health enhancement and removal of their hunger and thirst especially in rainfed dryland areas hold the key to improving the return from investment in other inputs like seeds and water.
3.7.4.19. Breeding soils for higher productivity may be undertaken in the case of problem soils and wastelands. Wasteland development could be linked to the production of biofuel and industrial raw material (for the production of paper and board, rayon, packaging material etc) as well as fodder, firewood etc. People must be made aware and sensitised of the shrinking capacity of soils to absorb any more abuse. A National Soil Charter structured on the “World Soil Charter of FAO” and “UN Soils Convention” should be created to ensure soil health security.

3.7.4.20. **Water:** Jal Swaraj or self-sufficiency in irrigation water availability is the need of the hour. Water is a public good and a social resource and not private property. The privatization of water supply distribution is fraught with dangers and could lead to water wars in local communities. Increasing supply through rainwater harvesting, recharge of the aquifer and water conservation should become mandatory. In addition, a nationally debated and accepted strategy for bringing 10 million hectares of new area under irrigation under the Bharat Nirman programme should be developed. All existing wells and ponds should be renovated. Demand management through improved irrigation practices, including sprinkler and drip irrigation, should receive priority attention. A water literacy movement should be launched and regulations should be developed for the sustainable use of ground water. Farmers need technical advice in site selection for borewells, particularly in the Southern Plateau Region. A farmer-friendly insurance cover for failed wells is also needed for ground water development. Seawater farming should be promoted in coastal areas through the cultivation of mangroves, salicornia, casuarinas and appropriate halophytic plants. The conjunctive use of rain, river, ground, sea, and treated sewage water should become the principal method for the effective use of available water resources.

3.7.4.21. In water scarce areas, the land use system should place emphasis on the cultivation of high value, low water requiring crops, such as pulses and oilseeds. Pulses and oilseed villages can be promoted where all farmers work together in harvesting rainwater and sharing the water equitably for growing pulses and oilseeds. Promotion of “Hybrid Arhar (pigeon pea) villages” can be the starting point of a
pulses revolution. In paddy and sugarcane, water saving methods of cultivation like those inherent in the “System of Rice Intensification” (SRI) methodology should be perfected and popularized. More crops per drop of water should not remain just a slogan. Land use decisions are also water use decisions. Hence, the choice of cropping systems should be based on irrigation water availability including rainfall pattern. Watershed management should be linked to the different Technology Missions as emphasized in our earlier reports, so that the concurrent availability of water and of the other inputs like seeds needed to optimize the benefit from irrigation water can be ensured. Low cost green houses can be promoted in areas where evaporation exceeds precipitation during many months in a year. Panchayats may be assisted in launching water literacy and water quality management programmes and in promoting participatory irrigation and efficient water use management. Extra efforts are called for minimizing water pollution due to pesticides, other agrochemicals and toxic substances.

3.7.4.22. Both the anthropogenic and natural causes of occurrence of poor quality water are known and their piece-meal solutions are also known. Looking into vast areas under such problems and their adverse impact on agricultural production, an ‘Integrated Water Use and Management System’ is to be developed to address the problem in a sustainable and holistic manner. Biodrainages should be promoted towards reclamation of saline, waterlogged and other wastelands. Along with irrigation, drainage development should also be considered an integral part of national water use policy.

3.7.4.23. A National Research Centre on Glacierology should be established for collection, storage and dissemination of information on status of seasonal/perennial snow and ice. The Centre should undertake research on understanding the interaction amongst biological processes, physical environment and the climate change and develop early, medium and long-term warning systems and advise on trends of water availability and overall hydrological situation in the medium and long-term.
3.7.4.24. **Biodiversity**: Biodiversity, comprising genetic resources, is the building block of functions and forms of living organisms and will always be needed to produce new genotypes to meet the ever changing needs of humankind. New sciences of biotechnology and bioinformatics, coupled with conventional sciences, should be judiciously used for developing efficient and effective methods of conservation, utilization and exchange of genetic resources. Due to economic and population pressures the resources are eroding fast. Moreover, their availability is getting increasingly restricted due to their propriety protection under several systems. The Cartagena protocol for conservation, biosafety and sharing of genetic resources provides largely accepted and harmonized current practices and standards, and should be accepted by all countries. Along with Plant Breeders Rights, Farmers' Rights should be honoured and implemented for equitable and fair sharing of benefits arising from the use of genetic resources. In this context, the indigenous rights over genetic knowledge and women's sphere of plant knowledge as well as the Farmers’ Plant Back Rights should be recognised under any intellectual property rights regime. The PVPFR Authority should ensure strengthening of national biodiversity management capacity, implementation of the Farmers’ Rights, execution of the TRIPS and SPS commitments, and judicious use of the Natural Gene Fund and the National Biodiversity Fund.

**Pro-Small Farmer and Pro-Poor Technologies for Inclusive Development and Economic Security**

3.7.4.25. Science and technology must promote inclusive development by addressing the needs and opportunities of small farmers, poor, less-favoured areas, neglected and excluded communities. Even biotechnology can be geared towards this cause. Benefits and risks associated with new technologies should be studied carefully before they are recommended to resource poor farming families.

As repeatedly emphasized by Nobel Laureate Amartya Sen, the lack of entitlement to basic resources is the main cause of hunger and poverty. Scientifically informed agrarian reforms to grant titles to land and water, and increased access to credit, knowledge and markets, will enhance productivity, sustainability (through better land
and water care) and income, thereby resulting in appreciable reductions in hunger and poverty. Engendering these changes and technologies and socioeconomic safety nets designed for small-scale and marginal farmers are essential for supporting rural livelihoods, and this aspect should be explicitly highlighted in national policies.

3.7.4.26. As highlighted by the Prime Minister, agricultural research and technology development must address the challenges and opportunities of small farmers. In this context, we must differentiate between small farms and small farmers. The small could be beautiful if managed and supported suitably, otherwise both remain “small”. Farmers owning less than two hectare cultivated land are classified as small farmers and those owning less than one hectare are categorised as marginal. Generally, those owning around 2 hectare irrigated land, with an average family size of 5-6 persons, are able to achieve and sustain their livelihood solely from agriculture. But, marginal irrigated land farmers and those owning even around 2 hectare rainfed land are often hardpressed to secure their livelihood solely from agriculture, as their income is generally small and inadequate to access desired inputs, technologies and markets, resulting in perpetual low agricultural productivity and depressed production. For such households, timely availability of adequate institutional credit at reasonable rates or even 30 per cent supplementary off-farm or non-farm income are essential to access the necessary inputs, technologies and markets to keep them out of the poverty trap and to render them efficient producers.

3.7.4.27. Studies reveal that, other things being equal, primarily because of the full indulgence and commitment of the family labour, small and marginal farms, as compared to large and medium-large farms, are more efficient and have higher productivity, cropping intensity and diversification index. Further, as discussed later, if organized in groups (Small Farmer Estates, Cooperatives, SHGs or Farmers’ Clubs), with desired economies of scale and with effective backward-forward linkages, small and marginal farms would generally be viable and effectively contribute to the national production, productivity and sustainability. But, the same size small farms, if owned by resource-poor small farmers with little access to formal credit, insurance, irrigation, technology and market, become non-viable and suppress
household as well as national productivity, income and livelihood security.

3.7.4.28. Recognising that alternate employment opportunities are limited and the number of small, marginal and sub-marginal farmers constitute nearly 80 percent of the rural households, and their number continues to grow, increasing productivity of such farms, predominantly comprising crop-livestock integrated systems, should be a priority goal of the Central and State Governments. Multiple livelihood opportunities should be promoted through strengthening production-agroprocessing-biomass utilisation-marketing chains. The National Agricultural Research System (NARS), encompassing public, university and private sectors, should topically and judiciously align their research and technology development priorities and programmes with the farmer’s capacity, need and aspiration by promoting participatory research.

3.7.4.29 The ownership of livestock is much more egalitarian since resource poor farming families own a majority of cattle, buffalo, sheep and goats. Livestock and livelihoods are very intimately related in our country and crop-livestock integrated farming is the pathway for farmers’ well-being. The major constraints experienced by such families relate to fodder, feed and healthcare. There is an urgent need for establishing Livestock Feed and Fodder Corporation to assist SHGs to produce good quality animal food locally, by providing seeds and planting material of improved varieties. The role of fisheries should also be strengthened and integrated. Particular attention should be paid to help SHGs of fisher families in producing seed and feed for aquaculture. The market value of Indian fishes should be enhanced by promoting special organic fish products and air-breathing fishes as health foods and promoting utilisation of underutilised species.

3.7.4.30. Alienation of small and marginal farmers from commercial banking and fair marketing systems is their major handicap in harnessing new technologies. It is encouraging that the 2006-07 Budget has reduced the rate of interest for crop loans to 7 percent. However, keeping in view the decline in the profitability of agriculture, increasing farmers’ distress and indebtedness, the Government may consider providing support to the banking system for further reducing the interest rate to 4
percent and minimise the hassles and redtape in procuring loan. The small farmers in
distress hotspots should not be charged compound interest on arrears. Micro-
financing should be changed to “livelihood” financing to further enhance the access
of the poor to various services. A long-term policy on agricultural credit needs to be
developed to include wider coverage, including consumption and entrepreneurial
needs of farmers. The Central and State Governments should jointly create an
Agriculture-Risk Fund to provide relief to the farmers in case of successive droughts
and other calamities. Special efforts are needed to issue Kisan Credit Cards to the
unreached and needy farmers, especially women farmers. Small and marginal
farmers should also be saved from distress sale by pledging loans to them against
their warehouse receipts.

3.7.4.31. Small farm productivity should be enhanced not only for increasing food
and nutritional security of majority small farmers, but also for generating marketable
surpluses which must be disposed off timely and remuneratively to enhance farmers’
income. MSPs for the commonly produced commodities should be appropriately
fixed (based on C₃ cost) and timely announcement (of the MSP), procurement and
payment should be ensured. Enhanced income of the farmer will lead to increased per
capita consumption and enhanced domestic demand for a larger and diversified food
basket and consumer goods at household levels, stimulating overall economic growth.
Further, urbanization and globalization have fuelled dietary convergence and dietary
adaptation. These present both an opportunity to reach lucrative new markets and a
substantial risk of increased marginalization of smallholders and poor people leading
to even deeper poverty. In order to capitalise the opportunity, smallholders must
organize themselves in cooperatives or as Small Farmers’ Estates or SHGs to
undertake group farming and contract farming to enhance their economies of scale
and competitiveness and should be guided by well-researched and structured
diversification and intensification, and supported both by the public and private
sectors for training and skill development and start-up funds.

**Mainstreaming the Smallholder in High-value Agriculture**
3.7.4.32. Involvement of smallholders in high value agriculture is crucial for achieving inclusive and equitable development. The role of the corporate system in the overall food chain is becoming important, highlighting the need for greater and effective linkages between public and private sectors in the changing food situation of the country. This linkage must be addressed by the country’s innovation and research system. Indian supermarkets are increasingly retailing and distributing not only processed food but also fresh vegetables and fruits and other agricultural products and are playing an important role in the food chain. This has also put an increased pressure on food management and processing. In this transformed scenario, we must not forget the role of small and marginal farmers who are not only producers but also constitute the bulk of the poor consumers as customers. Small farmers thus must get a foothold in this changing food chain. The hub and spokes model of the Nucleus Estate-System to provide centralised services to support decentralised production should be promoted. Agri-clinics, agri-business centres and SFAC could play an important role in this direction.

3.7.4.33. In order to mainstream the small landholders into the high-value agricultural and supply chain, the strategic partnership between public and private sectors will be needed. Such an arrangement should be built to pool risk and resources to bring actors together to resolve market failures. Supply chain plays important role in cooperation of the partners to specify high quality products to generate value and consumer demand. Such a win-win situation is particularly favourable for smallholders in terms of higher prices, knowledge, reduced losses and assured markets. However, smallholders are not able to make these demands due to market failures attributed to information asymmetries, organisational failure, high transaction cost and regulatory failures. The synergy of the public-private partnerships, especially involving the smallholder is bound to create mutual benefits and confidence and can remedy market failures which cannot be undertaken separately by public and private sectors.

3.7.4.34. The market failures can be remedied through: creation of research contribution to deliver high quality varieties, particularly suitable for processing,
development of third party certification organization and public-private-partnership-led initiative to create producers’ organisation to improve marketing and build linkages with processors, as suggested in the NCF Reports in relation to the creation of Small Farmers Estates (SFEs) on the NDDB model. The PPPs must be at the chain-level to intervene in all major bottlenecks, as targeting one may not benefit the whole supply chain. Bulk vending should be promoted to cut cost and also to mainstream small producers in market chain. Establishment of effectively functioning rural warehouses and transport connectivity and facilities, especially in hills and mountains and dryland arid zones, will be essential for linking the smallholder with the market chain. The PPPs must also induce positive effects for all stakeholders, processors, retailers, etc. to ensure a positive feedback and benefit to the whole supply chain. For keeping the system dynamically responsive to new situations with optimum output for all the partners, it may be prudent to undertake research to identify appropriate partners and modalities to scale-up PPPs and as to how can PPPs regulate market failures.

**Value Addition and Prevention of Post Harvest Losses**

3.7.4.35. Post harvest losses, on an average ranging from 10 to 30 percent depending on commodities, being high in horticulture, livestock and fisheries - all high value products, are colossal, estimated about Rs. 50,000 Crore each year. For instance, in horticulture, serious mismatch between production and consumption continues although there is no reliable data available to estimate the success achieved during the last 10 years in reducing post harvest losses. The estimates of monetary losses being incurred in the country keep rising. The huge investments made not only by the Department of Agriculture and Cooperation, but also by the APEDA, NCDC, NAFED, Ministry of Food Processing etc. have thus not succeeded much in reducing the staggering post harvest losses. No authentic data are available on the reduction in losses, if any, achieved due to the infrastructure created, improved PHM technologies promoted and several policy initiatives taken for streamlining the systems involved. This data gap is a serious hurdle in setting research and technology acquisition priorities, and should be abridged soon.
3.7.4.36. The extension staff, private sector and PRIs can play an important role in educating the farmers in better post harvest management practices. There is a need for introducing a Post Harvest Technology Wing in every Krishi Vigyan Kendra and organize processing and value addition demonstrations throughout the country, as mentioned earlier. Many of the demonstrations should be organized in dry farming areas, where millets, pulses, oilseeds and cotton are grown. The help of the Central Food Technology Research Institute (CFTRI), Mysore should be taken by ICAR while designing the Lab to Land programme. The demonstrations should be so designed that they also serve as training grounds.

3.7.4.37. Further, liberalization has brought focus on technology as a major factor in competitive marketing, which should be duly reflected in new agriculture and science and technology policies. As trade shifts from primary products towards processed and manufactured products, greater emphasis will be needed for agroprocessing and post-harvest technologies that convert primary products into quality products and value-added products. Horizontal and vertical diversification can together proceed to expand options for quality products that meet fast-changing demands of local and foreign markets. Trade - , biosafety - , gene - and legal-literacy should be ensured at all levels, from farmers to policy-makers. These moves will promote farmer-industry linkage, small and medium enterprises (SMEs), rural entrepreneurship, and off-farm rural employment. It will be necessary to generate and transfer low-cost post harvest and agroprocessing technologies and to create marketing infrastructures that pay increased attention to food safety and to minimize post-harvest losses which are particularly large for horticultural, livestock, and fish products.

3.7.4.38. Institutional innovations will have to be explored, e.g. Contract Farming, Nucleus-Estate linkage systems, Small Holders’ Estates and Futures Markets. The group dynamics will promote decentralized mass production by masses and benefit from centralized services. Through ensuring backward-forward linkages under an end-to-end approach, the Small Holders’ Estates will synergise production-processing-marketing linkage. Commodity-based farmers’ organisations should be promoted to facilitate direct farmer-consumer linkage and direct sale by farmers. The
supply chain is long and the intermediaries add their margin with very little/no value addition, leading to increase in the price paid by the ultimate consumer and low share of the producer.

3.7.4.39. Specialty commodities, such as off-season varieties and production systems, new crops, and novel varieties and breeds should be identified to capture new opportunities. With the increasing demand for herbal medicines and botanicals, and for organically produced food, aquaculture and other products, several countries have developed specific production and distribution patterns. Public and private sector support in supplying quality seed, planting materials, processing, procurement and marketing to promote these initiatives is a condition *sine qua non*. Individual countries have developed or are developing policies, strategies and programmes on such diversifications. As several of these initiatives are innovative and diverse, there is good scope for sharing such experiences through information system networks as well as through Technical Cooperation among Developing Countries (TCDC) arrangements promoted by FAO and other UN agencies and international organisations.

**Greening the Grey Areas**

3.7.4.40. Rainfed and other less favoured areas have the highest concentration of poor and malnourished people; these highly risk prone areas are characterized by low agricultural productivity, high natural resource degradation, limited access to infrastructure and markets, and other socio-economic constraints. In the interests both of improving household food security and lessening socio-economic inequity, and also of raising national agricultural production, research and technology development must give greater attention to soil health, water conservation, livestock for livelihood security, horticulture and agroforestry in the rainfed areas, while maintaining and further increasing the gains made in irrigated areas. Genetic improvement for tolerance to water stresses (both scarce and excessive), salinity, acidity and other abiotic stresses as well as to biotic stresses, water harvesting and enhanced water and fertilizer use efficiency, management of soil erosion, crop-livestock-fish-tree integrated farming systems, participatory research, contingency farming and agro
forestry should be high priority research agendas in rainfed areas. Technology transfer systems, including input and institutional supports should emphasize precision and pace, hence the need for greater skill, alertness and commitment.

3.7.4.41. Yield and productivity gaps are particularly large in rainfed areas. This is attributed mainly to large variability of soil features, negligible control on water, weak technology assessment, refinement and diffusion mechanisms and poor institutional supports. Seed security for crop security is a must in rainfed areas. Therefore seed banks, gene banks, water banks, fodder banks and food banks are essential for achieving and maintaining livelihood security in such areas. There are several successful stories of bridging the gaps at various levels, which should be critically analysed for identifying the underlying drivers of change and their judicious scaling up and adoption for greening the grey areas. A recent IFPRI study had examined the prospects of replicating and sustaining sporadic and isolated instances of technology-triggered success stories of enhanced yields to achieve broad-based aggregate successful growth in rainfed agriculture and suggests that, “where there is participation and individual motivation, where incentives are aligned with improved means to respond to incentives, and where technology plays a pivotal role, success may follow”.

3.7.4.42. The Prime Minister in his address to the Nation on the 15th August, 2005 had emphasised special focus on removing the problems of farmers, many of whom are marginalised in dryland areas, and announced setting up a National Rainfed Area Authority for this purpose. Unlocking the rich and diversified production potential of these areas was an imperative at the present juncture of our agricultural development. The National Commission on Farmers and Planning Commission had jointly organised last month a high level meeting involving also Secretaries of the concerned Departments, development planners and NGOs on the structure and function of NRAA. It was agreed that the basic mandate of NRAA should be to help farm families to achieve income and work security by promoting a farming systems approach to foster water harvesting, conservation and sustainable and equitable use of
rainwater to provide livelihood security to rural communities and to ensure the security and productivity of crop and animal husbandry, forestry and fisheries.

3.7.4.43. The NRAA should be a highly professional body whose recommendations and action plans are characterized by high scientific content and economic credibility. Principles of ecology, economics, equity (gender and social) and employment generation should guide the work of NRAA. The NRAA should provide scientific and intellectual support to and fully tap the potential of Panchayati Raj Institutions and participation of NGOs and community-based organisations. The NRAA should be structured somewhat like National Dairy Development Board with clear-cut functions in the areas of policy formulation, resource mobilization, coordination with all concerned Ministries, Centre – State linkages as well as with Bharat Nirman, NREGS, etc. and issues related to sustainable water security in the rainfed areas and mitigating the impact of drought and strengthening the livelihood security systems. In view of the high priority to rainfed dryland agriculture, these recommendations should be duly internalised in the technology policy and acted upon.

Managing the Gene Revolution

3.7.4.44. The global area planted with biotech (GMO) crops has steadily increased during the last ten years. Today, approximately 8.5 million farmers in 21 countries are growing such crops covering about 90 million ha (Figure 2). India so far grows only one biotech product, i.e., Bt Cotton, occupying nearly 0.7 million ha under legally-released Bt hybrid varieties and an additional about 0.6 million ha under “illegal” Bt hybrid varieties. A recent study has revealed that, on an average, 30 percent of the illegal seeds are non-Bt, only 27 percent are F₁, rest of 43 percent are only 10-75 percent positive for Bt, indicating F₂ and mixtures. Fake cartons of the legal seeds are increasing. Such huge flows of spurious seeds, fraught with economic and ecological dangers and erosion of confidence of the farmers and the civil society in an otherwise productive and farmer-friendly technology, should be halted forthwith. Bt detection kits are available and should be used judiciously and transparently to confirm truthfulness of the seed and to build up quality control and faith in the technology and the seed chain. The research and regulatory and extension...
systems must be effectively aligned to ensure smooth and cost-effective flow of quality seed.

3.7.4.45. The Gene Revolution is primarily propelled by the private sector, which has important implications for the kind of research performed, types of technologies developed and the way the technologies are disseminated. It raises concerns that the small farmers may not benefit. The potential of biotechnology should be approached with a balanced perspective by integrating it within the national research technology and development framework and using it as an adjunct to and not as a substitute for conventional technologies in solving problems identified through national priority setting mechanisms. Priority setting should also take into account national development policies, private sector interests, market possibilities, potential for adoption by farmers, public perceptions of safety, and consumers' views. The technology should be developed by training a couple of women and men members of every Panchayat/local body in the management of new technologies, such as the establishment of *refugia* in Bt Cotton fields. A Scientist–Panchayat linkage is the need of the hour. Genome Clubs may be organized in village schools and KVKs to spread genetic literacy.

**Figure 2. Global Area of Biotech Crops**

3.7.4.46. A panel chaired by Prof. M.S. Swaminathan, June 2004, had prepared a National Biotechnology Policy document and suggested the establishment of an autonomous National Biotechnology Regulatory Authority to oversee and harmonise
biotechnological developments in fields of Agriculture and Food, Environment and Medicine and Pharmaceutics. The Department of Biotechnology has also been preparing a document on national policy on biotechnology through a widespread consultative process. The National Commission on Farmers considered these two initiatives and widened the scope of the consultative process by organising a consultation with farmers and farmers’ organisations. The NCF recommends that a National Policy on Biotechnology should soon be firmed up and announced. The policy must address the following issues:

- Value, usefulness and appropriateness of biotechnologies and enhanced gene literacy,
- Risk and biosafety aspects and their management,
- Equity and ethical dimensions, overall awareness and promotion of pro-poor features of biotechnologies,
- Control of and access to biotechnologies, the role of public and private sectors, harmonization of IPR, SPS and other regulatory provisions, and
- Investment in research and other institutional supports and partnerships for transparent and balanced harnessing of biotechnologies to address particularly the food insecurity, malnutrition, and poverty issues.

3.7.4.47. Appreciating the fundamental commonness of the genetic thread throughout the living organisms – microbe to man, the NCF recommends that an Agricultural Biotechnology Authority should be established soonest as a major component of the National Biotechnology Regulatory Authority. It should be steered by an Advisory Committee comprising scientists, representatives of public and private sectors, industry, CSOs, NGOs and farmers. The Authority should combine both regulatory and advisory responsibilities and coordinate and harmonise the various socio-economic and other development aspects, regulatory measures and bioethical and biosecurity norms towards harnessing biotechnologies for the good of the common man (aam adami).

Managing WTO/ AoA
3.7.4.48. Cost competitiveness and product quality issues are critical to compete in world market. Research and technology development should be geared and focused to increase the overall competitiveness of our major crops and commodities. This calls for enhanced and sustained efficiency of inputs use, thus cutting cost of production, improving quality and reducing post-harvest losses so that the input-output ratio is maximized (without sacrificing the ecological and environmental security). International quality and safety standards for agriculture products are very high. Meeting of their standards involves substantial costs for building technical and physical capability. There is a need for pooling talents and resources available in both public and private sectors to build this capacity. Finally, public research system should shoulder the responsibility to protect small farmers from ill-effects of trade reform process.

3.7.4.49. Along the production-processing-marketing chain, commodity-specific detailed action plan should be prepared with clearly defined goals. India’s preparedness in the field of SPS measures is highly inadequate. As a result of which, several of our consignments get regularly rejected. The situation is likely to get still worse in the coming years as Safety Standards and Guidelines developed by international bodies such as Codex Alimentarius, International Plant Protection Convention and the Convention on Biological Diversity (CBD) get more and more stringent, let alone the fast shifting of the goal posts. Thus, the urgency of the launching of quality and food literacy movement at all levels, from farmers to policy-makers, and strengthening of SPS infrastructures can hardly be overemphasized.

3.7.4.50. We must urgently augment and create survey, surveillance and quality literacy programmes. The SPS infrastructure should be brought at par with International Standards and awareness should be generated abroad on steps taken by India to maintain high standards regarding food safety and biosafety. Keeping in mind high prospects of enhancing livestock and poultry exports from India, the food and health safety concerns for livestock and poultry products will particularly be important since livestock economy is the backbone of a large number of marginal
farmers and landless agricultural labourers. But today large parts of livestock and poultry products international trades are restricted because of infectious diseases.

3.7.4.51. The Union Minister for Commerce and Industry and the Government of India have done a commendable job in safeguarding the interests of our farm women and men in the WTO negotiations. As a national self-empowerment measure, we should consider establishing an Indian Trade Organisation (ITO) and our own boxes for domestic agricultural support on the model of WTO’s Blue, Green and Amber Boxes, as suggested in the Third Report of the NCF. Only a small proportion (6.2 percent) of our agricultural commodities enters the global market, whereas with a population of over a billion, there is a large home market. Hence, we must segregate the very modest support we extend to our farmers into two groups - those which are of the nature of life and livelihood saving support to small farm families, and those which could be considered as trade distorting in the global market. The Indian Trade Organisation (ITO) can be a virtual organisation, specializing in WTO affairs. It can serve as a brain and information bank for enabling Government to take informed and proactive decisions and should particularly serve as a friend and guide to small farm families in consultation with Land Use Board and should provide proactive advice on land use and crop planning. It should help to save resource poor farm families from the onslaught of the subsidy, technology and capital driven agri-business paradigm of OECD countries, and buttress our debt-ridden farmers against various trade distortions.

Access to Modern Technology and Information for Progressive Farming

3.7.4.52. The huge technology awareness and transfer gaps may be ascribed to: (i) the nonattractiveness of the technology package, (ii) farmers unawareness of the efficacy and power of new technologies, (iii) nonavailability of quality inputs at right time, in right quantity and at right and affordable cost, and (iv) the deteriorating term of trade for agriculture as reflected in the stagnating and declining farmers’ income and the rising (often strangulating) indebtedness of the farming households. The main pillars of the Green Revolution have also weakened – decelerated genetic gains and deteriorating flow of quality seed, quantitatively stagnating but increased imbalanced
use of mineral fertilizer, decelerated irrigation growth and highly inefficient use of water, and “opportunistic” political will and dwindling investment in agriculture and in livelihood of farmers. A simultaneous and effective removal of these weaknesses is the *sine qua non* for revitalization of Indian agriculture.

3.7.4.53. The National Sample Survey Organisation (NSSO), Ministry of Statistics and Programme Implementation, in its second of the five reports entitled, “Situation Assessment Survey of Indian Farmers: Access to Modern Technologies for Farming,” June 2005, had analysed the extent to which the farmers access various sources for getting information on improved farming techniques and the extent to which they use such information (Box I). The survey report shows that only 40 per cent of farmers in the country accessed one or the other source for getting information related to modern farming. While in Andhra Pradesh and West Bengal over 60 per cent of the farmers contacted some source for farm related information only 15 per cent did so in Rajasthan. The most frequently accessed source was ‘other progressive farmers’ (17%) followed by the ‘dealer providing inputs’ and ‘radio’ (13%). TV (9%), newspapers (7%) and extension workers (6%) were some of the other important sources. While these were the national averages, farmers in different States showed varying preferences.

### Box I. Access to Modern Technology for Farming, 2003

- At all-India level, 40% of farmer households accessed various sources of information for Modern Technology for Farming.
- At all-India level, of the sixteen different sources canvassed for accessing information for Modern Technology for Farming, the most popular was ‘other progressive farmers’ with percentage of farmer households accessing information through the source as 16.7%, followed by input dealer (13.1%) and radio (13.0%).
- Percentage of farmer households accessing information through ‘other progressive farmers’ was highest in Andhra Pradesh (34%), followed by Gujarat (30%) and West Bengal (25%).
- Percentage of farmer households accessing information through ‘input dealers’ was highest in West Bengal (36%), followed by Andhra Pradesh (30%) and Gujarat (24%).
- Percentage of farmer households accessing information through ‘radio’ was highest in Jammu & Kashmir (36%), followed by Kerala (31%) and Assam (29%).
- The two most popular sources, namely ‘other progressive farmers’ and ‘input dealer’ were contacted by the farmer households mainly on ‘need basis’ or ‘seasonally’.
- Among the farmer households accessing information for cultivation from ‘other progressive farmers’, 40% received information on ‘improved seed variety’, 31% on ‘fertiliser application’, 15% on ‘plant protection’ and 14% on ‘others’.
3.7.4.54. Over 50 per cent of farmers who received farming related information from sources like Radio, TV and Newspapers actually ‘tried’ the information or adopted the recommendations, whereas over 80 % of those who obtained the information from ‘input dealers’ or ‘other progressive farmers’ tried or adopted them. About 65 per cent of farmers who accessed information from extension workers or the ‘Krishi Vigyan Kendra’ actually tried or adopted. The different suggestions for improvement in extension services available to the farmers were: improvement in quality and reliability of information, timeliness of information, increase in frequency of demonstration, improvement of quality of presentation, and improvement of professional competence of information provider.

3.7.4.55. Among the farmers obtaining information from any source, 96 per cent obtained information on cultivation. As for the type of information on cultivation received by farmer households from any source, 60 per cent were on improved seed variety, 49 per cent on fertilizer application, 24 per cent on plant protection measures. Only 5 per cent of farmers obtained information on animal husbandry related topics and just under 3 per cent of farmers obtained information on fisheries. Most of the farmers rated the information received as ‘good’ or ‘satisfactory’. Only a small percentage of farmers rated the information received by them as poor.

3.7.4.56. The above findings call for the following policy changes and strategic alliances for bridging the information and technology transfer and adoption gaps:

- Strengthen information packaging and its transfer and communication for raising awareness of all stakeholders, from farming households to policy and decision-makers, regarding the role of new and emerging technologies in enhancing productivity, income and environmental sustainability.

- Although the low literacy rate prevailing in rural areas may be one of the main reasons behind 60 percent of the farmers being unaware of modern farming, alternative means of communication and demonstrations should be used to
raise the awareness of farming families. Illiteracy need not be equated with lack of intelligence and skill, as amply encountered in the fields of arts and crafts and in textile, agricultural machinery and automobile industries. Technologies that aim at value addition in the products of cottage/small scale industry can play a vital role in improving competitiveness of rural poor, including formally uneducated farmers. S&T can reach there in remotest parts of the country by emphasizing on skill training and on computer literacy, making it accessible even to those not having formal education. The ‘problem population’ can thus be converted into a valuable ‘human resource’ through activity-oriented training and skill improvement, helping to develop entrepreneurship and facilitating self-employment by using new technologies.

- Effectively implement the Every Village Knowledge Centre Movement and manage Gyan Chaupals to empower rural men and women by promoting and enhancing literacy and awareness at grassroots level especially on new and appropriate farming systems and season specific technologies, prices and marketing of inputs and agricultural produce and products and on disaster management and mitigation.

- Create virtual networks and partnerships to rapidly share information and knowledge and increase use of mobile phone which could operate in local languages to facilitate information diffusion and awareness-raising. New ICT technologies, such as e-agriculture, whereby agricultural information can be presented in multimedia formats to improve knowledge sharing in local cultural context, should be promoted.

- Recognising that input dealers and suppliers were second most common source of information, regular trainings of the dealers/suppliers/retailers should be organised not only to update their knowledge but also to improve their communication skills and attitudes to empower farmers with new information on inputs use and farming operations. “Hariyali Bazar”, “e-chaupal” and other such initiatives of the private sector and agriclinics should
be promoted. Innovative participatory extension approaches such as farmer-friendly “contract farming” should be encouraged.

- Since farmer-to-farmer learning and technology transfer was most frequent and was found reliable, as highlighted in our earlier reports, Farm Schools at the farms of and operated by farmer-achievers should be established in large numbers in different agro-climatic zones and farming system regimes.

- Farmer participation and feedback should become an integral part of agricultural research and technology transfer. Lab-to-land and land-to-lab programme should not only be revived but also vigorously pursued and suitably strengthened. Unfortunately, as the Survey revealed, the public sector extension system has become a lowly placed source of information and advice on modern farming systems. Considering that majority of our farmers are small and resource poor and depend heavily on public good technologies and information, the public sector agricultural extension men and women should be empowered and sensitised to meet the demands particularly by forging research – extension – education – farmer – market linkages. Through PPPs, including the synergies with KVKs (KVUKs), ATMAs, SHGs, SFEs etc., and with greater emphasis on facilitating transparent and timely adoption of various regulatory standards and guidelines to enhance access to quality inputs and markets, the public sector extension and ICT system should play a leading role in the Agricultural Renewal Movement.

- Paradoxically, the extension and information gaps in livestock and fisheries are the largest whereas these subsectors have been growing at a high annual growth rate of about 4 to 5 percent against 1 to 1.5 percent in cereals during the last five years or so. Extension and ICT services to these subsectors should be duly strengthened to further accelerate and sustain their growth rates at about 6 to 8 percent which would help step up growth rate of the agriculture sector as a whole to the desired level of about 4 percent. Livestock and fisheries extension cadres comprising adequate numbers of quality staff,
especially trained in disease prevention and management, and comprehensive training facilities should be established.

- Knowledge Connectivity should become fundamental to physical connectivity under the Bharat Nirman programme. As stated in the revised Bharat Nirman document regarding Knowledge Connectivity, the NCF welcomes the Government’s commitment to expanding rural knowledge connectivity. The NCF appreciates the GOI’s acceptance of its year 2005 recommendations to support VKCs and urges its urgent widespread operationalization. NCF recommends that Government may review its policy towards Community Radio, since a combination of the Internet/ cell phone and community radio will help to take timely information to farmers even in the remotest parts of the country and judiciously harness “air waves or frequencies which are public property.” NCF suggests that the extension and provision of community radio licenses should be streamlined and operationalised so as to reach the target community in the shortest period.

- In order to effectively adopt new technologies, the right inputs should be available at the right time and place at affordable costs. Input supply systems should become farmer-friendly and also controlled by Farmers’ Self Help Groups to the extent possible. Regulatory measures such as IPR, SPS, PVPFR etc. should be harmonised and made known to all parties. A National Agricultural Inputs Authority, on the lines of the Drugs Price Control Authority, to ensure flow of quality inputs should be established. The package of technology to be effective must be accompanied by an appropriate package of services in the areas of extension and input supply. Further, the energy sources needed by farm families, both electricity and diesel, should be available in a reliable manner and at affordable price. In addition, solar energy could be tapped where economical.
Partnership in Research and Technology Development

3.7.4.57. Policy measures should synergise three major partnership areas for intensification of generation, refinement and diffusion of modern technologies. These are: (i) public-private (industry)-universities-academia partnership, (ii) research-extension-farmer-market-consumer linkage and (iii) participatory research, technology assessment, refinement and transfer through farmers’ field research. Over the past few years, it has been increasingly recognised that greater coordination and cooperation between private sector and industry on the one hand and the R&D/academic institutions on the other is necessary for facing various challenges and taking advantage of the opportunities offered. In India, farming households comprise the largest private sector.

3.7.4.58. Participatory research and knowledge management is the key to promote relevance and effective adoption of technologies and new information by pursuing holistic and system–based approach for converging “global” knowledge to tackle local problems. The unique nature of agriculture makes agricultural R&D different from other sectors and makes extension vital. The context is different and other providers are emerging. A new ball game has been set up and our response has remained outdated. Clear enunciation of the roles of the Centre, States, local bodies, Panchayati Raj Institutions, private sector, and NGOs in a client-centred R&D structure is a critical task. Critical scientific and resource mass and modern management must back the human resources and research – extension – farmer – market – consumer linkage.

3.7.4.59. The awareness of mutual strengths and requirements of different stakeholders would require measures like: joint workshops/seminars and exhibitions; promotion of sandwich programmes involving attachment of students to an industry or to a farm or Farm School during their academic stints; establishment of sustained one-to-one linkages between R&D/academic institutions and the farming hubs, contract farming, SFEs and agro-industries located in a particular region; and setting up of accurate, upto-date, reliable, realistic and user-friendly database on indigenous
technological expertise/infrastructure, S&T personnel, R&D programmes, technological breakthroughs and innovations etc. For upstream agriculture-related industries, encouraging the mobility of S&T personnel between industry and R&D/academic institutions should be promoted. Academic institutions and R&D laboratories also need to organise appropriate training programmes for private sector personnel in order to cater to their specific requirements. Policy, procedures and systems should be reformed to encourage the academic faculty to accept contract/collaborative research for industry.

3.7.4.60. Interaction with the farmers and industry should not end with technology transfer but the agency providing the technology must constantly interact with the users problem solving, technology absorption, and improvement/upgradation of the technology. The Institute-Village linkage programme of ICAR needs to be revitalized and restructured. Government and industry associations should work together for the establishment of independent test facilities for reliable quality-checks, calibration and also for technology validation. Establishment of Industry S&T Interface Institutions (ISTI), with technology management centres manned by qualified personnel, could also be considered, besides the establishment of S&T entrepreneurship parks, Technology Business Incubators, upgrading R&D infrastructure of the industry through consortia of industry associations. Incentive/support measures would also need to be introduced for promoting the purchase of products developed through indigenous technologies. This approach should particularly be promoted in the areas of organic farming, pharma farming, biofertilizers and biopesticides etc.

3.7.4.61. Special emphasis should be given to identifying, promoting and supporting grass root innovations, adding value to them and disseminating them to ensure that the impact of such innovations is reflected in improved prospects of livelihood of a large number of people. Efforts should be made to design and develop or scout for advanced time and energy-saving tools/machineries and equipment, their adaptation, motivation of entrepreneurs to take up their manufacture and also encourage the innovators of advanced tools and equipments.
3.7.4.62. The developmental strategy with technological-orientation should focus on meeting the needs of the nation, including the majority small and resource-poor farmers and rural-based agroindustries and encompass a wide spectrum of activities, namely, basic research, applied research, technology transfer, design, development, fabrication, tests and trials, manufacturing, marketing, maintenance and product support during the life cycle. Often serious gaps are encountered in the cycle, depressing the overall efficacy of the chain. For instance, poor quality control in micro-irrigation has been the main cause of the sub optimal performance of pressurised irrigation in India. In the present liberalised environment, the increasing independence of corporate sector in agriculture should pay much more attention to external sources and upgrade its technology through radical technology jumps. It should anticipate and take advantage of technological changes, acquire appropriate new technology to develop and produce new products for the competitive markets, consistent with the home realities and needs of mass production by masses and not by machines (to avoid uprooting of livelihood bases without assured alternative employment).

3.7.4.63. Often the situation under which the scientific information is generated is unlikely to be same from those operated by the farmers. The scientific information is to be reviewed in terms of specific needs, opportunities and constraints faced by farmers in different production systems. The typical contrasts in physical conditions under which the farmers operate in terms of topography, soils, plot size, hazards, the facilities of irrigation, size of management unit, farming systems, nature of production stability, production sustainability, and priority for production need to be considered. The Small Farm Production Systems have some typical characteristics which include strong interaction between land and household economy, interlink of on and off farm activity, highly diverse, complex and risk prone activities even within systems, predominance of household inputs, prevalence of traditional practices, multiple enterprises primarily for domestic needs, production systems highly susceptible to stress and perturbations, and dependence on family labour and further sharing. The assessment and refinement of technology thus need to be site specific,
holistic, farmer participatory, and technical solutions to existing problems should be inter-disciplinary, interactive, iterative and gender sensitive.

3.7.4.64. Essentially the assessment and refinement of technology needs discipline to programme mode, piecemeal to system approach, open ended to focused technological intervention, “take it or leave” to demand-led approach, integration of biophysical and socio-economic factors, institute to inter-institute mode of technology assessment and refinement, and overall a strong research-extension to research-extension-farmer-market linkage and overall proper appreciation of distinction between science and technology. Different types of farmers’ participation are used for conducting on-farm trials for different purposes. In a truly participatory and collaborative, even collegiatic manner, the farmers must actively participate in on-farm trial process and be involved in regular meetings designed to clarify the logic, their current practices and their demand for new technology. The farmers must participate directly in the planning and execution of trials and analysis of the results and the knowledge should flow both ways.

3.7.4.65. While identifying the solutions from on-farm trial, it must be seen that the technology will function and its profitability, compatibility with the farming system, contribution to reducing risk, need for institutional support and ease of testing by farmers are duly considered. The assessment of trials should be based on net income to the farmer assessed through economic analysis and ability to solve the problem diagnosed through. The results of promising pilot activities should be extrapolated for defined groups of farmers in specific defined areas (clientele). The Farm School approach should be adopted for grassroots level training and technology diffusion, for which the R&D system must provide the needed financial and technical support.

3.7.4.66. Participatory (Farmer) breeding and knowledge sharing for development and diffusion of farmer-selected and scientist-assisted varieties combining proven adaptability to local agro-ecological, social and cultural milieu as well as possessing speciality traits (aroma, medicinal value and tolerance to local biotic and abiotic stresses) has emerged as an important strategy for harnessing treasures of our time-
tested and ever-evolving indigenous knowledge and genetic resources. Several national and international programmes viz. the CGIAR Centres and the Indo-UK (DFID) programme have been promoting this approach. Some of these have been remarkably successful. For instance, the farmer participatory rice improvement programmes of the M.S. Swaminathan Research Foundation on Kalajeera (a high quality aromatic rice) in Orissa and Navara (a medicinal rice in Kerala) have tremendous potential of enhancing income and livelihood security of farmers in those areas. Such initiatives should be strengthened through additional research and technology dissemination efforts by mentoring and supporting dedicated SHGs and by linking the producers with markets and by creating and capturing niche markets.

3.7.4.67. Participatory Research, Demonstration and Training (RDT) Centres should be farmer-centric and should concentrate on demonstrating how to increase the output and income of farmers with small holdings and artesenal fishermen. Precision farming, hi-tech horticulture, monsoon management and mixed farming will be important components of the training programmes. The proposed National Board for Strategic Research in Agriculture can work out the modalities of establishing such Centres at locations where the work done will have a large extrapolation domain. The concerned State Governments could be requested to provide about 100 ha of land free of cost for establishing RDT Centres. The Centres should be autonomous, and managed jointly by farm/ fisher families and scientists. Panchayati Raj Institutions should be associated with the design and management of RDT Centres. These Centres should be designed to serve as windows into the new world of agrarian prosperity that awaits rural India. They should have strong linkages with the relevant SAUs.

3.7.4.68 The SAUs/ ICAR Institute–KVK-Farm School system of technological and skill upgradation of farming needs continuous feedback and advice from farm men and women. In order to provide a structured opportunity for sustained scientist–farmer dialogue, it is suggested that a National Council of Innovative Farmers may be set up for providing on continuing basis guidance on the technology and public policy requirements for achieving productivity, quality and value-addition revolutions in the over 115 million operational holdings in our country. This Council may be serviced
by ICAR, with DDG (Extension) serving as the Convenor. Members of the Council of Innovative Farmers may be appointed by the President of ICAR in consultation with the National Commission on Farmers. A National S&T Alliance (Consortium) for Rural Livelihood Security with units in each district, may be established to synergise inputs of various concerned Departments and Ministries at grassroots level.

3.7.4.69. The proposed India – US Knowledge Initiative on agricultural research and education is a realization of the tremendous scope to complement the capabilities of the two countries being leaders in different fields of science and technology. The initiative is an effort towards addressing problems such as global warming, new pest-disease complexes - biosecurity, resource depletion and degradation, household nutritional security, slow growing farm profitability, and increased competition. Sharing of recent developments in cutting edge technologies, such as the use of microarrays for diagnostics and risk management, nanotechnology, etc. should be high on the agenda. While preparing the detailed action plan, ICAR and other components of the NARS should insist on accessing or jointly developing strategic and latest technologies as per the needs of India.

3.7.4.70. The IPR and other enabling regulatory measures should be harmonized nationally and internationally to reward the incentives as well as to protect the poor. The International Agricultural Research Centres (IARCs) of the CGIAR have long been interacting with the private sector, and mutually benefiting thereby. Some of the centres have formalized their collaborations through agreements. So far, the CGIAR system has been able to share its technologies and products as international public goods. The CGIAR policy must carve out a system which will allow a continuation of the free flow of technologies to the poor, without jeopardizing their partnership with the private sector. Financial and other supports should be extended to the CGIAR system to enable it to pursue frontline research to generate highly competitive technologies and to leverage benefits from the spillover effects. Linkages should be established among IARCs to build complementary Centres of Excellence and avoid duplication of efforts.
3.7.4.71. Private sector R&D institutions are growing in India, particularly in the areas of biotechnology and crop breeding. It is high time that we develop Codes of Conduct for public-private sector partnerships based on respect for each other’s obligations. Not-for profit R&D institutions also exist in the NGO sector which can also adopt the same Codes of Conduct as public-funded institutions in their partnerships with the private sector, where IPR, Breeders’ Rights and other forms of proprietary control over technologies and products of commercial significance are important. The Codes of Conduct should be developed through extensive consultation among all partners so that these could be used in the entire national scientific research system. The Commission recommends the following additional measures to further strengthen the partnership:

- Provide tax incentives, including tax holidays, so as to increase private sector’s contribution to R & D from 14% to 33%;
- Strengthen national capacities in regulatory matters, especially IPR, SPS and quarantine facilities to promote technology acquisition as well as trade;
- Encourage testing of new varieties bred by private sector and their other technological products in the public sector supported national technology testing programmes; and
- Undertake joint research activities with clearly defined responsibility, accountability and profit sharing.

**Technological Empowerment of Women**

3.7.4.72. Technology for women requires special attention and the impact of major on-going schemes (and any future schemes) on the knowledge and skills of poor, rural women engaged in farming and allied activities needs to be systematically studied. The lack of tools designed with women in mind is yet another area of concern. With the objective of empowering women in all fields of environmental management, including water harvesting, wasteland development, sustainable agriculture and livestock development, biodiversity conservation and its sustainable and equitable use, ongoing schemes should be “engendered” on priority basis.
3.7.4.73. Countries with lower achievement in the Human Development Index and Gender Development Index have a larger percentage of their economically active population (both male and female) employed in the agriculture industry. Second, these same countries have a higher proportion of economically active women involved in agricultural activities relative to men. The disparities are likely to increase as rural to urban migration continues to change the composition of rural areas putting even greater responsibilities for the growth of the agricultural sector on women than they already have. In aggregate, women in rural areas in the poorer countries will be impacted most heavily as the feminization of agriculture intensifies further. Agricultural technologies specifically designed to improve the efficiency and productivity of the female labour force will thus greatly improve overall agricultural productivity.

3.7.4.74. There is lack of analytical understanding of the gender inequality. Social research must provide disaggregated information on rural woman that can feed into policy formulation, and that can help articulate the strategic gender aspect of demographic transition. Meanwhile the following actions will help improve the situation:

- Promote full participation of women in all S&T activities.
- Encourage entrepreneurship among interested women by drawing up innovative schemes which help in the incubation and scaling up of innovative ideas which address the specific needs of women and establish special venture capital fund for enabling women entrepreneurs to take to a career of self-employment in converting new technologies into market driven products.
- Identify and promote micro enterprises based on assured and remunerative markets, low transaction cost and economic viability, preferably in horticulture, including medicinal and aromatic plants, village level agro-processing and value addition centres, organic farming, etc..
- Draw up well coordinated programmes to reach the rural women through well networked models for technology transfer, demonstration, dissemination and adoption and establish training and mentoring centres for the rural women on
the model of KVKs. Widows of farmers who committed suicide under agricultural debt burden and other related stresses should be trained in market-driven skills and assisted in establishing on-farm (livestock) and non-farm income earning enterprises.

- Establish rural technology parks which will also help in adoption of appropriate technologies, to address local problems like reduction in drudgery and occupational hazards, appropriate tools, identify income generating activities – provide a platform to assess the real needs and feed to S&T institutions as agenda for research.

- Engender the curriculum at the school level and technical education (Medicine/Engineering/Agriculture) level for gender sensitivity among future scientists and development personnel and strengthen S&T education and communication skills among community development workers.

- Engender all technology mission mode programmes and conduct periodic gender audit, the experience will help in preparing guidelines for the inclusion of women in other technology-based or technology-rich programme areas, especially the National Horticulture Mission, Bharat Nirman Programme, Capacity Building & Monitoring Centres for SHGs and revitalization of KVKs.

- Establish a Network of Women Scientists and Institutions interested in engendering the development through S&T based interventions to develop an end to end approach for the various agro-climatic zones. Such a national level action and policy research network should carry out longitudinal studies of women’s roles in agriculture and rural livelihoods in the various agro-ecological regions of the country, and also study the impact of S&T on livelihoods of rural women.

- Give greater focus to extension services in all areas of technology and build a strong cadre of women extension workers, who may be given frequent exposure for sharing these ideas with the members in the group. The various Acts, especially the BD, PVP&FR should be engendered and a literacy drive should be launched to understand them.
National Agricultural Biosecurity System

3.7.4.75. The recent and ongoing devastation and health risk due to the Avian Flu strain H5N1 is today’s one of the highest concerns not only of the Government and people of India, but of the whole world. Similar threats are around in plants, microbes, animals and aquatic organisms (as also the very humankind). Therefore, each nation must pay priority attention to management of biological risks and establish an effective, and efficient, science-based and transparent National Agricultural Biosecurity System (NABS) to protect the livelihood security of farm and fisher families and the health, food and trade security of the nation. The wheat economy and wheat-based food security of the country is threatened by a highly virulent stem rust race, Ug 99, which is fast spreading in Africa and has perhaps entered Middle East and may enter India sooner than later. ICAR’s work on animal and plant diseases and risk management must therefore assume extremely high priority for addressing these concerns.

3.7.4.76. Broadly speaking, Agricultural Biosecurity describes the concept, process and objective of managing – in a holistic manner – biological risks associated with food and agriculture, encompassing both policy and regulatory frameworks. Biosecurity is composed of three main sectors, namely, food safety, plant life and health, and animal life and health. These sectors include food production in relation to food safety, the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and safe management of invasive and alien species and genotypes. Accordingly, the proposed National Biotechnology Regulatory Authority should be a part of the National Agricultural Biosecurity System (NABS).

3.7.4.77. A National Agricultural Biosecurity Council (NABC), chaired by the Union Minister of Agriculture, should be established to provide a platform for convergence and synergy among the ongoing and new programmes of different Ministries and Departments and other national and international programmes. This should be supplemented by establishing a modern and adequately equipped and
staffed National Centre for Agricultural Biosecurity (NCAB) to dynamically provide technological tools and guidance for risk assessment and management. The existing biosecurity capacity of crop, livestock, fisheries and microbes should be strengthened and horizontally linked through a National Agricultural Biosecurity Network (NABN). Consequently, the NABC, NCAB and NABN will be the three mutually reinforcing components of the NABS. Necessary financial and human resources support to strengthen cutting-edge technology, viz development and use of microarrays for diagnostics and drugs, is essential for achieving the goal of a Biosecure India.

**Investments in R&D, Institutional Reforms and Revitalising the NARS**

3.7.4.78. It is heartening that the Government of India in its 2006-07 budget allocation has provided Rs. 100 Crore to Punjab Agricultural University, Ludhiana, Punjab for its strengthening and modernization. This is a welcomed beginning and is in line with the recommendations of the NCF’s Third Report. Reiterating its earlier recommendation, the Commission again recommends that a provision of Rs. 1000 Crore be made as a one-time grant to NARS to bridge the critical gaps in scientific infrastructure in frontier areas of technologies, so as to enable the Nation to enhance its agricultural competitiveness and to benefit from science-led Ever-green Revolution. This additional allocation will particularly strengthen work on conservation and improvement of livestock heritage of the Nation, genomics, bioinformatics, bioremediation and harnessing gene-richness of microorganisms, biomass utilization, value addition and use efficiency of plant nutrients and water. A National Board for Strategic Research in Agriculture may be set up to coordinate and harness advances in basic sciences for agricultural progress.

3.7.4.79 The uncommon opportunities provided by the frontier technologies should be captured for launching an ever-green revolution capable of improving productivity in perpetuity without ecological harm. In order to ensure social inclusion in access to new technologies, public investment in socially relevant agricultural research should be stepped up under the umbrella of the National Agricultural Research System which
comprises large numbers of ICAR institutions, State Agricultural Universities, All India Coordinated Research Projects and National Bureaus. Private sector institutions and NGOs carrying out research should also be encompassed under the NARS umbrella. Fighting the technology fatigue, and technology upgrading of small farm operations are urgent tasks.

3.7.4.80 Climate change leading to adverse changes in temperature, precipitation and sea level is no longer just a theoretical possibility. Most experts agree that we are already beginning to experience the impact of global warming as evident from the melting of glaciers and Antarctic and Arctic ice caps. Based on computer simulation models, contingency plans and alternative land and water use strategies will have to be developed for each major agro-climatic zone. Just as grain reserves are important for food security, seed reserves are important for crop security. Protecting the livelihood security of farm and fisher women and men from adverse climatic changes has to become a priority task of the National Rainfed Area Authority. In drought and flood prone areas, experienced farm women and men can be trained as “Climate Managers”.

3.7.4.81. The NARS covers the entire spectrum of crop, fishery, forestry, natural resources and agro processing and agri-business. However, there are gaps in several areas awaiting redressal or are not receiving focused attention. Some of such areas, as listed below, require more intensive and inter-disciplinary attention.

- Climate change and its implications,
- Harnessing space, ICT, nanotechnology and other frontier technologies for precision farming,
- Organic recycling and value addition to biomass, biofuels and bioenergy,
- Crop-livestock-fish integrated production systems,
- Pre-breeding and participatory breeding, and
- Scientific organic farming.

3.7.4.82. The Commission recommends setting up of new National Centres / Institutes in the above areas or mandate existing ones to address those areas
specifically. Such institutions could be set up in existing ICAR institutes or SAUs or institutes of other relevant Ministries but should be functionally and financially autonomous with their own Governing Boards. In the Commission’s view, the institutions should be built around outstanding scientists and research leaders of proven capability in these fields. Such committed research leaders should be first identified and involved in the project design process. The National Challenge Programmes (identified by the Task Group and other committees) should likewise be led by scientist–achievers.

3.7.4.83. The premier research institutes, such as IARI, IVRI, should be designated as Institutions of National Importance. The Commission recommends that such institutes should be given special funds and organizational and management supports to empower them to enrich the Indian agricultural knowledge system necessary for enhancing country’s competitiveness at the global level on one hand and to serve the majority small and marginal farmers, often inhabiting vast rainfed drylands and other poorly endowed non-congenial agro-climatic regions, on the other. A National Council for Global Leadership in Agricultural Science and Education should be set up under the chairmanship of the Minister for Agriculture to give guidance to these new initiatives and to position India as a leading player in international agricultural R&E system.

3.7.4.84. It is strongly recommended to increase the R&E intensity to 1.0 percent (from current level to 0.34 percent) of AgGDP. The existing serious imbalances in funds allocations to different agro-ecological regimes and commodities should be corrected by allocating larger proportions to eastern region to harness the high untapped agricultural growth potential, as also to rainfed arid and semiarid drylands and to livestock and fisheries subsectors. The resources recently allocated to the National Horticulture Mission need to be aligned to priority areas for technology development for prevention of post–harvest losses, processing, value addition, development of specialty varieties (viz. for processing) and production and distribution of quality planting materials.
3.7.4.85. A package of reforms aimed at enhancing autonomy, improving decentralization and devolution of power, and improved financial management through built-in monitoring and evaluation is required. Both ICAR and SAUs should commit themselves to such reforms. Support of high level policy makers at both the Central government and State government levels is needed to implement this far reaching reform agenda.

3.7.4.86. The following additional policy reforms by Central and State Governments are recommended:

- Balance expenditure per scientist in SAUs at par with ICAR.
- Maintain critical levels of scientific and resource mass in different ICAR Institutes and SAUs.
- Enhance share of operational expenses of scientists.
- Dedicate adequate public funds to promote basic and strategic research as well as to develop human capital.
- Promote competitive funding for networking, institutional reforms, addressing R&D challenges.
- Strengthen project-based funding with clearly defined outlay-outcome matrix on the lines of The Log Frame Options.
- Evolve National Innovation System aligning policy, incentives and regulations to foster innovation and entrepreneurship.
- Establish Genius Awards for young scientists to attract talented youth to agricultural research, technology development and education.
- Strengthen IPR regime for technology transfer, resource generation and evolving competitive market with due provision for social inclusion in access to new technologies.

3.7.4.87. SAUs are generally starved of operating funds and now largely depend on ICAR. The shortage of funding in the SAUs has had adverse effects on human resources development, research infrastructure, and linkages with farmers. There is an urgent need to sensitize policy makers at the State level to the payoffs to investing in
research. At the same time, the Central Government might develop a funding formula that supports the weaker States, but provides incentives to stronger States to increase their funding (e.g., matching grants). A key role of Central research is to generate spillovers to enhance efficiency in State research programmes.

3.7.5.0. Epilogue: Summary Policy Recommendations

3.7.5.1 Technological upgradation of Indian agriculture is a core element of the agricultural development strategy. The Green Revolution, built through synergy of technology, policy, services and farmers, ushered in 1968, resulted in tripling of foodgrains production (80% through yield enhancement), which more than halved percentages of hungry and poor people, enhanced employment and farmers’ income, and increased food self-sufficiency and national confidence.

3.7.5.2 Today, however, India’s agricultural growth rate (1.5%) has slipped below the population growth rate (1.8%), against the overall GDP growth rate of nearly 8%. While agriculture’s contribution to national GDP has decreased to about 20 percent, it employs about 60 percent of the country’s workforce. These have serious implications for economic growth, food security, equity and rural welfare. The “champagne glass” has further truncated. Stubbornly high incidence of hunger and poverty, technological fatigue, serious yield gaps, huge post-harvest losses, decreasing net trade intensity, low and stagnant farmers’ income, declining holding size and widening rural-urban (Bharat-India) divides are matters of serious concern. Investment and capital formation in agriculture has drastically declined while the dependence on agriculture for livelihood security continues to be extremely high.

3.7.5.3 The “business as usual” will thus not do and agriculture can not be made to wait. The problems of Indian agriculture and farming community should be diagnosed more systematically and critically and disaggregated over the different agro-ecological regions and socio-economic regimes so that effective malady-remedy combinations could be put in place. Policy provisions should support the following thrust areas:
• Protecting yield and productivity gains, extending the gains to new areas, and enhancing yield ceilings and achieving new gains; bridging yield gaps; minimizing post-harvest losses, augmenting value addition and improving productivity and farmers’ income; and promoting eco-technologies rooted in the principles of ecology, economics, equity and employment towards an Ever-green Revolution.

• Exploiting the gene revolution (biotechnology); benefiting from information and communication technology revolution, space, nuclear and nanotechnologies; and promoting knowledge-based precision farming systems, intensification and diversification.

• Protecting and improving natural resources (land, water and biodiversity); addressing environmental concerns, ecological security, agricultural biosecurity and sustainability; and managing climate change and natural disasters.

• Seeking congruence of productivity, profitability, sustainability and equity; addressing gender issues and problems of the poor and the excluded, particularly of small and marginal farmers and land-less agricultural labourers; and managing liberalized trade in the globalized world by addressing issues related to global competitiveness in the context of the WTO/AoA.

3.7.5.4 More specifically, the following aspects will be front runners:

• The accent on horticulture, livestock, fisheries, specialty enterprises, value-added products, precision farming, organic farming, biomass recycling and energy farming and market-driven diversification should further be intensified.

• Rising capital intensity, high premium on quality, food, health and environmental safety and increasing concerns of biosecurity, climate change, gender issues and sustainability must be addressed by research and technology development programmes.
• Yield growth rates of foodgrain crops should be restored to about 2.5 percent and the horticulture, livestock and fisheries production growth rates should be raised to about 6 percent and above so as to achieve the stipulated overall agricultural growth rate of 4 percent.

• The needs and prospects of rainfed dryland and semi-arid areas, hill and mountain agro-eco systems and other noncongenial areas must be addressed on priority basis, including the increased use of participatory breeding and other participatory researches by effective involvement of grass root people.

• Several of the above issues should be designated as National Challenge Programmes and, based on critical gap analysis, should be institutionalised under the leadership of scientist-achievers.

3.7.5.5 Observing that the (first) Green Revolution has run its course, and reiterating his commitment to science- and knowledge-led transformation of the agrarian economy, the Prime Minister, in his call for a Second Green Revolution, in keen to move towards an Ever-green Revolution which must build on but avoid the pitfalls and weaknesses of the First Green Revolution. The move should adopt the following three-pronged approach:

• Prioritise strategic research and technology development programmes, including cutting-edge technologies, geared to meet the technological problems retarding and decelerating agriculture-led growth and development and to achieve desired competitiveness, efficiency, productivity and income growth alongwith desired sustainability and inclusiveness.

• Realize that science and technologies must have a human face and cannot operate in a vacuum. Therefore, it is absolutely necessary to formulate clear cut goals, policies, strategies and programmes and adopt participatory (and proprietary when necessitated in national interest) approach for harnessing the (unlimited) power of science and for synergizing technological and social revolutions by duly enhancing social science research capacities and building bridges and partnerships among policy makers, scientists, development practitioners, farmers and other stakeholders.
• The National Agricultural Research System, the Technology Assessment and Transfer System, the Knowledge System (skill development, re-tooling, indigenous knowledge), the Humanware aspects, Enabling Mechanisms (IPR, SPS) and Services must be synergistically aligned, restructured and revitalized. The perpetuating functional rigidities and lack of responsive institutional support and mechanism should be overcome to impart efficiency, transparency and accountability at various levels.

3.7.5.6 A package of reforms aimed at enhancing autonomy, improving decentralization and devolution of power, and improved financial management through built-in monitoring and evaluation is required. Both ICAR and SAUs should commit themselves to such reforms. Support of high level policy makers at both the Central government and State government levels is needed to implement this far reaching reform agenda.

3.7.5.7. The following additional policy reforms by Central and State Governments are recommended:

• Balance expenditure per scientist in SAUs at par with ICAR.
• Maintain critical levels of scientific and resource mass in different ICAR Institutes and SAUs.
• Enhance share of operational expenses of scientists.
• Dedicate adequate public funds to promote basic and strategic research as well as to develop human capital.
• Promote competitive funding for networking, institutional reforms, addressing R&D challenges.
• Strengthen project-based funding with clearly defined outlay-outcome matrix on the lines of The Log Frame Options.
• Evolve National Innovation System aligning policy, incentives and regulations to foster innovation and entrepreneurship.
• Establish Genius Awards for young scientists to attract talented youth to agricultural research, technology development and education.
• Strengthen IPR regime for technology transfer, resource generation and evolving competitive market with due provision for social inclusion in access to new technologies.

3.7.5.8. Codes of Conduct should be introduced for public-private sector partnerships based on respect for each other’s obligations, where IPR, breeders’ rights and other forms of proprietary control over technologies and products of commercial significance, are important. The code of conduct should be developed through extensive consultation among all partners and can be used in the entire national scientific research system.

3.7.5.9. In order to promote investment in agricultural research by private sector, the following suggestions may be considered:

• Provide tax concessions and tax holidays to promote private sector’s contribution to R&D from 14 percent to 33 percent.
• Strengthen regulatory mechanisms, especially IPR, SPS and quarantine facilities, to promote technology acquisition. In doing so, however, ensure social inclusion in access to technologies and devise mechanisms for timely delivery of the technologies needed by the resource-poor.
• Encourage testing of private sector’s new varieties and other technological products by public sector regional and national testing programmes.
• Undertake joint research activities with clearly defined responsibility and accountability of and profit sharing by various partners.

3.7.5.10. SAUs are generally starved of operating funds and now largely depend on ICAR. The shortage of funding in the SAUs has had adverse effects on human resources development, research infrastructure, and linkages with farmers. There is an urgent need to sensitize policy makers at the State level to the payoffs to investing in research. At the same time, the Central Government might develop a funding formula that supports the weaker States, but provides incentives to stronger States to increase...
their funding (e.g., matching grants). A key role of Central research is to generate spillovers to enhance efficiency in State research programmes.

3.7.5.11. In order to enhance effective technology transfer and to bridge the yield and other performance gaps at various levels, the Commission recommends the following:

- Convert the Krishi Vigyan Kendras into Krishi and Udyog Vigyan Kendras in order to give concurrent attention to on-farm and off-farm livelihood and to promote end-to-end approach and to link production with marketing and consumption.
- Establish 50,000 Farm Schools in the fields of farmers-achievers to spread proven technologies through farmer-to-farmer learning.
- Integrate the activities of KVKs, ATMAs (Agricultural Technology Management Associations), Lab-to Land and Land-to Lab programmes, Self Help Groups, agricultural cooperatives and other grassroot institutions.
- Establish National Participatory Research, Demonstration and Training Centres to integrate available scientific institutions, extension programmes and grass-root institutions related with agricultural development including the proposed initiatives, namely, Farm Schools, Soil Health Cards, Kisan Credit Cards, Agriclinics and Agribusiness centres.
- Establish a National Council of Innovative Farmers to provide a structured opportunity for sustained scientist-farmer dialogue.
- Establish National and local level Science and Technology Alliances (Consortia) for rural livelihood security.
- Increase the involvement of small holders in public-private partnership in high-value agriculture by integrating the small-holders with the high-value agricultural and supply chain and making necessary provisions forremedying market failures and structuring the SFEs on the NDDB model.

3.7.5.12. The recommendations of the Swaminathan Task Group on Revamping and Refocusing of National Agricultural Research to meet current challenges and those of
the Mashelkar Committee on Reorganization of ICAR should be examined and the accepted ones should be implemented without further delay.

3.7.5.13. The ongoing revolutionary breakthroughs in biological, information and other related sciences and technologies offer great hope for meeting the earlier-mentioned challenges. Fortunately, there is a convergence of political will to capture these breakthroughs for improving livelihood security of farmers and the other ‘left outs’. However, the convergence was not duly reflected in the 2006-2007 budget allocation of the Government of India, and the country is way off the track in meeting the Millennium Development Goals. Scientists should actively participate in the policy debate leading to investment decisions. Concrete actions in terms of financial allocations, institutional and infrastructural support, human resources quality and number, and producer-market and backward–forward linkages are urgently needed.

3.7.5.14 Investment in agricultural research and education should be increased from current level of 0.34 percent of the agricultural GDP to at least 1 percent. The Government policy makers, scientists, public sector, private sector, farmers and other partners in agricultural development must strike a new pace and synergy, otherwise we will make little progress towards meeting the daunting challenges of climate change and globalisation, among other challenges, and would not reach the unreached – the one–quarter of the World’s hungry and poor who have their homes in India.

3.7.5.15. As highlighted in the Third Report of the NCF, a provision of Rs. 1000 Crore as a one–time grant to NARS is required to bridge the critical gaps in scientific infrastructure in frontier areas of technologies, so as to enable the Nation to enhance its agricultural competitiveness and to benefit from science–led Ever-green Revolution. This additional allocation will particularly strengthen work on conservation and improvement of livestock heritage of the Nation, genomics, bioinformatics, bioremediation and harnessing gene–richness of microorganisms, biomass utilization, value addition and use efficiency of plant nutrients and water. A
National Board for Strategic Research in Agriculture may be set up to coordinate and harness advances in basic science for agricultural progress.

3.7. 5.16. “We have miles to go”. But, we must reach there in time. Already nearly 160 districts have been declared as suffering from Naxalite activities. The existing serious imbalances in funds allocations to different agro-ecological regimes and commodities should be corrected by allocating larger proportions to eastern region to harness the high untapped agricultural growth potential, as also to rainfed arid and semiarid drylands and to livestock and fisheries subsectors. The National Horticulture Mission and other such Missions should be technology-rich and technology-driven and not subsidy-rich and subsidy-driven.

Acknowledgement

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CHAPTER 3.8
GUIDING PRINCIPLES UNDERLYING THE DRAFT
NATIONAL POLICY FOR FARMERS
CREDIT AND INSURANCE

3.8.1 Credit is a critical input for development of agriculture and activities allied to agriculture. The key task is to ensure a convergence among credit availability, effective credit delivery system and adequate credit absorptive capacity of the farmers. The mere availability of credit does not ensure its productive use and increased production/value addition. The Advisory Committee on flow of credit to Agriculture and Related Activities [2004] appointed by the Reserve Bank of India under the Chairmanship of Prof. V.S. Vyas has rightly observed “credit must reach all its users effectively; it must be on time, in required quantities and addressed to the right activity mix. Raising agriculture to higher thresholds to usher in value added, hi-tech enterprises require strengthening the delivery system. These tasks begin at home of the rural financial institutions: cooperatives, regional rural banks and the rural branches of the commercial banks. Their organisation must allow flexibility of approach, innovations to meet new needs, empathetic treatment of the clientele and responsiveness. All these call for changes in organisational structures, procedures and above all, the mindset of those who manage the system.”

3.8.2 The rural banking system in India has adopted a multi agency approach. There are four sets of institutions providing financial services in the rural areas. These institutions are the commercial banks both in public and private sector with a large network of rural branches, cooperative credit structure [three tier federal structure in most of the States i.e., the State Cooperative Bank (SCB) at State level, the affiliated District Central Cooperative Banks (DCCBs) at district level and the Primary Agriculture Credit Societies (PACS) at the village level; in some of the smaller States, the structure has two tier with State Cooperative Bank at State Level and Primary Agriculture Credit Societies at village level affiliated to the SCB], the long term credit under the cooperative system is met through the State Cooperative Agriculture and Rural Development Banks.
[SCARDBs] at State level with branches or affiliated Primary Cooperative Agriculture and Rural Development Banks [PCARDBs] at tehsil or block level and finally the Regional Rural Banks [RRBs]. While the cooperative banks lend for agriculture and activities allied to agriculture mainly through the cooperatives, the RRBs were established to focus on small/marginal farmers, agricultural labourers and artisans etc. The commercial banks in addition to general banking functions are bound by the guidelines issued by the Reserve Bank of India to lend 40% of the aggregate credit to the priority sector. These banks are expected to have at least 18% of the net outstanding credit for agricultural purposes of which 75% has to be for direct agriculture loans.

3.8.3 In the pre-independence period, agricultural credit to farmers was exclusively provided by the cooperative banking system with the exception of plantation finance by the commercial banks and taccavi loans by the Government. This credit system had no explicit relationship with input supply or farm investment and was really seen as an alternative system to village moneylender. The institutional credit was extremely small and formed about 7.2% of total debt outstanding of the rural households in 1951. The most notable developments in the rural credit since independence have been the Report of the Rural Credit Survey [1954], conversion of the Imperial Bank of India into the State Bank of India to extend banking facilities in the countryside, the formation of the Agriculture Refinance Corporation [the forerunner of the Agricultural Refinance and Development Corporation and the National Bank for Agriculture and Rural Development [1982], the introduction of the Banking Regulation Act, 1965 [as applicable to the cooperative banks], nationalisation of private sector banks [1969], the setting up of Regional Rural Banks [1975], the instructions of the Reserve Bank of India to the public sector banks about Credit Deposit Ratio [CDR] in 1980 and achieving the target of 18% of net bank credit for lending to agriculture to be met by March, 1990 [however, only 9 of the 27 public sector Banks had achieved it by end March, 2004]¹, introduction of the scheme of linkage of the Self Help Groups [SHGs] with the banking system in 1991-92 for micro finance, introduction of the Rural Infrastructure Development Fund [RIDF] at

¹ Even by end of March 2005, the aggregate credit outstanding to agriculture formed 15.7% of net bank credit in the case of public sector banks and 12.1% in the case of private sector banks. [Source: Trends and Progress of Banking in India: 2004-05]
the National Bank for Agriculture and Rural Development [NABARD] in 1995-96 wherein the banks which failed to meet the target for priority sector/agriculture contributed an amount based on their shortfall to the RIDF, the Kisan Credit Cards [KCC] in 1998 and the announcement of the ‘farm credit package’ by the Government in June, 2004 which envisaged doubling the flow of credit to agriculture in ensuring three years.

3.8.4 The objective of the agricultural credit policy in India since independence has been gradual replacement of moneylenders initially by credit cooperatives and later on by multi agency approach [including asking commercial banks to open more branches in rural areas and establishment and expansion of the Regional Rural Banks] and lowering of the interest rates. It was hoped that these would relieve the constraints on agricultural growth. This was also considered income - transfer mechanism in favour of the poor farmers. The policy bias in favour of lower interest rates on agriculture credit continues with commercial banks deciding to charge interest not exceeding their Prime Lending Rates [PLR] to agricultural borrowers and the announcements in the Union Budget 2006-07 regarding a 2% rebate on interest in respect of crop loans issued during 2005-06 and also the decision to ensure that the farmer receives short term credit at 7% per annum, with an upper limit of Rs. 3,00,000/- on principal amount [Government to give subvention to ensure this].

3.8.5 There is no doubt that agriculture credit has increased considerably and shown more than 14% growth per annum on a decadal basis. The share of institutional credit in total cash borrowings by the cultivator households in rural area increased from 21.7% in 1971-72 to 56.2% in 1981-82, declined to 55% in 1991-92 and again increased to 59.5% in 2002-03. [All India Debt and Investment Survey - NSS 59th Report - Household Borrowings and Repayments in India during 2002-03]. In absolute terms, the total credit flow during 2004-05 was Rs. 1,25,309 crore against the target of Rs. 1,05,000 crore showing an increase of 44.1% over the previous year. Against the target of Rs 1,41,000 crore for 2005-06, the disbursements by 31st December, 2005 had already reached Rs. 1,17,899 crore [Economic Survey 2005-06]. The flow of institutional credit during the last few years is shown in Table 1.
Table 1: Flow of Institutional Credit to Agriculture

<table>
<thead>
<tr>
<th>Agencies</th>
<th>2002-03</th>
<th>2003-04</th>
<th>2004-05</th>
<th>2005-06*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative Banks</td>
<td>23,716</td>
<td>26,959</td>
<td>31,231</td>
<td>28,947</td>
</tr>
<tr>
<td>RRB’s</td>
<td>6,070</td>
<td>7,581</td>
<td>12,597</td>
<td>11,146</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>39,774</td>
<td>52,441</td>
<td>81,481</td>
<td>77,806</td>
</tr>
<tr>
<td></td>
<td>69,560</td>
<td>86,981</td>
<td>125,309</td>
<td>1,17,899</td>
</tr>
</tbody>
</table>


Incidentally, the total institutional credit to agriculture during 1997-98 was only Rs 31,958 crore and registered an increase of over 392% between 1997-98 and 2004-05.

The direct agricultural loans outstanding in the case of the scheduled commercial banks had reached Rs. 1,22,370 crore as at the end of 2004-05 as compared to Rs. 90,451 crore as at the end of 2003 - 04.

3.8.6 However, despite the substantial increase in agriculture credit particularly during the last two years, there are certain issues which deserve attention. The first and the foremost is the question of the outreach of the formal credit institutions in the rural areas. According to the NSS Report No. 498 –Situation Assessment Survey of Farmers – Indebtedness of Farmer Households - NSS 59th Round - May 2005, the professional moneylenders had the highest percentage of farmer households indebted to them. The position is shown in Table 2.

Table 2: Indebtedness of Farmer Households

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Source</th>
<th>Percentage of farmer households indebted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Banks</td>
<td>22.5</td>
</tr>
<tr>
<td>2</td>
<td>Cooperative Societies</td>
<td>21.7</td>
</tr>
<tr>
<td>3</td>
<td>Government</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>Professional Money Lenders</td>
<td>24.1</td>
</tr>
<tr>
<td>5</td>
<td>Relatives and Friends</td>
<td>15.0</td>
</tr>
<tr>
<td>6</td>
<td>Traders</td>
<td>10.0</td>
</tr>
<tr>
<td>7</td>
<td>Others</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

3.8.7 The findings of the Rural Finance Access Survey done by the World Bank and the NCAER in Andhra Pradesh [AP] and Uttar Pradesh [UP] 2003 also reveals that only 24% of the total rural households in AP and 19% in UP had access to formal credit while 56% and 51% of the households in those two States respectively depended on private credit sources. Access to formal credit by types of households is shown in Table 3.

Table 3: Access to Formal Credit by Types of Rural Households

<table>
<thead>
<tr>
<th>State</th>
<th>Marginal Farmers</th>
<th>Small Farmers</th>
<th>Medium Farmers</th>
<th>Large Farmers</th>
<th>Other Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>11.8</td>
<td>33.8</td>
<td>41.9</td>
<td>56.3</td>
<td>20.7</td>
</tr>
<tr>
<td>UP</td>
<td>13.5</td>
<td>24.7</td>
<td>30.8</td>
<td>36.1</td>
<td>17.7</td>
</tr>
</tbody>
</table>


3.8.8 It is disturbing that after nearly 37 years of the nationalization of the private sector banks and over 15 years of credit targeting for agriculture, on all India basis, the banks had a smaller outreach of the Indian farmers as compared to the professional moneylenders. [NSS 59th Round Report referred earlier] In Andhra Pradesh, Bihar, Manipur, Meghalaya and Rajasthan, the combined outreach of the banks, the cooperative societies and the Government [the entire formal sector put together] was less than the professional moneylenders. In addition, the moneylenders had the largest outreach among all sources in Karnataka and Tamil Nadu. The traders had the best outreach among all agencies in West Bengal, Jammu and Kashmir, Nagaland and Sikkim. The friends and relatives were the most common source of funding to farmer households in Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram and groups of Union Territories.

3.8.9 The formal credit agencies i.e., the banks had the best outreach only in Jharkhand, Orissa, Tripura, Uttar Pradesh and Uttarakhand; the cooperatives had the best outreach in Chhattisgarh, Gujarat, Haryana, Kerala, Madhya Pradesh, Maharashtra and Punjab. The continued poor financial health of the credit cooperatives is a major issue in improving the outreach of the formal system. Keeping in view that the credit societies had the largest outreach in as many as seven States including agriculturally important States like Punjab, Haryana, Gujarat, Maharashtra, Madhya Pradesh and Kerala the issue
regarding revitalisation of credit cooperatives\(^2\) which is under discussion for well over a decade, needs to be implemented on a priority basis.

3.8.10 **Besides the low outreach another issue is the low Credit Deposit Ratio [CDR] of the rural and semi urban branches and the declining trend observed during the nineties.** The Reserve Bank of India had advised the public sector banks to achieve a CD ratio of 60% in rural and semi-urban branches separately, across India. In a circular dated June 18, 1980 issued to the public sector banks, the RBI advised that, “While it is not necessary that this ratio should be achieved separately branch-wise, district-wise or region-wise, the banks should, nevertheless, ensure that wide disparity in the ratio is avoided in order to minimize regional imbalances in credit deployment”. The instructions were reiterated to public sector banks in 1995. However, the CD Ratio for rural offices of the Scheduled Commercial Banks showed a continuous decline between 1991 to 2001 is shown in Table 4.

**Table 4: Credit-Deposit Ratio of Rural Offices of Scheduled Commercial Banks**

<table>
<thead>
<tr>
<th>Year</th>
<th>Deposits Amount</th>
<th>Credit Amount</th>
<th>CD Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>31,010</td>
<td>18,599</td>
<td>60.0</td>
</tr>
<tr>
<td>1992</td>
<td>35,750</td>
<td>20,692</td>
<td>57.9</td>
</tr>
<tr>
<td>1993</td>
<td>41,410</td>
<td>22,906</td>
<td>53.3</td>
</tr>
<tr>
<td>1994</td>
<td>49,331</td>
<td>24,670</td>
<td>50.0</td>
</tr>
<tr>
<td>1995</td>
<td>51,820</td>
<td>25,174</td>
<td>48.6</td>
</tr>
<tr>
<td>1996</td>
<td>61,313</td>
<td>29,012</td>
<td>47.3</td>
</tr>
<tr>
<td>1997</td>
<td>73,770</td>
<td>32,525</td>
<td>44.1</td>
</tr>
<tr>
<td>1998</td>
<td>86,706</td>
<td>37,598</td>
<td>43.4</td>
</tr>
<tr>
<td>1999</td>
<td>1,02,697</td>
<td>42,091</td>
<td>41.0</td>
</tr>
<tr>
<td>2000</td>
<td>1,20,539</td>
<td>48,753</td>
<td>40.4</td>
</tr>
<tr>
<td>2001</td>
<td>1,39,431</td>
<td>54,431</td>
<td>39.0</td>
</tr>
</tbody>
</table>

*Source: Rural Economy – An Economic Times Intelligence Group Report*

\(^2\) A number of Committees/Groups have examined this issue including Shri Jagdish Capoor Committee, State Minister’s Group under Shri Bhikhe Patil and Shri Vaidyanathan Committee in the last about 10 years.
3.8.11 While the number of deposit accounts with rural offices of the Scheduled Commercial Banks increased by nearly 21% between 1991 and 2001 the number of credit accounts [borrowals] declined by 30.12% [from 322.82 lakh to 224.58 lakh] in the same period and the credit deposit ratio continuously declined. Further, while, the decline in credit-deposit ratio of the rural branches is in line with the overall decline in CD Ratio, the decline in the case of rural branches has been steeper as shown in Table 5.

Table 5: Population Group-Wise Position of Credit Deposit Ratio

<table>
<thead>
<tr>
<th>Population Group</th>
<th>1990</th>
<th>2000</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>63.9</td>
<td>39.4</td>
<td>43.7</td>
</tr>
<tr>
<td>Semi-Urban</td>
<td>51.6</td>
<td>34.4</td>
<td>37.9</td>
</tr>
<tr>
<td>Urban-Metro</td>
<td>70.8</td>
<td>67.7</td>
<td>66.8</td>
</tr>
</tbody>
</table>


3.8.12 Besides the low outreach, low credit deposit ratio, the other issue is that the proportion of small and marginal farmers accessing formal credit is much lower than the comparatively bigger farmers. This has been revealed by the RFAS - 2003 referred to earlier. The NSS Report No.498: Indebtedness of Farmer Households - 2003 also reveals that the smaller land holders primarily rely on informal sources for their credit needs as shown in Table 6.

Table 6: Distribution of Outstanding Loans among Farmer Households according to Land possessed

<table>
<thead>
<tr>
<th>Land in hectares</th>
<th>Formal</th>
<th>Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of Land Possessed</td>
<td>Govt.</td>
<td>Cooperative Societies</td>
</tr>
<tr>
<td>Less than 0.01</td>
<td>1.9</td>
<td>5.3</td>
</tr>
<tr>
<td>0.01 to 0.40</td>
<td>4.0</td>
<td>14.5</td>
</tr>
<tr>
<td>0.41 to 1.00</td>
<td>3.8</td>
<td>17.0</td>
</tr>
<tr>
<td>1.01 to 2.00</td>
<td>1.7</td>
<td>20.5</td>
</tr>
<tr>
<td>2.01 to 4.00</td>
<td>1.5</td>
<td>22.5</td>
</tr>
<tr>
<td>4.01 to 10.00</td>
<td>1.3</td>
<td>23.0</td>
</tr>
<tr>
<td>Above 10.00</td>
<td>1.7</td>
<td>23.2</td>
</tr>
</tbody>
</table>


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The above data clearly presents that the informal sector had provided 77.4% of the debt outstanding from the farmers owing less than 0.01 hectare land and similarly 56.7% from farmers owing upto 1 acre land [0.40 hectare]. The moneylenders were the largest suppliers of credit to these categories of borrowers. As the land owned increased, the access to formal agencies for credit improved and it was 65% and above in case of all land owners possessing more than 2 hectare. The traders had met 10.6% of the credit outstanding of farmers possessing more than 10 hectare. In case of most other farmers it was around 4 to 6%. However, in no category of landowners, the share of informal agencies fell below 31.2% and moneylenders share below 16.7% indicating that the informal agencies and particularly the moneylenders are still an integral part of the rural financial system and even the bigger cultivators borrow from them.

3.8.13 Extremely low coverage of marginal and small farmers by the formal institution is a serious issue both from the borrower’s and lender’s view point as also from equity considerations. From the demand side, the small/marginal farmers generally do not have easy access to credit and a substantial part of credit they obtain is from informal agencies where the loan terms are often exploitative. This is despite credit targeting for commercial banks for agriculture/ weaker section etc. As per the current guidelines, the commercial banks are required to extend not less than 10% of the net bank credit to weaker sections comprising small/marginal farmers, landless labourers, artisans and borrowers under the Government sponsored poverty alleviation programme etc. However, as on 31st March, 2003 public sector banks had extended only 6.8% of the net bank credit to weaker sections. Only six out of 27 public sector banks had achieved the 10% target, with the rest ranging between 2% and 9.4%. The position has marginally improved by the end of March 2004, when 7 public sector banks had achieved the target and the overall achievement had reached 7.44% but was still lower than the target.

3.8.14 An important connected issue is that the credit requirements of the rural people are varied in nature. They not only require credit for agriculture operations and other income generating activities but also for consumption purposes and for meeting medical/educational/other social expenses. As a matter of fact the small and marginal farmers’ borrowing for consumption and other purposes far exceeds the loans
for income generation activities. Table 7 indicates the purpose wise break up of loan outstanding according to land possessed by farmer households in India.

Table 7: Distribution of Outstanding Loans on the Basis of Land Possessed by Farmer Households in India

<table>
<thead>
<tr>
<th>Land Possessed in Hectare</th>
<th>Capital Expenditure in Farm Business</th>
<th>Current Expenditure in Farm Business</th>
<th>Non-Farm Business</th>
<th>Total</th>
<th>Consumption</th>
<th>Marriages and other ceremonies</th>
<th>Education</th>
<th>Medical</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 0.01</td>
<td>15.1</td>
<td>5.7</td>
<td>7.7</td>
<td>28.5</td>
<td>21.2</td>
<td>22.4</td>
<td>0.3</td>
<td>13.0</td>
<td>14.6</td>
<td>71.5</td>
</tr>
<tr>
<td>Between 0.01 to 0.40</td>
<td>13.3</td>
<td>9.5</td>
<td>12.3</td>
<td>35.1</td>
<td>14.6</td>
<td>20.1</td>
<td>1.0</td>
<td>7.2</td>
<td>22.0</td>
<td>64.9</td>
</tr>
<tr>
<td>Between 0.41 to 1.00</td>
<td>24.1</td>
<td>22.7</td>
<td>10.3</td>
<td>57.1</td>
<td>10.5</td>
<td>13.3</td>
<td>1.3</td>
<td>4.1</td>
<td>13.7</td>
<td>42.9</td>
</tr>
<tr>
<td>Between 1.01 to 2.00</td>
<td>32.6</td>
<td>32.0</td>
<td>4.6</td>
<td>69.2</td>
<td>8.7</td>
<td>9.9</td>
<td>0.5</td>
<td>2.4</td>
<td>9.3</td>
<td>30.8</td>
</tr>
<tr>
<td>Between 2.01 to 4.00</td>
<td>38.8</td>
<td>34.7</td>
<td>4.7</td>
<td>78.2</td>
<td>5.0</td>
<td>8.9</td>
<td>0.7</td>
<td>1.3</td>
<td>5.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Between 4.01 to 10.00</td>
<td>41.1</td>
<td>39.8</td>
<td>2.3</td>
<td>83.2</td>
<td>5.9</td>
<td>5.0</td>
<td>0.5</td>
<td>1.2</td>
<td>4.2</td>
<td>16.8</td>
</tr>
<tr>
<td>Above 10.01</td>
<td>45.7</td>
<td>32.5</td>
<td>3.2</td>
<td>81.4</td>
<td>4.8</td>
<td>2.9</td>
<td>1.5</td>
<td>3.7</td>
<td>5.7</td>
<td>18.6</td>
</tr>
<tr>
<td>All India All sizes</td>
<td>30.6</td>
<td>27.8</td>
<td>6.7</td>
<td>65.1</td>
<td>8.8</td>
<td>11.1</td>
<td>0.8</td>
<td>3.3</td>
<td>10.9</td>
<td>34.9</td>
</tr>
</tbody>
</table>


3.8.15 As the size of the land possessed increases [upto 10 hectare] the proportion of loan outstanding for production purposes show a continuous increase and loans for other purposes a decline. The proportion of loans for purposes other than income generation is as high as 71.5% and 64.9% in case of farmer household possessing less than 0.01 hectare and between 0.01 hectare to 0.40 hectare respectively. Loans for purposes other than income generating were lowest at 16.8% [for farmer households possessing 4 to 10 hectare land]. This shows that if the formal credit system continues to fail in meeting all credit needs of the farmers, the reliance on moneylenders and other informal agencies would continue and there would also be chances of diversion of money from the purpose for which credit was approved to other purposes. Greater flexibility in approach from the formal credit agencies and introduction of different credit products are needed. The
purpose wise loan outstanding of farmers possessing land upto 1.0 acre [0.4 hectare] needs a closer look. The loans outstanding for consumption and medical purposes for farmers possessing less than 0.01 hectare and upto 0.40 hectare land at 34.2% and 21.8% respectively of the total debt outstanding are very high. Bulk of these is also likely to be from the moneylenders and other informal agencies on unfavourable terms compounding the problem. A high percentage of loans for consumption and medical purposes could mainly be due to [a] uneven income streams and volatile nature of expenses, necessitating loans for smoothening funds inflow or [b] non-viable nature of the employment/profession of the borrowers. In the case of [a] the banking system could make efforts to find solutions and assume that the savings [uneven income flow] could be collected and in time of need loans could be provided. The strategies of the financial system for the situation could be to expand the micro finance programme and the banks introducing greater flexibility and new credit products suiting the needs of small/marginal farmers. It is important that the micro finance institutions including the Self Help Groups [SHGs] complement the efforts of the formal institutions. While the banks and other formal credit institutions are better placed [both resource and capacity wise] to meet the larger credit requirements and also long term loans, the micro finance institutions could meet the short term and emergent requirements of smaller amounts. The stronger linkage between the Self Help Groups [SHGs]/other financial institutions is needed. The SHGs/MFI’s could recommend their members who have good credit history for need based larger loans from the banks and also do some monitoring/keeping an eye over such borrowers which would help in reducing the transaction/supervision cost of the banks. Under the SHG - Bank Linkage Programme, the emphasis so far has been on ‘outreach’. The complementarities between the informal structures and formal banking system need greater emphasis. The approach can not be credit from formal institution or credit from micro finance institutions. The micro system has developed in our country with almost exclusive reliance on SHG - Bank Linkage Programme. This outreach programme in no way could be considered a substitute for the whole range of financial services which the farmers need from the banks. The question is that of financial exclusion of a large part of rural population which needs attention. However, the situation at [b] can not be handled by the financial system and requires relief, development of human capital, increasing
incomes and creation of more gainful employment opportunities. Development of land lease markets or land markets in due course could also help.

3.8.16 The SHG - Bank linkage Programme has already become the largest and fastest growing micro finance outreach programme in the world [nearly 2 million SHGs have been linked to the banks and the credit flow through the SHGs is nearly Rs. 4000 crore per year], efforts are now needed to further expand this programme particularly in Eastern and North East Region, U.P., M.P., Maharashtra, Rajasthan and Gujarat where the growth of this programme is much lower as compared to southern States. The programme is also attracting criticism such as:

- It has become a numbers game without adequate emphasis on quality of SHGs.
- Credit extended through the SHGs is not adequate to improve the member’s income substantially.
- The poor require ‘livelihood finance’ rather than mere micro finance.
- By showing micro finance as a very successful programme and emphasising about its expansion both the banks and the State are not giving adequate attention to making qualitative improvements in delivery of agricultural credit.

3.8.17 While the constraints in the agricultural credit are discussed subsequently, the issue of the outreach which is extremely important particularly for the sub-marginal/marginal farmers, landless agriculture labour etc. has been discussed both from the supply side and the demand side in the following paragraphs.

3.8.17.1.0 Inadequate Access of Rural Poor – Supply Side Issues

The Transaction Cost

3.8.17.1.1 The transaction cost of rural lending in India is high primarily due to small loan size, large geographical spread and heterogeneity of borrowers. As the loan size increases, the transaction cost per unit of rupee lent comes down. Since agricultural loans are small and frequent the transaction cost is high. The lack of literacy and familiarity with documentation requirements among the rural borrowers adds to the problem. Really
speaking, the modern banking system/procedures/documentation requirements were not exactly designed for very small borrowers seeking small loans. Lot of innovation and investments in ATMs, IT etc. are needed to reduce the transaction costs. The supervision cost of small rural loans is also quite high due to low density of borrowers/credit

The Risk Cost

3.8.17.1.2 From the bank’s view point, in the case of rural poor there is greater uncertainty about their repayment capacity, their irregular and volatile income and expenditure pattern, possibilities of diversion of production loans towards meeting consumption requirements and consequently higher default risks. These problems are compounded by the non availability of suitable collaterals with the poor and the difficulties in contract enforcement in case of default. The poor credit discipline is also not conducive to aggressively expanding the outreach by banks. Due to extremely low incomes and non viable nature of their profession, there is always the risk of diversion of loan money if any emergency expenses have to be made leading to consequential repayment difficulties.

Lack of credit information

3.8.17.1.3 The formal agencies find it extremely difficult to obtain credit information about rural clients as they primarily rely on money lenders, traders and other informal lenders and it is most unlikely that they would be willing to part with any client information to formal agencies. The recent policy decision of the Reserve Bank of India regarding appointment of Credit Facilitators and Correspondents has the potential of becoming a useful arrangement to collect credit history/information regarding rural clients. The close relationship that is needed between the client and the rural branch is completely missing which is a serious constraint for the banks.

Branch Network

3.8.17.1.4 The branch network of the scheduled commercial banks in rural areas expanded quickly after the nationalization of the private sector banks. The rural offices
of the scheduled commercial banks increased from 1860 in 1969 to 35,396 in 1994 and thereafter declined continuously as shown in Table 8.

Table 8: Branch Network of Scheduled Commercial Banks in Rural Areas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Rural Offices</td>
<td>35,396</td>
<td>33,017</td>
<td>32,981</td>
<td>32,909</td>
<td>32,854</td>
<td>32,840</td>
<td>32,673</td>
<td>32,640</td>
<td>32091</td>
</tr>
<tr>
<td>Percentage of Rural Offices to total Offices</td>
<td>55.9</td>
<td>51.7</td>
<td>51.2</td>
<td>50.5</td>
<td>49.9</td>
<td>49.2</td>
<td>48.7</td>
<td>48.3</td>
<td>47.0</td>
</tr>
</tbody>
</table>

Source: Rural Economy – An Economic Times Intelligence Group Report and Trends and Progress of Banking in India 2004 - 05. *End June

The decline in the number of rural offices could perhaps be explained by [a] Liberalisation of branch licensing policy [April, 92]. [b] Freedom given to banks to relocate the branches etc. [c] Allowing the banks to exit on mutual consideration wherever they had loss making branches at rural centres served by two commercial banks [August, 93] and [d] Graduation of rural centres to semi-urban centres due to change in population etc. However, we need to keep in mind that the physical presence of a branch and personal interface with the branch staff are crucial psychological elements in rural banking in India where the literacy levels are low and technology use and awareness level even lower. Closing down of a large number of rural branches when the scheduled commercial banks had failed to achieve the agriculture lending/weaker section lending targets and the other institutions in the multi-agency approach i.e., the cooperative banks and RRBs had serious financial weaknesses, was perhaps not an appropriate strategy. Liberalisation in branch licensing policy could have been restricted to the banks which had achieved the rural lending targets.

3.8.17.1.5 The private sector banks which have a very small network of rural branches face serious problems in rural lending.

3.8.17.2.0 Problem of Access - Demand Side Issues

The collateral

3.8.17.2.1 Providing suitable collateral to the bank is the single most important constraint faced by the rural poor. Most of the rural poor have virtually no collateral which could be offered by them to secure their loans. Most of them may have only a
small plot of land which may not be easy to mortgage. Even the title documents may not be readily available. The entire process of registration of mortgage would be time consuming and expensive. Absence of collateral acceptable to the bank is a major hurdle for the rural poor in accessing credit from formal credit institutions. In spite of the instructions of the Reserve Bank of India, the RFAS-2003 referred to earlier, indicates that 87% of households who borrowed from RRBs and 89% households who borrowed from the commercial banks had to provide collateral for their loans. This means lack of collateral in practice leads to nearly financial exclusion as far as credit from banks is concerned. The informal agencies take recourse to more unorthodox approaches and are able to secure their loans and are to that extent more users friendly.

**Absence of Flexible Credit Products**

3.8.17.2.2 The formal credit institutions do not provide flexible products and services to meet the income and expenditure pattern of small borrowers in the rural areas. The rural poor need to borrow frequently as their wage income [which is a very large source of income even for the marginal farmers] in very irregular. They also have irregular expenditure pattern for which they are unable to borrow from formal sources. A major reason for the success of the SHG –Bank Linkage Programme has been the flexibility provided to the SHGs to decide the quantum of loan and the terms and conditions. The distinction between the consumption loan and production loan in the case of very poor is also rather blurred. The formal institutions lack flexibility and try to provide the rural poor, loans with terms which are not at all suitable to them as they do not match the income - expenditure pattern of the rural poor. The unit cost, period of loan, down payment, collateral etc. in many cases are standardized and decided on an all India basis/Regional basis leading to serious mismatch between what the borrower wants and could afford and what is offered to him. The result is that when an emergency expenditure has to be made, the rural poor find the moneylender, traders and relatives more dependable than the banks. The need is to develop different credit products innovatively at branch level to respond to farmers needs who have the requisite repayment capacity.
Documentation/Procedural Delays

3.8.17.2.3  Documentation and procedures for taking a loan [even for opening a saving bank account] are time consuming and cumbersome. Most of the rural poor do require the services of ‘other people’ [including some kind of middle men] to help in completion of the documents etc., which costs money. The RFAS-2003 referred to earlier revealed that loan approval took an average of 33 weeks in the case of the commercial banks. The survey also revealed that ‘hefty’ bribe amounts had to be paid by the borrowers and the sanction were often of smaller amounts than those applied by the borrowers as shown in Table 9.

Table 9: Some Aspects of Borrowing from Formal Sources and Costs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Particulars</th>
<th>Commercial Banks</th>
<th>RRBs</th>
<th>Co-operatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Loan amount received as a percentage of loan applied</td>
<td>91.8</td>
<td>88.2</td>
<td>83.5</td>
</tr>
<tr>
<td>2.</td>
<td>Percentage of household reporting bribes</td>
<td>26.8</td>
<td>27.0</td>
<td>9.7</td>
</tr>
<tr>
<td>3.</td>
<td>Bribe as percentage of loan approved*</td>
<td>10.1</td>
<td>18.2</td>
<td>19.9</td>
</tr>
<tr>
<td>4.</td>
<td>Time taken to process a loan application [weeks]</td>
<td>33</td>
<td>28.5</td>
<td>24.0</td>
</tr>
</tbody>
</table>

Source: RFAS - 2003

*About 27% of those sample farmers who borrowed from RRBs/Commercial banks and about 10% who borrowed from the cooperatives paid bribes.

Distance of the Bank Branch

3.8.17.2.4  Another factor which adds to the cost of taking loan or the time spent in taking a loan from the banks is the distance from the village and the money/time required to be spent for each visit. According to the RFAS - 2003 [referred to earlier], the median distance to the nearest bank branch was 5 km. Keeping in view, the average time taken for a loan decision [28.5 weeks to 33 weeks in case of commercial banks and RRB respectively] it may result in at least 6 to 7 visits to the branch [one visit on a monthly basis and each visit would cost money] as against on the spot decision taken by informal agencies generally located in the village itself.
3.8.17.2.5 Sometimes these costs become so high that in spite of comparatively lower interest rates charged by the formal institutions, it works out more or less equal to the rate of interest charged by the informal agencies. A paper published in Economic and Political Weekly [14-20 August 2004] by Anita Gill based on experience in Punjab States as under: “Then there are additional costs involved like frequent visits to the bank, fee, submission of documents [which more often than not require payment for services to someone who can fill the forms of the illiterate farmers] etc. All expenses can be added up in the rate of interest and the institutional rate of interest then is almost at par with the informal rate of interest”. This aspect can not be ignored and reveals that the stipulated rate of interest on formal credit constitutes only a part of the total cost which a farmer incurs in taking a loan. The need is to reduce the total cost of the borrowers by simplification of loan procedures/documentation, reducing the sanction time and generally toning up the working of the branches. Extension of mobile banking facilities in certain far off areas, use of Facilitators and Correspondents etc. could also help.

3.8.17.2.6 It may also not be out of place to mention that for an average small/marginal farmer the banks appear to be mainly for the rural elite who are educated and could deal with the bank staff.

3.8.18.0 General Constraints in Agriculture Credit

High Risks in Agriculture Credit

3.8.18.1 The minimization of lending risks is important for the banking institutions. The risks emanate from a host of factors including failure of investment, inadequate returns due to production/ market risks, defaults due to inadequate/improper appraisal of loans, diversion of loans, poor follow up and inability to realize the securities available to the bank. These risks are common to all investments. However, in the case of agriculture credit, these risks are more pronounced, due to the sector itself and certain aspects of Indian agriculture. Any agriculture investment could be affected by weather induced risks more so in the Indian conditions where over 60% agriculture is rainfed. Similarly, the market risks are normal to any business enterprise, but in Indian conditions...
agriculture, the risks are accentuated due to extremely small size of holdings [weak bargaining power of the grower], absence of transparency in auctions at the Regulated Markets, distress sales, huge post harvest losses, lack of value addition, absence of a well established godown network, nascent Commodity Future’s market etc. Some of these risks could be minimized by financial products/arrangements like rain insurance, crop insurance, medical/accident insurance, and more effective implementation of the Minimum Support Price across the country, use of commodity future market etc. However, some of these instruments are yet to fully developed and adequately used in rural India. In absence of an effective risk mitigation system, the dryland farmers often become defaulter to the bank when the rains are not adequate and the yield declines. The defaulters are ineligible for fresh finance. NABARD had earlier tried ‘Cyclical Credit’ for the dryland agriculture. The need is to try the same approach with necessary modifications on a larger scale to test the idea and improve it so that it could be developed into a system of financing in these areas.

Weak Legal Framework and Constraints in Enforcement

3.8.18.2 The state of affairs regarding the land records, the difficulties in getting up to date information and registration of charge/mortgage etc. [land titling and registration system] and transfer of land are difficult under the present legal system which act as constraints to agricultural lending. The stringent tenancy laws which prohibit in some States tenancy arrangements or are very restrictive in nature has resulted in unrecorded and unofficial year to year oral lease practice [nearly 10.4 million hectare land forming about 8.2% of the total cultivated land was leased in 1991-92] which makes it nearly impossible for the tenant to raise formal credit on leased in land. The enforcement of contract by realizing moneys from execution of charged collateral is also extremely weak, time consuming and expensive.

Identification of Rural Credit with State

3.8.18.3 The Government’s domination of rural financial institutions, announcement of waivers, write offs, interference in recovery procedures, cap on interest rates, use of credit cooperative for Public Distribution System etc and even conversion or
reschedullement of loans in case of natural calamities are provided in such a manner as appearing to be induced by the State. All this has resulted in close identification of rural and agricultural credit with State. The State is seen by most rural people as ‘Mai Baap’ who are always to give rather than to take back given amounts leading to poor credit discipline in rural lending. The percentage recovery of dues against demand in the case of District Central Cooperative Banks [DCCBs] at the end of March during the last three years was quite low and ranged between 61 to 67%, in case of SCARDBs between 49 to 58%, in case of PCARDBs between 44 to 53% and for RRBs around 70%. The loan portfolio of RRBs is however different from that of the DCCBs/PCARDBs which mainly lend for agriculture purposes in rural areas.

**Personnel Policies of the Banks**

3.8.18.4 Manning of the rural branches is an issue. There is a shortage of staff. The right type of orientation is not there. The branch manager rarely lives in the village where the branch is located or even in the surrounding area. The banks find it difficult to find enough ‘volunteers’ to work in rural branches. Most of the officers have to undergo a fixed duration rural posting during which they get lower perks like housing and transport allowance leading to a lower carry home salary, while their expenses go up as most of them maintain two establishments; one in the city mainly for securing a better medical and schooling environment for their family members and the other for themselves. Inadequate staff is a definite constraint in developing ‘relationship banking’ which is at the core of all banking activities. One man rural branches or branches being run by 2-3 persons including a gun-man are not uncommon. It is somewhat encouraging to observe that the banks have now again decided to recruit agricultural graduates as was done in the Seventies and was later on given up in the late Eighties. These graduates with requisite knowledge and experience could provide needed support for expanding agriculture credit. **The need is for further relook at the personnel policies of the bank including the career aspirations and provision of incentives etc. to develop and retain adequate number of committed staff in agriculture credit related departments/divisions in the banks.**
3.8.18.5.0 Weaknesses of the Specialized Rural Credit Institutions

Cooperative Credit System

3.8.18.5.1 The promotion of the cooperatives credit system in the present day form was an attempt by the Government to institutionalize credit in the rural area. The cooperative credit system was designed to serve the rural population primarily for agriculture development. The area of operation and functions at each level of the structure were predefined and limited. It was service as the main concern rather the returns/profitability to the contributors of the capital funds. State partnership in credit cooperatives was introduced on the recommendation of the All Indian Rural Credit Survey Committee. Besides, the State Partnership, a very substantial part of their resources were from the Reserve Bank of India and later NABARD. There were few implications of these [a] these institutions did not pay adequate attention to mobilization of rural savings particularly at the Primary Cooperative Societies at the village level [b] they lacked professionalism in management and developed as a lending arm of the State rather than true cooperatives [c] the Registrar of the cooperative became all powerful and decided most of the matters. The autonomy of these structures was compromised. At the primary agriculture credit society level, the Government appointed Secretary virtually run these organizations and the elected office bearers [the board of directors] had very limited say. The interference with the functioning of the cooperative structures, sometimes led to compromising the norms for credit worthiness. In due course, political expediency also led to laxity in quality of credit and its repayments. The Government of India’s loan waiver scheme [1989] greatly aggravated the weak credit discipline and erosion in financial health. The State Governments have also been announcing waivers [sometimes interest wavier and some time partial loan write offs] which further undermines the credit discipline. Sometimes informal instructions are also conveyed to go slow on recovery [d] inadequate interest taken by the members who had only share capital with very low linkage with loan amount [e] since substantial part of the resources of the credit cooperatives were from RBI, the instructions were that this money had to be used for so called ‘productive purposes’. The lending became rather straight jacketed and amounted to mainly distribution of moneys received from the higher tier. Timeliness, adequacy and
members needs for loans became secondary. Generally the members of the credit cooperatives had to approach money lenders and other informal agencies for much of their credit requirements leading to repayment problems as the informal system with stiffer terms of sanction and more effective monitoring [day to day contact] were able to get priority in repayment. It is not an uncommon that the members of the cooperatives borrow eligible amount from the cooperatives and maintain account with moneylender, Commission Agent etc. for balance of credit needs [f] the credit societies were also used for Public Distribution Scheme which often provided negative margins.

Deteriorating Financial Health

3.8.18.5.2 The cumulative impact of political interference, write offs, poor credit discipline, lack of professionalism in management, heavy dependence on higher financing agency for resources, certain sectoral issues and operational constraints has resulted in most of the primary credit societies running into loss and the financial health of a large number of district central cooperative banks, State Cooperative Banks and the Agriculture and Rural Development Banking System has become very weak as shown in Table 10.

Table 10: Financial Results of the Credit Cooperatives

<table>
<thead>
<tr>
<th>Tier</th>
<th>2000-01</th>
<th>2001-02</th>
<th>2002-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of State Cooperative Banks</td>
<td>29</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Number in Profit</td>
<td>24</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Number that have eroded net worth</td>
<td>6</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Total accumulated losses [Rs in crore]</td>
<td>492</td>
<td>567</td>
<td>281</td>
</tr>
<tr>
<td>No. of District Central Cooperative Banks</td>
<td>367</td>
<td>368</td>
<td>361</td>
</tr>
<tr>
<td>No. of profit</td>
<td>247</td>
<td>243</td>
<td>237</td>
</tr>
<tr>
<td>No. that have eroded their net worth</td>
<td>139</td>
<td>139</td>
<td>144</td>
</tr>
<tr>
<td>Total accumulated loss [Rs in crore]</td>
<td>3177</td>
<td>3770</td>
<td>4401</td>
</tr>
<tr>
<td>Primary Cooperative Societies [approximately 1 lakh]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number in profit</td>
<td>46,807</td>
<td>45,292</td>
<td>58,683</td>
</tr>
<tr>
<td>Number in loss</td>
<td>41,991</td>
<td>43,511</td>
<td>53,626</td>
</tr>
<tr>
<td>Total accumulated loss [in crore]</td>
<td>2112</td>
<td>NA</td>
<td>4595</td>
</tr>
</tbody>
</table>

Source: Vaidyanathan Committee Report
Further, the District Central Cooperative Banks and the State Cooperative Banks have also eroded their deposits to the time of Rs. 3,100 crore and Rs. 142 crore respectively.

Table 11: Poor Recoveries and High Level of NPA of the System

<table>
<thead>
<tr>
<th></th>
<th>2000-01</th>
<th>2001-02</th>
<th>2002-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Cooperative Bank Recovery %</td>
<td>82</td>
<td>82</td>
<td>79</td>
</tr>
<tr>
<td>NPA%</td>
<td>13</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>District Central Cooperative Banks Recovery %</td>
<td>67</td>
<td>66</td>
<td>61</td>
</tr>
<tr>
<td>NPA%</td>
<td>28</td>
<td>22</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: *NABARD Annual Report 2003 - 04*

The overall financial performance of the District central Cooperative Banks was also quite unsatisfactory as shown in *Table 12*.

Table 12: Financial Performance of the District Central Cooperative Banks

<table>
<thead>
<tr>
<th></th>
<th>2002-03</th>
<th>2003-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets [Rs in crore]</td>
<td>1,171,506</td>
<td>1,25,685</td>
</tr>
<tr>
<td>Net Profit [Rs in crore]</td>
<td>-268</td>
<td>108</td>
</tr>
</tbody>
</table>


Impairment of Governance

3.8.18.5.3 Another important aspect is that in the case a very large number of cooperative institutions their elected Board of Directors is under supercession as shown in *Table 13*.

Table 13: Elected Board of Directors of Cooperative Banks under Supercession 31st March, 04

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>SCB</th>
<th>DCCB</th>
<th>SCARDB</th>
<th>PCARDBs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total number of institutions</td>
<td>31</td>
<td>365</td>
<td>20</td>
<td>768</td>
<td>1,184</td>
</tr>
<tr>
<td>2.</td>
<td>No. of Institutions where Boards are under Supercession</td>
<td>12</td>
<td>186</td>
<td>11</td>
<td>416</td>
<td>625</td>
</tr>
<tr>
<td>3.</td>
<td>%age of [2] over [1]</td>
<td>38.7</td>
<td>51</td>
<td>55</td>
<td>54.2</td>
<td>52.8</td>
</tr>
</tbody>
</table>

Source: *Report on Trends and Progress of Banking in India: 2004-05*
Incidentally, it is also not uncommon that change in political set up in a State leads to supercession of the elected Board as the cooperatives are also an important conduit of distributing political patronage.

**Higher Risk Profile of Credit Cooperatives**

3.8.18.5.4 The credit cooperatives are local financial institution, with the mandate of working in a limited geographical area and also with limited client groups and sectors. This adds to the overall risk profile of these institutions. A District Central Cooperative Bank [DCCB] or a Primary cooperative Agriculture and Rural Development Bank [PCARDB] is likely to have nearly entire lending for agriculture and may be for two/three specific crops or investment activities popular in that area. Any climate aberration or adverse market swing could land this bank into serious financial difficulties. Due to the high risk profile, these institutions need different dispensation. If these are also treated at par with Commercial banks [with nation wide area of operation and lending in different sectors] they may require recapitalization support at regular intervals. For example, nearly 85% of the resources of the long term cooperative credit structure [SCARDB/PCARDBs] are provided by NABARD as they are not fund based institutions [they can mobilize only term deposits from members]. However, the rate of interest charged by NABARD to these banks is the same which is charged to the nationalized banks with much lower risk profile, and a large resource base with lower average cost of funds. However, inspite of the problem of higher cost higher risk the PSCARDBs/SCARBs have to lend at more or less same interest rates as charged by the Commerce Banks. Obviously, many of these banks are non-viable and have also accumulated high NPAs as shown in Table 14 and Table 15.
Table 14: Financial Performance of the State Cooperative Agriculture and Rural Development Banks [SCARDBs] and Primary Co-operatives Agriculture and Rural Development Banks [PCARDBs] [Rs. in Crore]

<table>
<thead>
<tr>
<th>Agency/Year</th>
<th>Total Number</th>
<th>Profit making</th>
<th>Loss making</th>
<th>Overall Profit/Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Amount</td>
<td>No.</td>
<td>Amount</td>
</tr>
<tr>
<td>SCARDBs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-02</td>
<td>20</td>
<td>9</td>
<td>11</td>
<td>182</td>
</tr>
<tr>
<td>2002-03</td>
<td>20</td>
<td>8</td>
<td>11</td>
<td>164</td>
</tr>
<tr>
<td>2003-04*</td>
<td>20</td>
<td>10</td>
<td>9</td>
<td>210</td>
</tr>
<tr>
<td>PCARDBs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-02</td>
<td>768</td>
<td>196</td>
<td>47</td>
<td>572</td>
</tr>
<tr>
<td>2002-03</td>
<td>768</td>
<td>208</td>
<td>52</td>
<td>560</td>
</tr>
<tr>
<td>2003-04*</td>
<td>768</td>
<td>281</td>
<td>76</td>
<td>430</td>
</tr>
</tbody>
</table>


*Data in respect of ISCARDB and 57 PCARDBs not available. Both the SCARDBs and PCARDBs as a whole had non-viable operations during the last three years.

Table 15: Non Performing Assets and Recovery Rates of SCARDBs and PCARDBs

<table>
<thead>
<tr>
<th>Year</th>
<th>SCARDBs</th>
<th>PCARDB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPA%</td>
<td>Recovery %</td>
</tr>
<tr>
<td>31 March, 2002</td>
<td>18.5</td>
<td>55.0</td>
</tr>
<tr>
<td>31 March, 2003</td>
<td>21.0</td>
<td>49.0</td>
</tr>
<tr>
<td>31 March, 2004</td>
<td>26.7</td>
<td>44.0</td>
</tr>
</tbody>
</table>

Source: Report on Trends and Progress of Bankings in India: 2004-05

While such high levels of NPAs and poor recovery position may not be justified, it should be carefully examined whether there is a need for a more diversified loan portfolio for these banks and also a different dispensation for resource raising including refinance from NABARD to these banks.

3.8.18.5.5 The financial impairment of the cooperative credit system has serious consequences for the rural poor/weaker section. The very fact that 144 District Central Cooperative Banks have eroded their net worth and do not comply with the requirements of section 11 of the Banking Regulation Act, 1965 [as applicable to the cooperative
societies] and their real net worth is not even Rs. 1 lakh makes them ineligible for NABARD refinance in the normal circumstances. Keeping in view that the cooperatives have the largest outreach among all formal and informal rural credit agencies in Maharashtra, Gujarat, Punjab, Haryana, Kerala, Madhya Pradesh and Chattisgarh their weak financial position and consequent reduction in lending has serious consequences in credit flow for agriculture. [Against a total membership of 13.541 crore at the Primary Agriculture Cooperative Societies level, nearly 31.38% [4.25 crore] belonged to scheduled castes/scheduled tribes]. **The deteriorating financial health of the cooperative banks has created a vaccume in agricultural credit flow in certain states/regions and it has also been very harsh for weaker section of the rural population.** Over time the share of the cooperative system in total lending for agriculture purposes has continuously declined as shown in **Table 16**.

**Table 16: Flow of Ground Level Credit to Agriculture [short-term and long term]**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative Banks</td>
<td>9,378</td>
<td>13,975</td>
<td>20,718</td>
<td>23,524</td>
<td>23,716</td>
<td>26,959</td>
<td>31,231</td>
</tr>
<tr>
<td>Percentage of share</td>
<td>62%</td>
<td>44%</td>
<td>39%</td>
<td>38%</td>
<td>34%</td>
<td>31%</td>
<td>25%</td>
</tr>
<tr>
<td>Regional Rural Banks</td>
<td>831</td>
<td>2,040</td>
<td>4,219</td>
<td>4,854</td>
<td>6,070</td>
<td>7,581</td>
<td>12,597</td>
</tr>
<tr>
<td>Percentage of Share</td>
<td>5%</td>
<td>6%</td>
<td>8%</td>
<td>8%</td>
<td>9%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>4,960</td>
<td>15,831</td>
<td>27,807</td>
<td>33,587</td>
<td>39,774</td>
<td>72,886</td>
<td>81,481</td>
</tr>
<tr>
<td>Percentage of Share</td>
<td>33%</td>
<td>50%</td>
<td>53%</td>
<td>54%</td>
<td>57%</td>
<td>60%</td>
<td>65%</td>
</tr>
</tbody>
</table>

*Source: Vaidyanathan Committee Report and Economic Survey 2005-06*

In just 12 years i.e., between 1992-93 and 2004-05, the share of cooperatives in total agriculture credit has come down from 62% to 25%. This is mainly due to deterioration in financial health of the cooperatives, their inability to mobilize more deposits and stagnation in support provided by NABARD to the Cooperative Banks as the General
Line of Credit [which was used for this purpose by NABARD] from the Reserve Bank of India is being phased out.

3.8.18.5.6 An impact of the impairment of deposits [total erosion of deposits of DCCBs were Rs. 3100 crore and the SCBs Rs 142 crore] is that deposits of members of the cooperatives and public are at risk. Incidentally, the deposits of one SCB and 15 DCCB have been fully eroded.

This problem was well analyzed by Vaidyanathan Committee which stated as under:

“Thirty eight percent of the deposits of the DCCBs were from the ‘cooperatives’ including Primary Agriculture Credit Societies [PACS]. As statutory liquidity ratio [SLR] requirements of the urban cooperative banks and other banking institutions in the area could be placed in the DCCS [and in turn DCCBs place their SLR deposits with the State Cooperative Bank [SCB]], the deposits under the head “Cooperatives” may have a significant component of SLR related deposits. This adds to the overall risks to the cooperative banking sector, taking to much beyond the exposure of individual deposits in the district and state level banks. Erosion in the deposits of DCCBs/SCBs, therefore, could have a ‘domino’ effect on the banking system in the area”.

Incidentally, the institutional deposits with higher tier are not covered by the insurance under the Deposit Insurance and Credit Guarantee Corporation of India [DICGC] and further even individual deposits are covered only upto Rs. 1 lakh. Further, deposits at the level of the Primary Agriculture Credit Societies [PACS] which as on 31st March, 2003 amounted to Rs 19,120 crore are not covered by the DICGC adding to the problem.

3.8.18.5.7 The multi agency approach in our country is a reflection of the need for different players in the field of agricultural credit. The refrain of all Committees and working groups which have looked into the performance of the cooperative credit system has been that the cooperatives have not done as well as they should have, but there is no question of getting away from the cooperatives in the long run. Experience reveals that the commercial banks have also shown some similar weakness in their rural lending operations that afflicted the cooperative system. **It may not be wrong to believe that**
some of the perceived weaknesses of the cooperatives are in fact not the weakness of the cooperatives but are associated with the clientele and the sector in which they operate. The problems of Indian agriculture do get reflected in the performance of the credit cooperatives as they primarily serve the agriculture sector. While the commercial banks have an important role in rural credit, in Indian conditions there is perhaps no alternative to the cooperatives at village level for provision of agriculture credit. The historic statement made in the All India Rural Credit Survey Committee Report in 1954 “the cooperatives have failed, but the cooperatives must succeed” perhaps holds well even today. **The need is to make a serious attempt to revitalise the cooperative system and devise strategies to ensure that these institutions work as autonomous/responsible bodies and in a very professional manner.** The NABARD/RBI would also have to introduce special dispensations for them to counter their design deficiencies. Unfortunately all support measures are sometimes wrongly described as concessions. **Need based support measures are essential to ensure that the specialised institutions are able to serve the less privileged people in the society.**

3.8.18.6.0 Regional Rural Banks [RRBs]

3.8.18.6.1 The Regional Rural Banks [RRBs] form an integral part of the Indian banking system with focus on serving the rural sector particularly the weaker section, i.e., the small and marginal farmers, agricultural labourers, artisans and small entrepreneurs for development of agriculture, trade and other productive activities. There are 196 RRBs operating in 26 States across 518 districts with a network of 14,446 branches [31-03-2004]. As per their organisation design, the RRBs combine the local feel and familiarity with rural problems, which the cooperative possess, and a degree of business organization as well as the ability to mobilize deposits, which the commercial banks possess. They are State-sponsored and partnered rural oriented commercial banks. These banks were expected to constitute a low cost banking system. The commercial banks not only contributed to their capital along with the union and the State Government but also provided crucial manpower and guidance. These banks were to be manned by rural based staff who were expected to be better suited to look after the needs of the rural population and also remain low cost. However, hopes of both low cost operations and
better attention to the needs of the rural population remained elusive mainly due to the unionized staff insisting on salaries comparable to commercial banks and the RRBs adopting ‘narrow banking’ and developed reluctance to lending. The investments in Government securities and banks had been exceeding the loan outstanding as shown in Table 17.

Table 17: Some Financial Indications of RRBs [as on 31st March]

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004*</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Deposits</td>
<td>38,272</td>
<td>44,539</td>
<td>50,098</td>
<td>57,010</td>
<td>62,143</td>
</tr>
<tr>
<td>Loans outstanding</td>
<td>15,816</td>
<td>18,629</td>
<td>22,158</td>
<td>25,481</td>
<td>31,803</td>
</tr>
<tr>
<td>Investments [including assets with banking systems]</td>
<td>27,636</td>
<td>30,532</td>
<td>33,063</td>
<td>30,437</td>
<td>45,097</td>
</tr>
</tbody>
</table>

Source: Trends and Progress of Banking 2005 * 26 March, 2004

The investments of the RRBs far exceeded their loans outstanding. As on 31st March 2005, the investments exceeded the loan outstanding by Rs. 13,294 crore [42%].

3.8.18.6.2 The outstanding agricultural loans of the RRBs increased from Rs. 10,261 crore at the end of March 2003 to Rs 16,710 crore by end March 2005. However, keeping in view their mandate, existence of 14,446 branches [which are nearly 45% of the total number of rural offices of scheduled commercial banks] and refinance facilities from NABARD, these banks need to focus more on loans to farmers and rural artisans etc. Their share in agriculture lending at about 10% is very small as compared to their branch network. With 167 out of 196 RRBs making current profits, the approach should quickly change from ‘narrow banking’ to a more aggressive lending based banking. With their rural based staff and a huge unmet demand for financial services in their operational areas these banks are yet to perform to their potential.

3.8.18.7 There is a need for clear visualisation of the expected developments in the field of rural credit and particularly agriculture credit and the role expected from the Reserve Bank of India, NABARD, different types of banks i.e., the commercial banks, RRBs and the cooperative banks in the next 10-20 years to give it a firm direction. Based on the above, there has to be a road map for strengthening/improving those credit agencies which are weak and require support for enabling them to perform as per the
future role decided for them. It is expected that these institutions would continue evolving to meet the constantly changing requirements of the sector and hence require a closer watch for orderly growth. Similarly there is also a need to decide our role expectations from the micro credit system. The Government of India and the Reserve Bank of India may take a lead in the matter.

**Regional Imbalance**

3.8.18.8 There are wide disparities in the disbursement of agriculture credit in different regions. Though these could be partly attributed to differences in credit requirements, absorption capacity of borrowers etc in different regions but the disparities are too large to be explained by the above. In the case of the Scheduled Commercial Banks, against an all India per capita credit of Rs. 128 [1996-2001], the per capita credit was very low in North Eastern region [Rs 17], Eastern Region [Rs 42] and Central Region [Rs 86]. The per capita credit in Southern Region [Rs 280] was the highest followed by Northern Region [Rs 153] and Western Region [Rs134]. The problem is compounded by the fact that the specialized rural credit institution i.e., the credit cooperatives are extremely weak in the North Eastern and the Eastern Region in particular. The long-term co-operative credit system [the SCARDBs and the PCARDBs] are virtually non-functioning in the entire North East Region and extremely weak in Bihar, Orissa, Jharkhand etc. Similarly the short term cooperative credit structure is also by and large in poor financial health in North East & Eastern Region. According to the Vaidyanathan Committee Report, forty three out of Sixty nine District Central Cooperative Banks in Eastern Region were loss making and thirty had NPA levels exceeding 40%. In the North East, the situation was worse as the percentage of recovery to demand at State Cooperative Bank Level on 30th June 2003 in the case of Arunachal Pradesh and Manipur was less than 20%, Assam and Nagaland between 20% and 30%, Tripura and Meghalaya between 30% and 40% and Mizoram about 48%. In a multi agency system, where one agency is weak, the others are expected to step in. However, the financially strong commercial banks including the public sector banks have failed to play this role. It is necessary that the credit policy should provide that where the localised institutions are weakened due to local problems,
greater risk profile or any other reason, the commercial banks must step in and shoulder greater responsibility in meeting the banking needs of the population.

19.0 Additional Suggestions - For Improving the Outreach and Agriculture Credit

Out Sourcing

3.8.19.1 One of the measures for improving outreach could be outsourcing. The Self Help Groups Linking with Banking System relied on outsourcing for credit decision making, monitoring and recovery of loans by the formal system to the informal system i.e., the Self Help Groups to reduce costs. Similarly the ‘Facilitators and Correspondents’ could be used by banks to reduce the costs and improve outreach. Similarly simplification of procedures and introduction of innovative schemes under which the poor could borrow and repay frequently as per their funds flow/position could be of help. Innovative arrangements need to be developed for collecting credit information regarding clients. There is a need to build up further on the SHG Bank Linkage Programme. The SHG members who are able to build up a good credit history and could use larger amount of credit may be identified and supported by the banking system. The SHGs are better suited to provide small credit for emergency needs or for tiding over temporary cash shortages but can not provide full financial services like the formal system. It would not be correct to expect the SHGs to substitute formal financial system; they can at best complement the formal system.

Land Leasing

3.8.19.2 Another aspect to be noted is that the small/marginal farmers are quite active in land lease market. In absence of supporting legal provisions they do not get adequate rent while leasing out land and are unable to raise credit on leased in land. Tenancy laws should encourage all sections of rural population to participate in the land lease market as per their needs. A well organised land lease market where leasing is logically permitted, would enable the small/marginal farmers and the land less who lease in land to raise loans from the formal agencies. Till such time, suitable amendments in land laws take
place, the banks need to finance oral lessees under joint liability groups and the State and Revenue authorities may give special support to the banks in recovering such dues.

**Insurance for Covering Risks**

3.8.19.3 An effective crop insurance system could minimize production risks. However, the present crop insurance under the National Agriculture Insurance Scheme [NAIS] is neither farmer friendly nor very effective. Certain changes in development of insurance as a financial risk mitigation arrangement are discussed subsequently. There is also a need for an integrated insurance cover for accident, natural death, medical and loss of hut by fire etc. The data given at para 14 shows that 13% and 7.23% of the outstanding debts of farmers owing less than 0.01 hectare and between 0.01 hectare to 0.40 hectare respectively were for medical purposes. In events of such needs, the farmers are quite likely to divert loan money and even default in payment if there were not financial products covering such emergencies or the rural public health system continued to be inefficient. In the first report of the National Commission on Farmers ‘Serving Farmers and Saving Farming’ has suggested a low cost Integrated Insurance Policy covering medical, accident, loss of dwelling unit, natural death etc. The proposal needs to be considered.

**Agriculture Risk Fund**

3.8.19.4 In event of successive droughts/floods etc the conversion /reschedulement of loans are not enough to provide adequate relief to the farmers. The successive loss of income would mean that the postponed debt burden plus the obligations for current loans would be beyond the capacity of the borrower to repay. The need therefore is for ‘relief’ by way of interest/principal write off which would need State support. An Agriculture Risk Fund with contribution from the Centre/State Government /Banks is needed to meet such situations. The bank could contribute say about 2% of the net profit [which could be given tax concession/exemption] towards the Fund on an annual basis. The localized financial institutions i.e., cooperatives/RRBs with limited geographical area, lack of diversification in lending and low volumes would require strong support from such a Fund to relieve the hardship of the farmers.
Fixing Proper Repayment Period

3.8.19.5 Fixation of shorter maturities than what is justified by increased income stream makes repayment difficult. Routinised fixation of repayment period instead of working out a mutually acceptable loan period based on carefully worked out future income flows could be the first step to check default in payment. The tendency on the part of the commercial banks to fix shorter maturities for loans is counter productive. As the commercial banks are constrained for long term resources, they should avail need based refinance from NABARD for long term funds or devise suitable systems under which longer end of maturities are held by institutions having large long term funds and commercial banks hold medium to short term maturities.

Credit Quality and Response to Development Needs

3.8.20 Agriculture credit quality could be significantly enhanced if the timeliness and adequacy is assured. The need is to fix realistic scale of finance for different crops and adjust it on a regular basis to take-care of the price changes and requirements of inputs based on new technologies and developments. Timeliness is crucial. Coverage of all agricultural borrowers by Kisan Credit Cards [KCC] with in a fixed time frame expeditiously is called for. Both in North East Region and hill areas, most of the agricultural operations are carried out by women farmers. However, there has been a general reluctance on the part of the banks to issue KCC to women farmers. This aspect needs to be examined. Even where land is in the name of the husband who has moved out of the village for job, the banks with proper documentation could issue KCC to the wife who is handling the agricultural operations. Further, the unit cost for different investments should be flexible and be used primarily as a general norm and not to be rigidly used irrespective of the need for higher amount of finance. The linkage between credit and marketing needs strengthening by increasing pledge finance, credit for marketing activities, developing storage facilities and lending against Warehouse Receipts. The banks need to explore the possibilities of providing loans to farmers against produce stored in their homes/godowns to minimise distress sale. ‘Contract Farming’ or other arrangements where the marketing risks are shifted to the processing
company or purchase of produce, facilitate flow of formal credit. The need is to develop farmer centric contract farming rules to encourage such developments. There has been remarkable growth of poultry and dairy in India. Development of commercial poultry/dairy farms requires bank credit. The banks need to meet credit requirements not only in traditional projects but also in new business enterprises for value addition/marketing which could create additional employment and provide linkages. It is expected that as the rural economy develops, there would be closer linkages between the farmers, trade intermediaries, food processing industry and the marketing units. These developments would need strong credit support. Farmers in dryland agriculture try to spread their risks by taking up different investments like animal husbandry, a micro non-farm activity and sometimes mix crop cultivation and horticulture etc. The banks need to look at their credit requirements differently and try to finance the basket of investments which would yield them a steady income.

3.8.21.0 Investment Credit – Crucial for Growth

3.8.21.1 Investment credit is used for realising long term potential of the agricultural farm by acquiring and using additional physical assets, improving the efficiency of existing assets [land improvement, land reclamation, using water lifting devices, water conservation devices etc.] and generating value addition etc. Long term investments in agriculture helps in improving the stock of equipments, tools and productivity of resources, which in turn enables the farmers to use their resources, particularly labour and capital more productively and realise the long term growth potential.

3.8.21.2 Though the long term credit has been increasing in absolute terms, as a percentage of total credit it has declined overtime. In 1999-00 the investment credit at Rs. 17,303 crore had formed 37.1% of the total institutional credit flow. Though the investment credit flow increased to Rs. 23,974 crore in 2002-03, it formed only 34.5% of the total. During 2004-05, the share of investment credit in the case of commercial banks was 27% where as in the cases of cooperative banks and RRBs it was only 16%.

3.8.21.3 The decline in growth of investment credit is mainly due to collapse/near collapse of the long term cooperative credit structure [SCLDBs and PCARDBs] in many
States like Maharashtra, Bihar, Orissa, the entire N.E. Region, Karnataka etc. The disbursements by this structure declined from Rs. 4776 crore in 2001-02 to Rs. 3956 crore in 2002-03. Further, as long term loans have to be invariably backed by mortgage of land etc., the need is for reduction of stamp duty and registration charges on mortgage, introduction of simple procedures for creation of charge, issuance of notification naming the Panchayat Headquarters for creation of equitable charge, improvement in availability of information regarding land records, etc. Land consolidation, more secure tenancy system, arrangement of long term leasing of water bodies would help in increasing investment credit. Strengthening of various development corporations such as State Irrigation Development Corporation, Forest Development Corporation and Agro Industries Development Corporations would also attract investment credit from banks for various development projects. The banks could also focus on providing group loans for tractors and other costly machines, development of water markets etc to avoid over capitalisation, encourage better use of capital assets and help in creation of employment opportunities in the form of encouraging youth to take up custom hiring etc. Development of rural infrastructure particularly roads, power, backward and forward linkages would also help in growth of term credit. High value agricultural activities require term credit support. **Bank could identify areas where farmers are moving towards high value agriculture and upgrade those branches by posting trained and technically qualified staff who could appraise such projects and commit necessary credit support.** Further, the marketing infrastructure, storages, cold chains, investments for value addition, agro-processing and agro-business are likely to be new investment areas in the years to come. The banks will be required to respond in a proactive manner to facilitate these developments.

3.8.21.4 There are also very large variations in per hectare average investment of term-credit between States. While for 2001-02 the per hectare average investment on all Indian basis was Rs. 456, in Orissa [Rs.205], Rajasthan [Rs. 324], Bihar and Jharkhand [Rs. 326], Chhattisgarh [Rs. 191], Maharashtra [Rs. 164], Jammu and Kashmir [Rs. 322] and in entire N.E. Region it was less than Rs 100. Increasing public sector investment in infrastructure, improving extension services, land records and land rights are some of the
issues which may require special focus for improvement considering the importance of increasing investments in agriculture for improving productivity. These States could also organise special studies to identify factors which could help in increasing investment credit flow. In the North-East Region, where land is owned by the Government or the community, the farmers are unable to offer land as collateral to the banks. This issue needs special attention and the banks and State Government need to reach a mutually acceptable arrangement in the matter.

**Insurance Support**

3.8.22 Insurance provides financial instruments to cover risks which are assessed in money terms. The National Agriculture Insurance Scheme [NAIS] was introduced from Rabi 1999-00 substituting the Comprehensive Crop Insurance Scheme [CCIS] which was operational between 1985 and 1999. Despite heavy subsidization by the Government [to the extent of nearly 75% of the scheme cost in the form of subsidizing the premium and meeting deficit cost] the coverage of NAIS has been hardly 10% of the Indian farmers. The National Agriculture Policy [2000] had stated “National Agriculture Insurance Scheme covering all farmers and all crops throughout the country with built in provision for insulating farmers from financial distress caused by natural disasters and making agriculture financially viable will be made more farmer specific and effective. Endeavour will be made to provide a package insurance policy for the farmers, right from sowing of the crop to post harvest operations including market fluctuation in the prices of agricultural produce”.

3.8.23 The NAIS, at present covers 23 states and 2 Union Territories. Between 1999 and 2003-04 Rabi, the NAIS had cumulatively covered nearly 4.62 crore farmers and provided relief to 1.58 crore farmers for an aggregate amount of Rs. 4752 crore against premium collection of Rs 1242 crore. About 75 million hectare of cultivated area was covered. Though the NAIS mainly covered the loanee farmers, the coverage of non-loanee farmers was increasing. Incidentally, the claim experience of non-loanee farmers till 2003-04 was about three times higher than the loanee farmers which was rather unusual and needed to be looked at closely.
3.8.24 Under the NAIS, the loss assessment is based on an area approach, the ‘Threshold Yield’ and ‘level of indemnity’. The Threshold Yield [TY] is the moving average yield based on past three years in case of rice and wheat as past three years and last five years in case of other crops. The unit area for assessing the actual yield has been Block/Taluka and the indemnity levels fixed at 90%, 80% and 60% for the compensation under the scheme based on crop cutting experiments. The Scheme also provided a 50% subsidy in premium to be paid by the small/marginal farmers [shared equally by the Government of India and the State Governments] which is to be phased out in a period of five years.

3.8.25 The main criticism of NAIS has been on following grounds:

- Large insurance unit [Taluka/Block] not reflecting individual farmers yield experience
- Guaranteed yield based on last 3 to 5 years needed change particularly in areas where last few years have not been good.
- Inordinate delay [6 months to 12 months] for settlement of claims.
- Insurance coverage not available for all crops notably fruits/vegetables.
- Loss of farmers where the sowing does not take place not covered.
- Indemnity level of 60% is very low and needs to be increased.

3.8.26 On directions of the Hon’ble Prime Minister, the Ministry of Agriculture, Government of India appointed a Joint Group of to study the improvements required in the crop insurance programme in August, 2004. The Group submitted its Report in December 2004. However, the Hon’ble Union Finance Minister during his budget speech declared that the NAIS would be continued in its present form for Kharif and Rabi 2006 - 07.

3.8.27 The Situation Assessment Survey of Farmers done by NSSO [NSS Report No 496: Some Aspects of Farming-2003] revealed that at the all India level, only 4% farmer households reported ever having insured their crop. Among those who had never insured their crop, a very large percentage [57%] were unaware of the practice of crop insurance. Out of the remaining 43%, as many as 16% were not interested, 24% said that the facility
was not available to them and 3% said that they could not pay the premium. Lack of awareness and interest of such a large percentage of the population in a Scheme, which is in operation for nearly 20 years [in one form or the other], is a sad commentary on the developmental/promotional efforts made and also the user’s perception about the usefulness of the Scheme.

3.8.28 Besides the need to make the NAIS more user friendly, by eventually making it individual based and reducing the time in settlement of claims it would also be useful to experiment with ‘Weather Insurance’[Rain Insurance] at a larger scale. Instead of using the crop cutting experiments to assess the actual yield, serious thought needs to be given to using ‘Surveyors’ for loss assessment. Let us not forget that the claims under cattle insurance, tractor, poultry and certain horticulture crops is settled on the basis of assessment of damage/loss made by the surveyors. It would be worthwhile to make an attempt. The National Agriculture Insurance Company [NAIC] could consider opening one/two men district offices who could have a number of surveyors as retainers and could be allotted the work as per the claims etc. Till such time, the NAIS switches over to individual basis as indicated above, the unit area may at least be reduced to ‘Gram Panchayat. Further, the delays in settlement of claims [6 - 12 months] defeat to a certain extent the very purpose of insurance. So long as the settlement of claims is continued to be based on crop cutting experiments, prompt settlement of claims is difficult to achieve.

3.8.29 It is also worth considering whether the NAIC may continue as a ‘one risk’ insurance company or be encouraged to grow into an organization to meet various insurance requirements [other that the life insurance] in the rural areas. A more diversified insurance portfolio would help in reducing the risk, increasing volume of business, improve its visibility and help in developing rural insurance as a financial product. It may also be worthwhile to allocate about Rs. 100 crore to NAIC as Rural Insurance Development Fund to take up promotional and developmental work regarding rural insurance.
CHAPTER 3.9
GUIDING PRINCIPLES UNDERLYING THE DRAFT
NATIONAL POLICY FOR FARMERS

MARKET*

3.9.1 An efficient marketing system is essential for the development of the agriculture sector, providing incentives to the farmers for commercialization, increasing production and giving appropriate signals for production planning and research activities. At the time of independence, there was shortage of production against demand and the immediate concern was to save the farmers and consumers from the malpractices of traders and facilitate growth and development of an orderly marketing arrangement. Some of the characteristic features of the agriculture produce marketing in India at the time were [a] sales immediately after harvest mainly for meeting the cash needs—mostly distress sale at discounted prices, sale of upgraded produce, loose carrying of produce [b] predominant role of village trader and interlocking of credit and commodity market [c] use of unstandardised weights measures by traders and high market charges which included charges like ‘mudat’, ‘dharamda’, ‘arahat’ etc. [d] direct sale by farmers and absence of farmer’s organisation to reach volumes and protect the interest of the small producers. In view of the above circumstances, the Government developed organised marketing of agricultural produce through the regulated markets. The States and the Union Territories passed the APMC Act. A massive programme for creation of marketing network was taken up. As on 31 March, 2004, as many as 7418 markets had been brought under the ambit of regulated markets. In addition, out of 27,294 rural periodic markets [village haats, shanties etc.], nearly 15% function under the regulated framework. The basic

objective of setting up the above network of markets was to protect the interest of the farmers and eliminate various malpractices of the traders.

3.9.2 In view of the serious supply side constraints, apart from market regulatory programme, various legal enactments were also promulgated and orders covering specific products issued by the Government. These included the Essential Commodities Act, 1955, Standards of Weights and Measurement Act, 1976, Prevention of Black Marketing and Maintenance of Supply of Essential Commodities Act, 1980, Agriculture Produce [Grading and Marketing] Act, 1986 and Consumer Protection Act 1986 and Bureau of Indian Standards Act, 1986. In addition, there were also specific orders covering various products like meat, vegetable oils, milk and milk products, fruit and fruit products, pulses, edible oil seeds, edible oil, solvent extracted oil, deoiled meals etc. The recourse to the provision under these orders etc. is mainly intended to be taken during periods of scarcity and stop the malpractices. Some of these orders also covered activities like storing, packing, quality, blending, processing etc.

3.9.3 The regulated markets achieved certain amount of success in providing transparent transactional methods/marketing practices, basic amenities and services conducive to an efficient marketing system. Some of the developments in the marketing system at the primary market level and farmers marketing practices are [a] the marketed surplus per farm has grown up. The overall marketed surplus-output ratio is estimated to have improved from 13% in 1950-51 to 64.1% in 1999-2000 [b] there has been some standardization of market charges resulting in their reduction and the liability has generally shifted to the buyers [c] the quality of market information available is much better than what it was during the ‘fifties’ and the ‘sixties’ [d] the market sales have increased [e] there are sectors where the sales through the cooperatives are substantial [f] inspite of the restrictive features, the system has made space for ‘contract farming/direct marketing/other innovative practices like the ITC’s e-chaupal etc.

3.9.4 Inspite of the development of the regulated agricultural produce marketing system, several weaknesses such as distress sales immediately after harvest, absence of grading and packaging at the farm level, inter-locking of credit and markets continued.
Further, the Regulated Marketing System did not offer the farmers virtually any option/choices; the farmers also complain about lack of transparency in weighing and auctions, considerable delay in effecting sales, unauthorized deductions and poor treatment given to them at the market yards. The other weaknesses of the system are [a] poor spread of regulated markets in certain States [b] inadequate development of the rural periodic markets which are the first contact point for the growers [c] inadequate infrastructural facilities at the regulated markets [d] large variations in the market fee/charges across districts/States [e] failure to develop common trade language and [f] inefficient working environment, etc.

3.9.5 A recent study done by the Karnataka State Agriculture Prices Commission [2002] in respect of 3408 farmers revealed that only about 29% of the sample farmers sold their produce through the regulated markets. The remaining 71% farmers not using the regulated markets cited distance [31.2%], good price at the local market [18.4%], small quantity [12.7%], advance already taken [9%], no knowledge about the regulated market [8%], delay in payment [7.8%], no provision of paddy sales [5.4%], cheating in weighment/removing 4-5 kgs of the produce and harassment by Hamals/ Coolies [3.1%], long wait for weighing [1.4%], others [3%]. The above findings clearly reflect that the majority of farmers do not sell their produce at the regulated markets. These markets are neither farmer friendly nor there has been adequate effort on the part of the regulated markets to attract the farmers and build the business.

3.9.6 The Government monopoly in setting up agriculture produce markets under the State specific Acts [Agriculture Produce Markets Committee Act] has prevented the private sector from taking initiatives in development of agricultural marketing. Further, the lack of competition and the regulatory focus under the APMC Act has meant that these organisations have played little role in development of markets or encouraging grading processing, value addition at the farmer’s level. For improving the management of existing regulated markets and making them farmer friendly, holding of regular elections of the marketing committees and State Agricultural Marketing Boards/ SAMBs should be made mandatory and the emphasis should be on promotion of grading, binding and packaging of farm products and promoting new markets for the local products. The
system of issue of licenses for trading and functioning in the regulated markets needs to be changed to counter the oligoponistic powers of established traders and other ‘market functionaries.’

3.9.7 As regards the Essential Commodity Act, 1955 and other Acts/orders etc., the Task Force on Employment Opportunities [Planning Commission] had observed ‘The Essential Commodities Act is a Central Legislation which provides umbrella under which the States are enabled to impose all kinds of restrictions on storage, transport, processing of agricultural produce. These controls were traditionally justified on the ground they were necessary to control hoarding and other type of speculative activity, but the fact is that they do not work in time of genuine scarcity and they are not needed in normal times. Besides, they are typically misused by lower level of administration and become an instrument of harassment and corruption.’ Some of the other Acts/orders [some of which are mentioned in paragraph [2] also need a revisit in view of the changed circumstances.

3.9.8 The farmer wants different options for marketing his produce. The State APMC Acts need to be amended to provide for among others, encouraging the private sector or cooperatives to establish markets, develop marketing infrastructure and supporting services, collect charges, allowing marketing without the necessity of going through APMC/licensed traders etc.

3.9.9 The supply chain in agricultural marketing is long and has increased the margin between the price received by the farmer and the price paid by the consumer. Tightening of the supply chain is called for and the role of the farmer’s organisations [cooperatives/Self Help Groups] needs to be expanded. To begin with these organisations could aggregate the farmer’s produce and improve post harvest handling. Direct marketing by farmers needs encouragement by providing them opportunities for direct sale to consumers in the regulated markets and also by developing special markets/bazaars for the purpose. Sale of graded produce could fetch better price to the farmer, reduce the time taken in effecting sale at the Market Yard and lead to greater transparency in auctions etc. There is a need for fixing quality standards for all
agricultural commodities and introducing compulsory grading for sale in the regulated market in a phased manner.

3.9.10 ‘Contract Farming’ eliminates market risks for the farmer and could encourage diversification and commercialization of agriculture. However, it is necessary to develop farmer centric ‘Code of Conduct’ for contract farming and also building effective farmer’s groups/organisations to negotiate with the purchasers to help in orderly development of these arrangements and protect farmer’s interest.

3.9.11 Distress sale by small and marginal farmers at discounted prices for immediate cash continues to be a serious problem which could be countered to some extent by liberalising pledge loans against produce stored in godowns/farmer’s own home. There is need for considerable expansion of storage [including cold storage] facilities, improving warehousing system, facilitating loans against Warehouse Receipts and generally making Commodity Futures Markets more useful to the farmers.

3.9.12 Farmers all over the country consider ‘market’ as the most crucial aspect in the entire agricultural operations which impact their income and welfare as also a major constraint for further diversification and commercialization. They want much greater support from the State in getting reasonable prices for their produce. Many farmers are not satisfied with the level of Minimum Support Prices and believe that these have not kept pace with the increase in prices of inputs and the prices of other products. The Minimum Support Price [MSP] needs protection across different regions of the country. In absence of procurement operations all over the country, the benefits of MSP are mainly limited to Punjab, Haryana, U.P. and to some extent A.P. The prices of crops covered under the MSP remain below the MSP level in many parts of the country particularly after the harvest. Further, the prices of sensitive commodities [not covered by MSP] have to be watched particularly during glut period for quick intervention under an effective Market Intervention Scheme.

3.9.13 Farmers require authentic information based on meteorological, marketing and management information for land use decisions/investments etc. The need for such
advice would become more acute in future with new growth areas of agriculture being characterised by greater heterogeneity, unlike traditional crop cultivation etc. The production may be highly concentrated and markets could be quite different from the present. For rendering advice to the farmers the Government could restructure the Land Use Boards supported by team of technical experts/agencies etc. Besides promoting diversification, there is need for value addition in agricultural production for increasing incomes and rural employment. Post harvest losses are a serious drain on farmer’s income and need attention.

3.9.14 There is a need for early consideration of the proposal made in the Third Report of the National Commission on Farmers [Serving Farmers and Saving Farming - 2006: Year of Agricultural Revival] for establishing an Indian Trade Organisation [ITO] and our own boxes for domestic agricultural support on the models of the WTO’s Blue, Green and Amber boxes. We need to segregate the support extended to farmers into two groups - those which are of the nature of life and livelihood support to small farm families and those which could be considered as trade distorting in the international market. The first group of support measures needs to be strengthened for protecting the food and livelihood security of our farmers.

3.9.15 The Union Ministry of Agriculture have already initiated the reform process in agricultural marketing. The Ministry has been proactive and has circulated a draft for the revised APMC Act to all the States. The State Governments will have to undertake such reforms speedily in order to remove bottlenecks and scope for corruption and harassment. Both quality and trade literacy programmes should be initiated all over the country. In relation to commodities, which are exported, it will be essential to conform to WTO Regulations. At present, such commodities constitute about 7% of total agricultural production in the country. Farmers’ Associations and SHGs should be helped to export on competitive terms by spreading awareness of the opportunities available for external agricultural trade. In such cases, cost, quality and reliability of supply will determine long term trade relationships. The agri-export zones should be further strengthened and should become places where farmers will get the best possible price for their produce. The establishment of Community Grain and Food Banks could
help in the marketing of underutilized crops. Indian farmers can produce a wide range of health foods and herbal medicines and market them under strict quality control and certification procedures.

3.9.16 Internal trade in India faces many problems due to the diversity of controls exercised by multiple authorities at different levels, restrictions of inter-state and inter-district movement of goods, lack of uniformity of standards laid down by different authorities and agencies and in taxes. All this has led to breaking up of the vast Indian Market into a large number of smaller regional markets to the detriment of the farmer. The Hon’ble Prime Minister of India, Dr. Man Mohan Singh in his address at the Agriculture Summit-2005 observed as under, “An important commitment of our Government is to integrate the domestic market to all goods and services. The time has come for us to consider the entire country as common or single market for agricultural products. We have to systematically remove all controls and restrictions, we should enable direct marketing between farmers and NGOs, Cooperatives and Private Companies.”

3.9.17 The paper work involved in complying with various controls, regulations and licenses, the costs involved in terms of time and resources and the inevitable corruption and malpractices that this leads to, have served as a big drag on the efficiency of trading operations in the country. All these costs are ultimately passed on to the producer and the consumer. The barriers to internal trade could be grouped into [a] restrictions imposed by the Essential Commodities Act, 1955/Prevention of Food Adulteration Act, 1954 and other legal enactments and orders [b] fiscal issues [c] transport issues and [d] agriculture trade related issues.

3.9.18 While India is nearly a ‘Common Market’ as there are no customs duties and no quantitative restriction in movement of goods from one State to another however, many steps particularly in the matters relating to transport [replacing annual road tax and removal of fitness certificate by a life time payment/system, introducing a National Permit for plying commercial vehicle anywhere in India etc.], fiscal matters [introduction of State VAT, uniformity in taxes on commodities, withdrawal of Octroi and local taxes],
tax administration [avoid using the border posts for collection/verification of payment of taxes], agriculture trade related issues [amendment to APMC Act to allow private parties/cooperatives to establish markets and relook on various Acts/orders leading to some very restrictive features in matters concerning movement, storing, stocking, processing of agriculture produce] are some of the further steps needed for making India a ‘Single Market’. The above changes would need building a consensus/constant persuasion and sharing/compensation for loss of revenues to the State Governments. The financial matters including loss of revenues for the States could be a major issue in moving towards a Single Indian Market. This could be referred to the Finance Commission for suggesting methods, allocations etc. by which the Indian Single Market may become a win-win situation for all.

3.9.19  Until recently, Indian agriculture was described as a gamble in the monsoon. Now, it is also becoming a gamble in the market. Market security is becoming vital for further agricultural progress. Hence, steps to bring about a Single Indian Market have become urgent.
CHAPTER 4

TOWARDS A BIOSECURE AGRICULTURE

4.1.0 A National Agricultural Biosecurity System: An Urgent Necessity

4.1.1 Our national preparedness and capability in the area of Biosecurity are currently issues of widespread debate following the detection of the H5N1 strain of avian influenza virus in a few pockets in Maharashtra and Gujarat. Biosecurity has wider implications in biological warfare and bio-terrorism. This area is obviously a matter of serious concern to the National Security Council. In our country, agricultural Biosecurity covering crops, trees, and farm and aquatic animals is of even greater importance since it relates to the livelihood security of nearly 70 per cent of the population, and the food, health, and trade security of the nation.

4.1.2 The world is truly becoming a global village with reference to communication and transport. Disease causing organisms can spread fast through aeroplanes and farm trade. India is the transitory home for many migratory birds. Our country is also becoming a national village with reference to communication, transportation, and trade. Therefore, home quarantine assumes as much importance as international quarantine. Cross-border movement of farm goods and animals with neighbouring countries is another area of Biosecurity significance.

4.1.3 The National Commission on Farmers (NCF) is concerned with the impact of invasive alien species on the livelihood security of farm women and men. Therefore, it stressed in its very first report submitted in December 2004, the need for a thorough review of the present infrastructure and institutional framework in the area of agricultural Biosecurity, including the World Trade Organisation specifications of sanitary and phytosanitary measures.

4.1.4 The National Bureau of Plant Genetic Resources has been intercepting many alien invasive pests in imported agricultural commodities. There is also the threat of new
strains of wheat rusts. Hence, the NCF has been holding consultations on developing a National Agricultural Biosecurity System characterised by high professional, public, and political credibility. The major conclusion is that we urgently need a National Agricultural Biosecurity System with the following principal goals:

(a) To safeguard the income and livelihood security of farm and fisher families as well as the food, health, and trade security of the nation. This through effective and integrated surveillance, vigilance, prevention, and control mechanisms designed to protect the productivity and safety of crops, farm animals, fish, and forest trees.

(b) To enhance national and local level capacity in initiating proactive measures in the areas of monitoring, early warning, education, research, and international cooperation. And, to introduce an integrated Biosecurity package comprising regulatory measures, education, and social mobilisation.

(c) To organise a coordinated National Agricultural Biosecurity Programme on a hub and spokes model with effective home and regional quarantine facilities. This should be capable of insulating the major agro-ecological and farming zones of the country from invasive alien species of pests, pathogens, and weeds.

4.2.0 Scope of Biosecurity

4.2.1 Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyse and manage risks in the sectors of food safety, animal life and health, and plant life and health, including associated environmental risk. Biosecurity covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and management of invasive alien species and genotypes. Biosecurity is a holistic concept of direct relevance to the sustainability of agriculture, food safety, and the protection of the environment, including biodiversity.
4.2.2 Biosecurity is a process of managing biological risks associated with food and agriculture in a holistic manner. Besides enhanced productivity, sustainability and profitability, interest in Biosecurity is increasing as national regulatory and export certification systems are being challenged by large increases in the volume of food and agricultural products being traded internationally, by the expanding variety of imported products and by the growing number of countries from which these imports are originating. Increased travel is also creating more pathways to spread pests, diseases and other hazards that are moving faster and farther than ever before. Improved coordination is being sought among national bodies responsible for enforcing sanitary, phytosanitary and zoosanitary measures to better protect human, animal and plant life and health without creating unnecessary technical barriers to trade.

4.2.3 The strengthening of policy and regulatory frameworks for Biosecurity in food and agriculture must be among the highest priorities. These policy and legislative frameworks need to be extended to include biosafety needs within the overall framework of Biosecurity. This will provide: (i) optimization of scarce human and financial resources, (ii) improving the cohesiveness of advice on all aspects of Biosecurity, including biosafety, (iii) recognition of the special importance of biosafety to food and agriculture as well as the special impacts of food and agriculture on biosafety. Further, this will seek the development of appropriate standards, guidelines, and other recommendations for food safety and the protection of plant, animal and aquatic life and health based on risk assessment and taking into account relevant aspects of biosafety, including environmental health.

4.2.4 Thus, risk analysis and management as a framework for Biosecurity becomes the central binding force across various sectors. It provides an opportunity to harmonize terminology and methodology, while respecting the need for individual sectors to tailor risk analysis procedures to the characteristics of the risks involved. It should be recognized that risk analysis procedures should provide an appropriate science-based and transparent basis for Biosecurity. Fast expanding trade has intensified the need for effective risk analysis capacities and for bilaterally and multilaterally agreed standards.
4.2.5 There are several commonalities in risk assessment and management across the subsectors and organisms which must ideally be addressed by the National Agricultural Biosecurity System. And, in time to come, since Risk Analysis and Management will constitute bulk of the animal, plant, fish health management, Biosecurity would automatically occupy the centre stage in this field.

4.2.6 The various international standards issued through several international conventions and agreements notwithstanding, in the wake of implementation of WTO-SPS Agreement and to meet TRIPS and TBT, the country is required to undertake following actions:

i. Designating a single Central Government authority as responsible for implementation of SPS measures.
ii. Reviewing and updating of legislation and regulations related to SPS to give effect to international agreement and establishing a nodal point for enquiries and information exchange,
iii. Establishing national standards on SPS measures in line with international standards,
iv. Establishing a notification procedure,
v. Undertaking pest risk analysis and identifying and maintaining pest-free areas for plants and animals as per international standards and safety assessment for food,
vi. Providing scientific justification of high level protection in the absence of pest risk assessment,
vii. Recognising of equivalence of specific measures through bilateral or multilateral agreements,
viii. Identifying researchable issues and strengthening back-up research,
ix. Capacity building in terms of infrastructure and expertise,
x. Awareness building and catalyzing attitude change, and
xi. Developing functional public-private-NGO partnerships.

4.2.7 Requirements of several of the other international, regional and bilateral agreements and of national regulations on various agricultural commodities and ago-
ecological and socio-economic regimes, whether on plants or animals or fisheries or microbes, are analogous. Establishing and operationalising separate facilities for each of the requirements amounts to not only gross duplication of scarce resources and efforts but also erosion of effectiveness, efficacy and synergy which are essential for achieving sustainable, sound and competitive outcomes. A National Agricultural Biosecurity System, which involves the management of biological risks in a comprehensive and synergistic manner, is a strong force of convergence of the various paths of sustainable development – a win-win situation for all partners of development.

4.3.0 Status and Prospects of the National System

4.3.1 India has been striving to become a Biosecure nation. But our facilities for sanitary, phytosanitary and zoosanitary measures are inadequate. The Avian Flu menace notwithstanding, India’s consignments of farm exports are rejected in hundreds (often being on the top of the list of rejections) every year on grounds of mycotoxin, salmonella, pesticide residues, etc. The situation is likely to worsen in the coming years since health safety standards as presented by Codex Alimentarius are getting increasingly stringent and the goalposts in developed countries have been shifting fast. Food safety standards will become the most important non-tariff barrier. Therefore, we must not lose any further time in rendering India Biosecure, both from within and outside. A quality food safety and Biosecurity literacy campaign must be launched at all levels – from farmers to policy makers.

4.3.2 Our Biosecurity infrastructure needs to be vastly strengthened. As regards plants, according to the National Bureau of Plant Genetic Resources (NBPGR), several invasive alien species have been introduced into the country along with grain, seed and planting material imports. These introduced pests include bunchy top of banana, banana bract and streak viruses, vegetable/pea leaf miner, spiraling white fly, American serpentine leaf miner, peanut stripe virus, cotton leaf curl, potato wart, sunflower downy mildew, coffee pod borer, apple San. Jose scale, Biotype B of white fly and invasive weeds like *Lantana camara* and *Phalaris minor*. Six of these were introduced in 1990s. With the increasing intensification of agricultural production, productivity and trade, such
invasive alien species will further threaten our crops. A new wheat stem rust pathotype Ug 99 is causing serious damage in Uganda, Kenya and a few other countries, and threatens to reach India. Wheat being our main pillar of national food security and rural economy, India must take proactive steps to prevent entry and establishment of this race in India (see Box I).

**Box I. Sounding the Alarm on Global Stem Rust**

Stem rust is a catastrophic disease because of its ability to cause complete annihilation of wheat crops over wide areas. The widespread use of PBW 343 wheat variety possessing 1BL.1RS translocation with \( Sr31 \) and its continuing stem rust protection over about 6 million ha in India alone had led to complacency throughout the wheat community. The discovery of race Ug99 with virulence for \( Sr31 \) and other important genes in Uganda in 1999, and possibly earlier in Kenya, was a reminder of the pathogen’s ability to respond, but little seems to have happened in breeding programs until the emergence of current concerns following the continued incidence and spread of race Ug99 in Eastern Africa. The prospect of a stem rust epidemic in wheat in Africa, Asia and the Americas is real and must be stopped before it causes untold damage and human suffering. Fortunately, resistant sources against Ug 99 have been identified and the desirable agronomic bases are being used for developing resistant strains in collaboration with Kenya and CIMMYT.

Another disease of wheat that can be very important is Blast on wheat. This strain of blast was first found in Brazil and is now spread up to Bolivia. Very little is known about its likely effect to wheat crop in rice-wheat belt of India. If germplasm enhancement is initiated now (obviously selection will have to be done in Brazil or Bolivia), perhaps by the time diseases reaches India we may have resistant cultivars.

An Expert panel on “Global Rust Initiative”, 2005 recommended that diverse genetic resistance be identified in global wheat germplasm by testing in Kenya and Ethiopia. Because modern cultivars currently grown in Northern Africa and Asia are susceptible to race Ug99, a breeding strategy be implemented to incorporate diverse genetic resistance to Ug99 into such germplasm before the race migrates to those areas. DNA-marker assisted selection should be utilized where feasible. The seed multiplication agencies and community-based organizations be encouraged to produce commercial seed of newly developed stem rust resistant varieties with stipulations that (1) farmers and other stakeholders play a leading role; (2) breeding programmes be supported in the maintenance and multiplication of Breeder’s and Foundation seed; (3) commercial seed be readily available to farmers; and (4) on-farm demonstrations of elite varieties be conducted. The ex-ante and ex-post impact assessments should be undertaken, taking into account alternative crops and livelihood systems.

*Source: Various CIMMYT Publications, and R.P. singh of CIMMYT (personal communication).*

4.3.3 Five major quarantine stations at New Delhi, Mumbai, Kolkata, Chennai and Amritsar have been modernized with sophisticated equipment and Post Entry Quarantine facilities under a UNDP/FAO project. However, there are other 24 plant quarantine
stations for the upgrading of which an initial effort has been made for need assessment in terms of laboratory and green house facilities required under a FAO-TCP proposal. The 24 stations were classified into three broad categories in the said project based on nature and volume of material received in each of the stations. The output of the project can be a starting point to initiate upgrading of these stations. It may however, be noted that apart from equipping these stations with modern instruments and facilities, the means of communication (telephone, fax, e-mail, vehicle) need special attention for efficient functioning of these stations.

4.3.4 The establishment of national standards on sanitary and phytosanitary measures in line with the international standards is of critical concern to meet the stiff challenges under the international agreements. During 1995 to 2005, 24 international standards have been developed (see Box II). During the past 15 years or so, India has developed the following eight National Standards, some of which conform to some of the International Standards but a lot more work is needed in this direction:

- National Standard for Pest Risk Analysis.
- Guidelines for certification of forced hot-air treatment facilities for wood packaging material.
- Quarantine treatments and application procedures: I. methyl bromide fumigation.
- Guidelines for assessment, audit and accreditation of fumination agencies for undertaking methyl bromide fumigation.
- Requirements for establishment of pest free areas for mango nut (seed) weevil (*Sternochaeus mangiferae*) and pulp weevil (*S. frigidus*).
- Requirement for establishment of pest free areas for tephritid fruit flies.
- Guidelines on certification of hot water immersion treatment facilities for mango fruits.
- Accreditation treatment for ISPM-15 Compliance.

The National Agricultural Biosecurity System may constitute a National Committee on SPS Standards and a suitable standard setting procedure needs to be developed and adapted at the Central and State levels.
Box II. International Standards for Phytosanitary Measures

- ISPM 1 Principles of plant quarantine as related to international trade 1995
- ISPM 2 Guidelines for pest risk analysis 1996
- ISPM 3 Code of conduct for the import and release of exotic biological control agents 1996
- ISPM 4 Requirements for the establishment of pest free areas 1996
- ISPM 5 Glossary of Phytosanitary terms 2001
- ISPM 6 Guidelines for surveillance 1997
- ISPM 7 Export certification system 1997
- ISPM 8 Determination of pest status in an area 1998
- ISPM 9 Guidelines for pest eradication programmes 1998
- ISPM 10 Requirements for the establishment of pest free places of production and pest free production sites 1999
- ISPM 11 Pest risk analysis for quarantine pests including environmental risks and LMOs 2001
- ISPM 12 Guidelines for Phytosanitary certificates 2001
- ISPM 13 Guidelines for the notification of non-compliance and emergency action 2001
- ISPM 14 The use of integrated measure in a systems approach for pest risk management 2002
- ISPM 15 Guidelines for regulating wood packaging material in international trade 2002
- ISPM 16 Regulated non-quarantine pests: Concept and Application 2002
- ISPM 17 Pest reporting 2002
- ISPM 18 Guidelines for the use of irradiation as a Phytosanitary measure 2003
- ISPM 19 Guidelines on list of regulated pests 2003
- ISPM 20 Guidelines for Phytosanitary import regulatory system 2004
- ISPM 21 Pest risk analysis for regulated non-quarantine pests 2004
- ISPM 22 Requirements for the establishment of areas of low pest prevalence 2005
- ISPM 23 Guidelines for inspection 2005
- ISPM 24 Guidelines for the determination and recognition of Equivalence of Phytosanitary Measures 2005

Source: Interim Commission on Phytosanitary Measures

So far no systematic efforts are being made for survey and surveillance of endemic pests, of new and emerging pests and of the exotic pests which have been introduced and are spreading. An effective integrated pest surveillance system and
organization devoted to performing field inspection and pest survey activities for the detection, delimitation or monitoring of established pests as well as system and organization devoted to the detection of new pests needs to be introduced. Specific systems may be required for identification, establishment and maintenance of pest-free areas as per the international standards. Similarly, systematically designed survey, surveillance and monitoring studies for the toxin incidence in food and agricultural commodities are required to identify less risk-prone areas for export and domestic use. For this, need-based additional support is needed to strengthen containment facilities, pest risk analysis capacity, pest diagnostic laboratories, residue and toxic laboratories, referral laboratories, emergency control and treatment facilities and accreditation laboratories.

4.3.6 In fisheries and aquaculture, alien species and genotypes (also known as introduced species and genetically altered species) both have a major role in increasing production. They are recognized as one of the most significant threats to natural aquatic ecosystems, and thus to those who depend upon them.

4.3.7 Alien species are a valid means to improve production and the economic benefit from fisheries and aquaculture. About 17% of the world’s finfish production comes from alien species. Asia produces more of the African cichlid tilapia (>700 000 t) than Africa itself (39 245 t). In Chile, introduced salmonids provide about 20% of the world’s farmed salmon, in an industry directly employing some 30 000 people.

4.3.8 The issue is neither to ban alien species, nor to abandon regulation of their movement, but to assess the risks and benefits associated with their use and, if appropriate, develop and implement plans for their responsible use. A lack of adequate information is often a major constraint: without such information it is difficult to determine the possible impact of a proposed introduction into a complex and dynamic aquatic ecosystem.
4.3.9 Internationally recognized treaties have recently been established to address the issue, calling for accurate assessments of the risks of introducing exotic species, and promoting the creation of information sources and exchange of information on exotic species, including their biological and ecological attributes, and possible positive and negative impacts. These include the FAO Code of Conduct for Responsible Fisheries, and CBD Article 8h and decision V/8 on “alien species that threaten ecosystems, habitats or species”. The International Council for the Exploration of the Seas (ICES) and the European Inland Fisheries Advisory Commission (EIFAC) have both created specific guidelines and procedures for dealing with alien species and GMOs.

4.3.10 As regards aquatic life forms, surprisingly, there are no quarantine facilities in this huge country of tremendous aquatic resources. A National Strategic Plan for Aquatic Exotics and Quarantine has been prepared. It addresses the following key issues:

(i) Risk of introducing exotic species;
(ii) Criteria to finalise list of potential, approved and prohibited exotic species and criteria to finalise diseases of concern;
(iii) Evaluation of proposals for introduction in an objective manner;
(iv) Management of exotics already present in India; and
(v) Surveillance and Disease Reporting and establishment of a network of diagnostic laboratories.

Necessary infrastructure and human resources should be urgently provided for effective implementation of the above Plan.

4.3.11 The problem is most acute in livestock. The greatly accentuated livestock Biosecurity problems are generally linked with unmindful industrialised productions located within or close to cities using infected water, feed and other inputs, flouting all the norms, standards and guidelines. Little heed is paid to the instructions and guidelines, underlining the lack of awareness and sensitivity. For instance, the Ministry of Agriculture had communicated Biosecurity Measures to all the States, but these have hardly been adopted at the ground level. The recurrence of Avian Flu in certain pockets in the country points to this apathy.
4.3.12 Infectious diseases cause an annual loss of about Rs 50 billion, besides the losses due to export restrictions and the impending danger of public health hazards. In case of epidemic outbreaks the losses are much more colossal. A case study in Canada (2004) has brought out the seriousness of this problem in an extremely lucid manner (see Box III). Unfortunately, the recent outbreak of Avian Influenza caused by strain H5N1 threatens total collapse of the Indian poultry industry (see Box IV).

Box III. Livestock Revolution Threatened

One of the most spectacular event in Canadian biosafety history was certainly the rapid spread and responsive cull of the avian flu H7N3 in 2004 in BC’s Fraser Valley, where 84 percent of BC’s poultry industry is located. The disease, less deadly to humans than the H5N1 strain found in Asia, was first found in geese and ducks on February 18 near Abbotsford, and was diagnosed over a large cluster of commercial poultry farms by March 22. Over the next eight weeks, an astonishing 42 farms were infected, and approximately 19 million chickens, turkeys and ducks were slaughtered. “Depopulation” procedures were stopped on June 4, 2004, but strains of bird flu continue to be detected across the country.

More ominously, in late 2004 influenza experts warned of a possible “perfect storm” of infection that could easily kill millions. Certainly the experience of the so-called Spanish flu, which killed some 40-50 million people during and following the First World War, suggests that another such catastrophe is possible. As of August 2005, the H5N1 avian influenza virus had killed over 50 people in Asia, and it has been discovered in places as distant as Russia, Greece, Kuwait and Israel. Epidemiologists worry that the flu could mutate into a strain that can spread rapidly among humans, let alone the hundreds of thousands of poultry birds culled currently in certain pockets of India.

Source: Stoett Peter, 2006, Biosecurity: The next public policy imperative for Canada and the World

4.3.13 Besides the above mentioned incidence of Avian Influenza, transboundary transmissions of exotic diseases in the past also have inflicted severe losses to our livestock and poultry industry. Notable examples of such transmissions into India are listed below:

- Bluetongue in sheep
- Peste des petits ruminants (PPR) of goats
- Caprine arthritis encephalitis in goats
- Equine Influenza & EIA in horses
- Canine parvovirus infections in dogs
- Marek’s disease, Gumboro disease, egg drop syndrome, chicken infectious anaemia
- Swine fever, recognized for the first time in India in 1962 caused mortality of 3500 pigs
• Outbreak of African horse sickness in 1960 resulted in death of over 22,000 equines between 1960-1963.
• Introduction of bluetongue disease in sheep resulted from the import of exotic breed of sheep into the country.
• PPR first detected in 1989 from Tamil Nadu is widely spread in the country.
• Introduction of infectious hydro-pericardium (Lichi disease) of poultry through cross-border transmission.

Box IV. India’s Poultry Industry Faces Unprecedented Crisis

India’s Poultry Industry, which contributes Rs. 35,000 crores to the GNP and provides employment to over 3 million persons - the only segment of our agriculture economy which has been growing consistently at about 17% per annum – is facing the worst ever crisis in its history, and a situation of total breakdown and collapse, due to the recent outbreak of Avian Influenza caused by H5N1. This has dealt a severe blow, not only to the farmers but practically to every input industry related to poultry farming, such as hatcheries, breeder-integrators, feed mills etc.

If the breeders decided not to continue in the business (due to the setback from the outbreak), it will have an extremely adverse impact on the indigenous pure-line research and breeding activity and the country will be exposed to total dependence on imported breeding stock – which will be nothing short of a negation of all the good work done by indigenous genetic research for the past 3 decades. More than 1,000 hatcheries in the country will face total closure.

Study by a renowned economist from USA has revealed that in terms of competitiveness, India ranks no. 1 in the world: USA was placed at No. 4, China at No. 15 and Netherlands at No. 36. The study has further shown that India – which presently ranks No. 2 in the cost of chicken production will soon become the cheapest source of chicken production in the world, and this will even overtake Brazil.

It is projected that if the present rate of growth in the industry is sustained, in the next 5 years, poultry can be second largest industry in our country, next only to the automobile industry. It will be very unfortunate if this industry, which has been painstakingly built based on indigenous research over 3 decades, is destroyed (by the H5N1) and the country is forced to depend on import of eggs and chicken. An all out effort, including interim relief measures by the Government to the affected parties, should urgently be made to save this vital industry and put it back on the track.

Source: Anuradha J. Desai, Chairperson, National Egg Coordination Committee, April, 2006

4.3.14 Nearly 40 exotic animal diseases of economic importance are known. All effort, proactive and preventive, must be made to keep them away from the country. These exotic diseases as a matter of principle should not be handled in any of the existing open laboratories without containment facilities. The recently established High Security Animal Disease Laboratory (HSADL), IVRI, Bhopal in 1998 has BL-4 facility to safely handle high-risk pathogens/List “A” diseases of OIE and authorized by Govt. of India to handle exotic animal pathogens.
4.3.15 Recently, the Dept. of Animal Husbandry and Dairying (DAH&D) has
designated one central and four regional disease diagnostic referral laboratories under the
Animal Disease Management and Regulatory Medicine Scheme at Pune, Kolkata,
Bangalore and Jalandhar. The Centre for Animal Disease Research & Diagnosis
(CADRAD) of the Indian Veterinary Research Institute, Izatnagar has been identified as
the referral apex laboratory There are about 100-district level diagnostic laboratories in
the country.

4.3.16 Four Animal Quarantine Certification Stations (AQCS) are functioning at Delhi,
Mumbai, Chennai and Kolkata. The DAH&D is contemplating setting up two more
Quarantine Stations at Bangalore and Hyderabad, as these are now international airports
at which requests for imports are frequently received. There are no facilities available at
the seaports, which are very important imports points.

4.3.17 India is also establishing Diseases Free Zones for selected diseases by zoning
and buffer zoning keeping international view of OIE and WTO, with strict enforcement
of phytosanitary and zoosanitary requirements, yet another new initiative. But, effective
surveillance and survey facilities are essential for this purpose. Further, surveillance is
critical not only for detecting outbreaks, but also for improving veterinary practices and
treatments. The country is not well equipped to do this job. The requisite infrastructures
for diagnosis, surveillance, reporting etc. are not in place in many States.

4.3.18 There are several other points which should be considered while adopting the
quarantine practices. These include:

- What is the probability that vaccinated animal will not spread any infection when
  they are permitted to move?
- Should there not be a decontamination policy?
- Will the government (Central/State) allow import of any vaccinated animal in the
country without quarantine? If not, how is it proposed to meet the contradiction
  between the international and intra-national policies in this regard, especially if it
is raised in international forums? If allowed, what will be the role of all the Quarantine Stations established by the Government.

- As detention of animal or animal products would affect the economic conditions as well as livelihood of the owner/livestock farms adversely, it is desirable that the executive order for slaughtering of infected/suspected animals is issued by the highest authority like the President of India or the Governor of the State only for some selected diseases.

- There is considerable migratory or nomadic livestock activity that still exists in the country which requires a different approach and strategy, and the provisions of the Act need to be suitably amended to recognize this reality.

- Interplay between Central and State/Local Laws and clarity about the role of Central, State, and Local authorities, which would simultaneously have separate but concurrent legal quarantine power in a particular situation.

- The consistent production of high quality, safe, potent and efficacious vaccines requires quality assurance procedures to ensure the uniformity and consistency of the production process.

- Vaccine quality, safety, potency, and efficacy must be ensured by consistency in the production process; Control procedures selected should be those that best fit the conditions under which vaccines are produced and should comply with good manufacturing practices.

- Worldwide harmonization of standards for veterinary biologicals will be of help to chief veterinary officers who must follow the instructions given in the OIE International Animal Health Code, as they apply to all biological products for use in international trade; worldwide harmonization of registration rules should be ensured to simplify and facilitate international marketing of the products.

### 4.4.0. Global Convergence Towards Biosecurity

4.4.1 There is a growing global recognition that Biosecurity will profit from a more integrated approach. Closer cooperation among institutions responsible for implementing and the rationalisation of infrastructures, where appropriate, will be synergistically beneficial. Models to rationalise regulatory functions among sectors in the quest for
improved effectiveness and efficiency have appeared in a number of countries. For example, New Zealand has had a Biosecurity Act since 1993 and a Biosecurity Minister and Council since 1999. In Belize, food safety, animal and plant quarantine and environmental issues are dealt with by a single authority, the Belize Agricultural and Health Authority. USA, China and Australia have also followed this path.

4.4.2 The Australian government, State and Territory governments, industry and other key stakeholders are describing and reviewing the Australian Biosecurity System (ABS) with a view to further improvements and integration. The development of a consistent national framework of policy and processes within which to approach national Biosecurity issues is of major importance. Primary Industries Ministerial Council commenced development of an ABS to address the broader, longer term Biosecurity issues with regard to terrestrial animal pests and diseases, terrestrial plant pests and diseases, aquatic animal pests and diseases and terrestrial and aquatic weeds. The ABS will assist in identifying gaps in Biosecurity arrangements as to strengthen the country’s approaches, minimise pest, weed and disease impacts and demonstrate, nationally and internationally, Australia’s commitment to Biosecurity. The ABS aims to:

- Prevent pests entering and establishing in Australia;
- Ensure appropriate preparedness and response capacity which is internationally recognised and meets Australia’s trading obligations and international treaties; and
- Maintain or improve the status of Australia’s Biosecurity system.

4.4.3 The ABS provides a description of the roles of the various contributors and aims to improve the efficiency of investments in the system. While the same model will not fit everywhere, and each country should institutionalise its synergy path as per its capacity, need and goal, the Australian model appears closest to the proposed Indian approach. Thus, along with other partners, India may wish to work closely with Australia to share relevant experiences and expertise.
Several initiatives of the United Nations’ Organisations and other international organisations and institutions are actively promoting Biosecurity as per their mandates. The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization disciplines SPS measures in relation to international trade. The Codex Alimentarius Commission (Codex), the International Plant Protection Convention (IPPC) and the Office International des Epizooties (OIE) provide international standards for food safety, plant health, and animal health, respectively. A further relevant instrument is the Cartagena Protocol of the Convention on Biological Diversity (CBD) which applies to the transboundary movement, transit, handling and use of Living Genetically Modified Organisms (LMOs). Guidelines on the management of invasive alien species have been developed under the CBD. These international agreements, standards and programmes are parts of a loose international framework for Biosecurity, and reflect the historically sectorial approach to regulation in this area.

The Food and Agriculture Organisation of the United Nations (FAO), recognizing the growing importance of Biosecurity, has made this area as one of its sixteen Priority Areas for Inter-disciplinary Action (PAIAs) which aims at “promoting, developing and reinforcing (Biosecurity) policy and regulatory frameworks for food, agriculture, fisheries and forestry.” The FAO programme clearly sees the advantages of a more coherent, holistic approach to Biosecurity that sought synergies between the sectors at national and international levels, without creating new or centralised, unified and rigid structures. The traditional focus on regulating individual production systems was shifting to one of ensuring confidence in the overall regulatory framework which would automatically seek interdisciplinarity, partnership and convergence. Many countries were revising their Biosecurity arrangements to take into account the SPS Agreement, at the same time seeking greater efficiencies.

FAO /Norway project on strengthening countries capacity to implement Biosecurity measures has recently been launched. Its main objective is to improve Biosecurity and strengthen national capacities to meet domestic and international marketing requirements, reduce risks of and increase preparedness for food system
shocks associated with disease and related outbreaks that increase the risk of food insecurity and market collapse. Eight Core Partner Countries, namely, Ethiopia, Ghana, India, Kenya, Nicaragua, Senegal, Uganda and Vietnam are participating. The Donors’ contribution is US$ 1 million per year, with a maximum of US$ 5 million over five years. The first phase starts this year. The project will address food safety, animal health, plant health, fish product safety, socio economic analysis, policy development and law and regulations. India should urgently avail of this opportunity by completing the necessary formalities and launch the project without losing any time.

4.4.7 The programme elements of the project are:

1. Biosecurity capacity needs assessment using existing tools.
2. Developing new tools to assess:
3. Baseline ability to implement international agreements;
4. Assessment of legal framework;
5. Animal health emergency response capacity analysis; and Plant health emergency response capacity analysis.
7. Studies on mitigating the impact of (or preventing) market collapse, and development of policy guidelines.
8. Development of guidelines in fish product handling incorporating the FAO code on responsible fisheries and other internationally agreed codes of practices.

4.4.8 Fortunately, India is participating in the FAO/Norway Project. As this Project is encouraging the development of methodologies and economic analysis in relation to Biosecurity, India may select cases where pest eradication campaigns, or the implementation of improved food standards, had resulted in quantifiable export increases, thus suggesting the way to replicate the success stories. One possible methodology could be developed around an analysis of the values of goods transiting through control and inspection systems, in relation to the costs of such systems. These could be extended to regional Biosecurity standards and procedures. Methodologies were required to document
the economic advantages flowing from cross-sectorial cooperation, and of documenting and analysing the costs and the benefits of public-private sector cooperation, as well as where investments in Biosecurity measures had been most successful. A further methodology could consider market opportunities in relation to the Biosecurity investments that would be required to realize them. This effort will provide India a greater visibility in the international era in the field of Biosecurity.

4.5.0 Functions, Organisational Structure and Management of the National Agricultural Biosecurity System

Functions

4.5.1 The NABS should determine the potential for synergies and harmonization within the national and sub-national regulatory frameworks that would result from a holistic and coordinated approach to Biosecurity. Policy-makers should recognize the importance of Biosecurity as a key element of sustainable development, and the benefits, including in trade, that can be gained from comprehensive approaches to Biosecurity. They should also appreciate the cost of not fully recognising the role of Biosecurity. Full awareness on part of all stakeholders is essential for sustaining and further strengthening this national movement.

4.5.2 Strategy of the NABS should be to synergise linkages among science and technology, education and training and commercialization and utilization in the different subsectors capturing both commonalities and specialities for synergistically addressing the four main Biosecurity components, namely, Preparedness and Prevention, Diagnostics, Surveillance and Input Management (Figure 1).

4.5.3 In a large country like India, NABS should recognize the efficiencies that may emanate from regional and sub-regional approaches to risk analysis, particularly in relation to animal and plant life and health, and living modified organisms, and reorganise or establish agro-eco-regional facilities as per specific challenges and opportunities. The various quarantine, SPS and zoosanitary facilities should be updated.
and adequately staffed to be in an ever-ready condition. The Plant Protection staff should be duly rewarded with befitting incentives.

Figure 1. Programme Strategies and Linkages

4.5.4 Risk analysis and management frameworks are essential to achieve Biosecurity. In the past, such frameworks have been mostly sectorial or used to address specific technical issues. In future, such frameworks should seek to improve collaboration among diverse interests and institutions (particularly agriculture, public health, environment, trade, and their associated stakeholders) to achieve Biosecurity in a mutually supportive manner, thus avoiding duplication and possible inconsistencies. There are several such opportunities which should be grabbed.

4.5.5 General principles for biological risk analysis in food and agriculture are the same, although procedures may differ depending on the hazards addressed. The IPPC, the Codex Alimentarius, the OIE, the CBD and its Cartagena Protocol, where appropriate, should apply coherent risk analysis methodologies in different sectors by jointly
analysing differences and commonalities in approaches, and use of terms in risk analysis. FAO may play an archestrating role in this area and help develop tools, including tools to extend the Phytosanitary Capacity Evaluation to other sectors, to assist the country to analyse her capacity-building needs that take account of the full scope of Biosecurity, including the communicational, legal, institutional, scientific and technical aspects.

4.5.6 The roles and responsibilities of both the public and private sectors should be considered in planning Biosecurity capacity-building initiatives. In India, agriculture related industries should play greater positive role in strengthening the national Biosecurity umbrella. The System should devise innovative measures to build partnerships involving all stake-holders.

4.5.7 Appropriate linkages and coordination mechanisms among existing and planned Biosecurity capacity-building initiatives should be established to enhance complementarity and avoid duplication of efforts, and to ensure that capacity building is directed at identified priorities.

4.5.8 The System should give highest attention to obviate the serious shortcomings in quantity and quality of necessary databases. The need to share information and to ensure better understanding of the requirements for achieving Biosecurity can hardly be overemphasised. The need for an Internet-based Biosecurity Portal to facilitate information exchange on Biosecurity is a priority. The importance of information access and exchange in developing Biosecurity capacity should also be recognised. India can play a leading role in developing appropriate mechanisms for information exchange in Biosecurity, and to participate in the development of information Portals.

4.5.9 In order to lead from the front, the NABS should develop a specific methodology or adopt the ones already used by other national and international programmes for identification, establishment and maintenance of a given strategic area and render it pest free as per the international standards. Such a project could be initiated involving State Governments, Farmers, Traders and other Stakeholders to “sanitise” and
declare all areas under identified leading varieties of mangoes as pest free for export to USA under the recent Indo-USA agreement and also highlighted under the Indo-USA Knowledge Initiative.

4.5.10 NABS may initiate projects in a few hot-spots in a highly scientific and professional manner - collection of ground facts and creation of database and benchmark information, undertaking detailed risk analysis and eradication of the risk (pathogen and pest) and monitoring the freedom of the eradicated area from the eradicated pest. It should also analyse impact of socio-economic and of agro-ecological and climate change on overall Biosecurity situation in the area.

Organisational Structure

4.5.11 Necessary capacity must be put in place to establish and sustain the National Agricultural Biosecurity System and harmonised with international Biosecurity standards for food and agriculture to take advantage of trade opportunities and technology sharing for enhanced and sustained agricultural production and farmers’ income. Achieving Biosecurity requires an understanding of, and the ability to analyse diverse and complex risks, and determine and apply measures in a coherent manner while respecting differences among sectors and organizations. Risk analysis and management, as mentioned earlier, is the most important unifying concept across different Biosecurity sectors.

4.5.12 In order to achieve its goal of rendering Indian agriculture biosecure, the NABS should have the following three mutually reinforcing components:

- **National Agricultural Biosecurity Council (NABC):** Chaired by the Union Minister of Agriculture, NABC will serve as a platform for convergence and synergy among the on-going and new programmes of different Ministries and Departments of the Government of India, as well as appropriate international and State Government Agencies and Private Sector Organisations. NABC will serve
as an apex policy making and coordinating body and will pay particular attention to strengthening the national capacity in agricultural Biosecurity as related to crops, farm animals, forestry and aquatic organisms. The existing infrastructure for sanitary and phytosanitary measures will be reviewed and major gaps filled. Such a multistakeholder apex level NABC would be essential to ensure the livelihood security of nearly 70 crores of our population engaged in agriculture, animal husbandry, fisheries, forestry and agro-processing. While in developed countries, any disaster arising from invasive alien species like H5N1 strain of the Avian Flu may be more of a human health problem, since hardly 2 to 3% of population is engaged in farming, agriculture is the backbone of the livelihood security system in rural India.

- **National Centre for Agricultural Biosecurity (NCAB):** This National Centre should have four wings dealing with crops, farm animals, living aquatic resources and agriculturally important micro-organisms. The major purpose of this Centre will be the analysis, aversion and management of risks, as well as the operation of an early warning system. NCAB will maintain databases relating to potential threats to Indian agriculture and human health security from alien invasive species. It will also serve as a watch dog agency helping to initiate pro-active action in the case of impending Biosecurity threats. NCAB will provide the Secretariat for the National Agricultural Biosecurity Council. Further, it will work on the standardization of surveillance and control methods and help to introduce the latest molecular techniques like micro-arrays for disease diagnosis. NCAB will be largely a virtual organization with considerable capacity in computer aided monitoring and early warning systems. The four different divisions of NCAB could be located in appropriate existing ICAR Institutes / Agricultural / Animal Husbandry and Fisheries Universities, such as the High Security Animal Diseases Laboratory of ICAR at Bhopal.

- **National Agricultural Biosecurity Network (NABN):** NCAB will serve as the coordinating and facilitating center for a National Agricultural Biosecurity Network designed to facilitate scientific partnerships among the many existing
institutions in the public, private, academic and civil society sectors engaged in biomonitoring, biosafety, quarantine, and other Biosecurity programmes. This will help to maximize the benefits from the already existing scientific expertise and institutional strengths. The National Agricultural Biosecurity Network could have four mini-networks relating to crops and forestry, animals including migratory birds, living aquatic organisms and agriculturally important microbes.

4.5.13 The establishment of a National Biosecurity Council, National Centre for Agricultural Biosecurity and a National Agricultural Biosecurity Network will help us to strengthen considerably our ability to undertake pro-active measures to prevent the outbreak of pandemics and the introduction of invasive alien species. Such an Agricultural Biosecurity Compact is an urgent national need since prevention is always better than cure.

**Agricultural Biosecurity Compact**

4.5.14 Among other areas which require urgent attention from the proposed National Agricultural Biosecurity Council, the following deserve priority.

a. Review all existing Acts relating to Biosecurity and identify and fill gaps in the existing regulatory framework. Based on such a review, develop a National Agricultural Biosecurity Policy for being placed before Parliament and the National Development Council.

b. Education: Education holds the key to prevent unconscious and ill-informed introductions of invasive alien species. There is need for launching a Biosecurity Literacy Movement in the country. Human resource development is also exceedingly important. A course may be introduced in all Agricultural, Veterinary and Fisheries Universities on Agricultural Biosecurity. This should be done at the basic degree level. A Media Resource Centre should be established by the proposed National Centre for Agricultural Biosecurity to give
authentic information to mass media, so that unnecessary panic is not created. The media require authentic and credible information from time to time.

c. Social Mobilisation: Agricultural Biosecurity should be everybody’s business and not merely that of a few government departments or academic institutions. It would be useful to train Grassroot Biosecurity Managers (at least one woman and one male) in every Gram Panchayat and Nagarpalika. Towns and Cities require equal attention to enlist urban populations in the fight against biologically dangerous introductions and to create a well-informed public opinion in relation to agricultural risks and human health hazards.

**Administrative Management**

4.5.15 The three components of NABS, namely, NABC, NCAB and NABN should be professionally-led bodies, capable of providing scientific and intellectual leadership and strategic guidance. These should be lean and virtual bodies, having effective structures suiting to the mandate of NABC as an apex integrating force in the area of Biosecurity. In order to be productive, these should have the necessary functional and financial autonomy and authority coupled with accountability. Also, the Chief Executives and other Staff should be eminent professionals and should work on a long tenure, without frequent changes.

**National Agricultural Biosecurity Fund**

4.5.16 NCF recommends the establishment of a National Agricultural Biosecurity Fund of Rs. 1,000 crores with an initial contribution by the Government of India and appropriate international and bilateral donors as well as private sector companies. Such a Fund is urgently needed for the following purposes.

- Strengthening infrastructure for sanitary and phytosanitary measures.
- Upgrading facilities for plant, animal and fish quarantine and certification.
• Establishing an off-shore genetic screening center for animals for the purpose of identifying genes for resistance to serious disease epidemics arising from invasive alien species, such as the H5N1 strain of the Avian Flu in poultry. Fortunately, there are unmanned islands in Lakshadweep which can be developed as off-shore Genetic Screening Centres. The present policy of killing indiscriminately all native breeds of poultry will be harmful and we may lose the opportunity of identifying genetic resistance to serious diseases. At the same time, off-shore screening in isolated areas will help to avoid risks within the country.

4.6.0 Epilogue

4.6.1 The National Commission on Farmers urges the Government of India to take immediate action in setting up a National Agricultural Biosecurity Council, National Centre for Agricultural Biosecurity and a National Agricultural Biosecurity Network. The recommendations made above relating to strategic interventions and strategic partnerships also need immediate attention. Above all, a National Agricultural Biosecurity Fund will help to strengthen our infrastructure, introduce new molecular techniques of identification and verification, derive benefits from our animal genetic resources, and provide needed and timely help to the affected families.

Acknowledgement

National Commission on Farmers is grateful to Prof. V.L. Chopra, Member, Planning Commission and to a large number of leading experts from the ICAR system, Central Departments of Agriculture, Health and Medicine and Biotechnology for their active participation in an Expert Consultation on Agricultural Biosecurity organised under the Chairmanship of Prof. M.S. Swaminathan at the Indian Agricultural Research Institute (IARI), New Delhi, on March 18, 2006. The Commission greatly appreciates the cooperation of the Government of Gujarat for deputing Shri Kishor Rao, Principal Secretary, Animal Husbandry and Fisheries, who gave a detailed account of the ground realities and his personal experience of management of Avian Flu caused by H5N1 in Gujarat.
Presentations and interventions/ remarks particularly by Prof. Chopra, Dr. S. Nagarajan (Chairperson, PPVF&RA), Dr. G.S. Toteja (DDG, ICMR), Dr. Natesh (Sr. Adviser, Deptt. of Biotechnology), Dr. M.P. Yadav (Director, IVRI), Dr. Anupam Varma (Ex-National Professor, ICAR), Dr. Taneja (DDG, ICAR), Dr. Sushil Kumar (Director, NDRI), Shri Ashish Bahuguna (Joint Secretary, Plant Protection, MOA), Dr. S.P.S. Ahlawat (Director, National Bureau of Animal Genetic Resources), Dr. Ravi Khetarpal (Head, Plant Quarantine Division, NBPGR), Mr. William (Bill) Thorpe (Regional Representative, Asia, ILRI), Dr. S. Ayyappan (DDG, Fisheries), Dr. Mahadevappa (Ex-Chairman, ASRB) and Dr. N.B. Singh (Agriculture Commissioner, MOA) are greatly appreciated, which formed the base of this analysis and recommendations by the NCF on this extremely topical subject.

Grateful thanks are also due to FAO, especially Dr. Louise Fresco (ADG, AG), Shivaji Pandey (Director, AGS), Mahmoud Solh (Director, AGP), Niek Van der Graaff (Chief, AGPP) and Peter Kenmore (Adviser, ADG/AG) from Rome Headquarters for sparing some latest documents on the subject and most importantly for including India as one of the core partners in an international FAO/Norway project on agricultural biosecurity. The useful support received from the FAO Country Office, New Delhi (Dr. D. Gustafson and Mr. Gopi Ghosh) is also gratefully acknowledged.

The Commission is thankful to Dr. A.K. Singh, Director, IARI and to the Heads of IARI Departments of Plant Pathology, Entomology and Microbiology for providing both logistic and technical supports to the Consultation.
ACKNOWLEDGEMENTS

The National Commission on Farmers is indebted to a large number of farmers’ organizations, scientific institutions and individuals for their advice and suggestions. NCF also acknowledges the valuable technical contributions by Shri S.S. Prasad, Joint Secretary, Ms. Mamta Shankar, Director, Ms. R.V. Bhavani, OSD to Chairman and Research Officers: Dr. (Ms.) Laxmi Joshi, Dr. Deepak Rathi, Dr. Pavan Kumar Singh, Dr. Ramesh Singh and the sincere work of Research Assistant, Dr. Prabhu Dayal Chaudhary and the secretarial staff of the Commission in the preparation of the Fourth Report.
SERVING FARMERS AND SAVING FarmING
Fifth and Final Report, 4 October 2006
Towards Faster and More Inclusive Growth of Farmers’ Welfare

“To those who are hungry, God is bread” – Mahatma Gandhi, 1946

“Everything else can wait, but not agriculture”- Jawaharlal Nehru, 1947

Our work during the last two years has been guided by the above words of the architect of our independence on the one hand, and by the prime mover of planned development designed to promote faster economic growth coupled with social and gender equity, on the other. The approach to the XIth Plan is “faster and more inclusive growth”. Obviously this aim should cover 70% of our population, who live in villages and whose major occupation is crop and animal husbandry, fisheries, agro-forestry and agro-processing. The four reports submitted by us since December 2004, all contain concrete suggestions on how this goal can be achieved.

This fifth and final report deals with some of the key issues confronting our farmers and farming such as the economic survival of farmers with small holdings in a globalised economy, shaping the economic destiny of farmers, strengthening the ecological foundations essential for sustainable agriculture, attracting and retaining youth in farming, and restoring the glory of Indian farmers and farming. It presents an action plan for making hunger history. The Revised Draft National Policy for Farmers is submitted separately, based on widespread consultations throughout the country as well as extensive advice received from Central and State Government Departments, farmers, farmers’ organizations, tribal families, women’s organizations, academia, civil society organizations, political parties, panchayat institutions, mass media representatives and individuals.
We are indebted to Shri Sharad Pawar, Union Minister for Agriculture, Food, Public Distribution and Consumer Affairs, for his continuous guidance and encouragement and for being the major source of inspiration in our work.

We have chosen for the cover of this Final Report an extract from the Visitors Book of the National Dairy Research Institute, Bangalore, showing the Father of the Nation identifying himself as a “Farmer”. It is this pride in farming, both as a way of life and means to livelihood that we should revive. This is the pathway to “Purna Swaraj” and this report shows the way.

M S Swaminathan  
(Chair)

R B Singh  
(Member)

Y C Nanda  
(Member)

Atul Sinha  
(Member-Secretary)

Atul Kumar Anjan  
(Member-Part time)

Jagadish Pradhan  
(Member-Part time)

R L Pitale  
(Member-Part time)

Chanda Nimbkar  
(Member-Part time)
# National Commission on Farmers

**Serving Farmers and Saving Farming**

Towards Faster and More Inclusive Growth of Farmers’ Welfare

Fifth & Final Report

**VOLUME I**

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ABOUT NATIONAL COMMISSION ON FARMERS

National Commission on Farmers was set up under the Chairmanship of Shri Sompal vide Resolution No. 8-2/2003- Policy (ES) dated 10th February, 2004. The Commission was reconstituted under the Chairmanship of Prof. M.S. Swaminathan vide Resolution No. 8-2/2003- Policy (ES) dated 18th November, 2004 with Terms of Reference which reflected the priorities listed in the Common Minimum Programme of the United Progressive Alliance Government. The Terms of Reference of the Commission and its composition are at pages iii to v.

The National Commission on Farmers has held 37 formal meetings during the last two years. The Commission addressed the various issues facing farmers and farming as per its Terms of Reference by organizing a series of Technical Consultations in various parts of the country involving the principal stakeholders. A list of Technical Consultations is at Annexure A at pages 265-267.

The results of these Consultations were assimilated with the work of the Commission on specific issues. These were incorporated in four Reports of the Commission, which were submitted to the Union Agriculture Minister in December 2004, August 2005, December 2005 and April 2006 respectively. Presentations were also made to the Planning Commission, Government of India and the National Advisory Council. The list of these Reports and the dates of their submission are at Annexure B at page 268. In particular, Chapter 2 in the Fourth Report contained Jai Kisan: “A Draft National Policy on Farmers” which was proposed for comments, public debate and consensus building and which was based on the work done and recommendations made by the Commission since its formation.

The Draft National Policy was thereafter discussed in State level Consultations with farmers including women farmers, and other stakeholders including NGOs, Bankers, Media and Scientists. A list of these Consultations is at Annexure C at pages 269-270. Based on these Consultations, where the women farmers and other farmers as well as...
their organizations were heard first, and the written suggestions and representations received from individuals, institutions and organizations, the Draft National Policy for Farmers was revised and elaborated. The Revised Draft Policy for Farmers is submitted separately. The National Commission on Farmers requests that the National Policy for Farmers, after the approval of Cabinet and National Development Council, may be adopted by the Parliament of India on 15th August, 2007 which would mark the 60th Anniversary of India’s Independence.

A table connecting the Terms of Reference with the Chapters in the Reports of the National Commission on Farmers is at Annexure D at pages 271-276.

NCF hopes that its recommendations will receive serious and urgent consideration by both the Government of India and State Governments.
TERMS OF REFERENCE
FOR
NATIONAL COMMISSION ON FARMERS

- Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.

- Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

- Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

- Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

- Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

- Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured
programmes. Also suggest credit-linked insurance schemes, which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

- Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier sciences and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.

- Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

- Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

- Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.

The Commission is to submit a medium term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as soon as practicable and in any case on or before 13th October, 2006. The Commission, however is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

COMPOSITION OF THE
NATIONAL COMMISSION ON FARMERS

The composition of the reconstituted National Commission on Farmers is as under:

**Chairman**
Prof. M.S. Swaminathan

**Full-Time Members**
Dr. Ram Badan Singh
Shri Y.C. Nanda

**Part-Time Members**
Dr. (Ms) Chanda Nimbkar
Shri Atul Kumar Anjan
Dr. R.L. Pitale
Shri Jagadish Pradhan

**Member Secretary**
Shri Atul Sinha,
I.A.S. (Retd.)

CHAPTER 1

PUTTING FARMERS FIRST

1.1 Introduction

1.1.1 The National Commission on Farmers (NCF) has held consultations over the last two years with State Governments, Financial and Insurance Institutions, Representatives of Farm and Tribal Women and Men, and Civil Society Organisations, Academia and Media Representatives working on problems relating to farming and farmers. In addition to several meetings in New Delhi, Consultations have been held at various locations across the country, based on the issue being addressed, as per the terms of reference. State-wise Consultations have also been held for feedback on the Draft National Policy for Farmers. Four Reports have already been submitted and this is the Fifth and Final Report. This chapter is a synoptic account of some of the major recommendations made in the earlier Four Reports. A box on a Livelihood Security Compact for the agrarian distress hotspots is also included.

1.1.2 To achieve secure and adequate livelihood for all farmers, as defined in the draft Policy, they must be assured of access to and some control over the basic resource base for livelihood. These are both natural and societal. The first category includes land, water and bioresources; while the second refers to human and institutional resources such as credit and insurance, technology and knowledge management, markets, and other inputs and services.

1.1.3 The ecological foundations essential for sustained advances in agricultural productivity in India, such as soil, water, biodiversity and forests are under severe anthropogenic pressures. The ecosystem’s capacity to support the human and farm animal population has been exceeded in many parts of the country. The quantity and quality of groundwater, which is now the dominant source of irrigation water, is fast deteriorating. Although India has over 20% of the world’s farm animal population, good grazing lands are practically non-existent. Fodder and feed production is also not
adequate. Compounding current problems, the possibility of adverse changes in rainfall, temperature and sea level due to global warming and climate change is no longer just a theoretical possibility.

1.1.4 In the area of farm economics, resource flow to the agriculture sector is declining, and indebtedness of small and marginal farm families is rising. Input costs are increasing, while factor productivity is declining. The cost-risk-return structure of farming is becoming adverse, to over 80 million farming families operating small holdings, since the resource-poor families cultivating 1 to 2 hectares (ha) or less are unable to benefit from the power of scale at either the production or post-harvest phases of farming. Both meteorological and marketing factors influence the well-being of small farm families, who lack the capacity to withstand the shock of either crop failures or uneconomic market prices for their produce.

1.1.5 A technology “fatigue” has further aggravated farmers’ problems, since the smaller the farm the greater the need for sustained marketable surplus, in order to have cash income. Linkages between the laboratory and the field have weakened and extension services have often little to extend by way of specific information and advice on the basis of location, time and farming system. Good quality seeds at affordable prices are in short supply and spurious pesticides and biofertilisers are being sold in the absence of effective quality control systems. Input supply is in disarray, particularly in dry farming areas. Micronutrient deficiencies in the soil as well as problems relating to soil physics are crying for attention. Farmers have no way of getting proactive advice on land use, based on meteorological and marketing factors. Though it is now over twelve years since the WTO regime started operating in agriculture, serious attempts are yet to be made in rural areas to launch movements for quality literacy (sanitary and phytosanitary measures and Codex Alimentarius standards of food safety), trade literacy (likely demand-supply and price situation), legal literacy (IPR, Farmers’ Rights), and genetic literacy (genetically modified crops). No wonder the prevailing gap between potential and actual yields, even with technologies currently on the shelf, is very wide. Such a knowledge deficit pointed out in the reports of the NCF has been highlighted in the Approach Paper to the Eleventh Plan.
1.1.6 1968 marked the beginning of the Green Revolution leading to quantum jumps in the productivity and production of wheat and rice. But the last 10 years have witnessed a fatigue in the Green Revolution with the growth rate in foodgrain production falling below population growth for the first time since then. It implies human numbers are increasing faster than our capacity to make the goal of Food for All a reality. At the same time, consumption per capita is not going up, due to inadequate purchasing power at the household level. A “famine” of jobs/ livelihoods as a result of poor growth of opportunities for employment in the rural non-farm and off-farm sectors is leading to a “food famine” at the household level. According to the Union Planning Commission, we are off-track in achieving the UN Millennium Development Goal of reducing the number of hungry persons by half by 2015. Also, we are off-track in reducing infant and maternal mortality rates and in achieving universal primary education.

1.1.7 To double annual foodgrain production from the present 210 million tonnes to 420 million tonnes within the next 10 years, (by 2015), will call for producing at least 160 million tonnes of rice from 40 million ha, and 100 million tonnes of wheat from 25 million ha. Pulses, oil seeds, maize and millets will have to contribute another 160 million tonnes. In addition, the national goal is to raise the production of vegetables and fruits to over 300 million tonnes by 2015. Since land is a shrinking resource for agriculture, the pathway for achieving these goals can only be higher productivity per unit of arable land and irrigation water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. The average farm size is going down and nearly 80% of the farm families belong to the marginal and small farmer categories. Fortunately, the ownership of livestock is more egalitarian. Enhancing small farm productivity, increasing small farm income through crop-livestock integrated production systems and multiple livelihood opportunities through agro-processing and biomass utilisation, are essential both to meet food production targets and for reducing hunger, poverty and rural unemployment. Programmes designed to achieve these goals must be “engendered”,
since there is increasing feminisation of agriculture, poverty and under-nutrition, not to mention the increase of HIV/ AIDS cases.

1.1.8 2005 was a difficult year both for the nation and for farm and fisher families. Beginning with the titanic tsunami of 26 December 2004, and ending with the disastrous earthquake in Kashmir and floods in Tamil Nadu, our farm and fisher families have been subjected to the fury of nature in the form of drought, unseasonal and heavy rains (like the one which caused damage to the onion crop in Maharashtra), and floods. Institutional support to small farmers is weak. The same is true of post-harvest infrastructure. For example, even now paddy is being dried on the road in many places. The spoilage losses can be as high as 30% in the case of vegetables and fruits. Institutions which are supposed to help farmers, such as research, extension, credit and input supply agencies, are by and large not pro-poor and pro-women. Mechanisms for risk mitigation are poor or absent. There is no minimum support price (MSP) or procurement arrangement for the crops grown in dry farming areas. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance. There is no Agricultural Risk Fund. Both risk mitigation and price stabilisation are receiving inadequate policy support. The cost of production is invariably higher than the minimum support price, due to ever-increasing prices of diesel and other inputs. Investment in agriculture has suffered a decline over the past two decades. Capital formation in agriculture and allied sectors in relation to GDP started declining in the 1980s and is only now being reversed. This has adversely affected irrigation and rural infrastructure development.

1.1.9 The cost-risk-return structure of farming is becoming adverse. Consequently, indebtedness is growing in rural areas. In Maharashtra, over 55% of the State’s farm households are in debt. Average household size of farmers is 5.5 at the all-India level. In the low-income groups, the average size goes up to 6.9. According to NSSO-59th Round, the average monthly per capita consumption expenditure of farm households across India was Rs. 503 in 2003. Endemic hunger (i.e., chronic undernutrition), is high both in families without assets like land or livestock, as well as in families with small land holdings but no access to irrigation. An unfortunate consequence of the constellation of hardships faced by small farm families is the growing number of suicides among farmers.
The situation is particularly alarming in parts of Vidarbha in Maharashtra. To our shame, the suicide hotspots include Wardha district, where Mahatma Gandhi spent a significant part of his life fighting for freedom from colonial rule, so that the country could be rid of hunger, poverty and gender injustice.

1.1.10 Indebtedness of farmers is rising not only because of farming-related expenditure, but also because of the need for healthcare. The public healthcare system in villages is in a state of collapse. Pandemics like HIV/AIDS and tuberculosis are spreading in villages, with women being the main sufferers. Because of protein-energy undernutrition, as well as micronutrient deficiencies, a purely drug-based approach to the control of diseases is not adequate. A nutrition support programme is equally important.

1.1.11 Policy reform in agriculture is thus long overdue. Such policy reform should be pro-small farmer and pro-women and pro-landless agricultural labour. It should pay particular attention to the promotion of conservation agriculture and remunerative marketing. If we do not attend to the problems of small farm and landless agricultural labour families with a sense of urgency and commitment, the Indian enigma of the co-existence of enormous technological capability and entrepreneurship on the one hand, and extensive under-nutrition, poverty and deprivation on the other, will not only persist, but will lead to social disruption, violence and increasing human insecurity. Without peace and security, enduring economic progress will not be possible. NCF therefore recommended in its Third Report that the agricultural year 2006-07 be designated as the Year of Agricultural Renewal or the Year of the Farmer.

1.1.12 We would like to stress that agriculture being a State subject, State governments are also accountable for providing adequate support, particularly to meet the needs of location-specific agricultural problems, as well as the health, education, drinking water, social security and other social and production infrastructure essential for farm and agricultural labour families to have an opportunity for a healthy and productive life.

1.1.13 The seven core areas needing urgent attention to make farming a viable activity for farmers are land, water, and bioresources on the one hand and credit and
insurance, technology, knowledge management, markets, and inputs and services on the other.

1.2 Land

1.2.1 The basic issues of access to land for both crops and livestock, and some control over its use are:

- unfinished agenda of land reform,
- speedy distributions of ceiling-surplus and waste lands,
- land rights for women,
- preventing diversion of prime agricultural land and forests to corporate sector for non-agricultural purposes
- ensuring grazing rights and seasonal access to forests to tribals and pastoralists and access to common property resources;
- Equally important are the technical issues concerning land.

1.2.2 The second Green Revolution has to begin in dry farming areas, which need particular attention from the point of view of overcoming macro- and micronutrient deficiencies. An important reason for the low return per unit of water is the lack of synergy between a genetic strain, irrigation water and soil nutrition. “Hidden hunger” in the soil resulting from micronutrient deficiencies results in “hidden hunger” in both farm animals and human beings. Soil health enhancement holds the key to improving the return from investment in other inputs like seeds and water.

1.2.3 Reliable soil tests for 13 macro- and micronutrients are critical for improving crop productivity. This requires sophisticated, finely-tuned equipment that are currently unavailable in most soil testing laboratories. The objective should be to provide a complete soil test analysis at the commencement of each cropping season, specifying the crops most suitable for cultivation according to the soil profile and providing detailed instructions on how to enhance the soil to ensure proper plant nutrition for optimal yields and profitability. Soil test results will be of little value unless expert advice is available to the farmers to interpret the significance of nutrient levels and recommend appropriate
steps to enhance soil nutrition. Computerised systems must be developed for at least 20 major crops, customised to different agro-climatic zones.

1.2.4 Initially, farmers may not fully appreciate the value of a complete soil test, so the government should conduct an intensive programme of free tests for the first one or two years, demonstrating the efficacy of the approach. Thereafter, fees can be charged to recover costs. In the first phase, there should be a minimum of one laboratory per district, each with the capacity to conduct a minimum of 10,000 complete soil analyses per month.

1.2.5 A Soil Health Card containing integrated information on the physics (soil structure, occurrence of hard pan in the subsoil, etc.), chemistry (soil organic matter and macro- and micro-nutrient status), and microbiology (occurrence of earthworms, soil micro-organisms etc.) of the soils should be issued to each farm household. Such cards combined with the required advice can gradually lead to the technological upgrading of farm practices

1.2.6 Implementation of the technology will require a quantum jump in the number of soil testing laboratories and soil test analyses conducted throughout the country. Existing laboratories should be upgraded and supplemented by new testing facilities. A national monitoring agency must obtain and compare test results on standard samples on a regular basis to maintain test accuracy. If a commercial fee structure is fixed at around Rs. 200 to Rs.250 per test, then farm graduates will be attracted to supplement the government effort by establishing agri-clinics which can undertake such tasks as soil health monitoring and management as well as pest proofing on an area basis. Agri-clinics can also be established in Farm Schools and Village Knowledge Centres.

1.2.7 The tsunami that swept over coastal areas in Tamil Nadu, Kerala, Pondicherry and the Andaman and Nicobar Islands in December 2004 caused untold damage to soil and water bodies. There was deposition of slushy grayish brown clay and sand on agricultural soils. Seawater entered prime agricultural land adjoining the coast, rendering both soil and water saline. Many of the small water ponds that are the source of irrigation
for the second and third crop were severely affected. Ad hoc recommendations were being given to the affected farmers by both NGOs and government departments. NCF, therefore, organised a travelling workshop comprising a team of scientists with the best possible technical expertise available in the country. The scientists visited affected villages and made their recommendations on soil health restoration, water management and seawater replacement, crop and varietal choice, introduction of livestock farming for supplementary nutrition and income, and producer-oriented marketing.

**Box I**

<table>
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<th>LAND</th>
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<tr>
<td>1. Reforms related to access and control over land and forest resources including unfinished agenda of land reform, speedy distributions of ceiling-surplus and waste lands, land rights for women, preventing diversion of prime agricultural land and forest to corporate sector for non-agricultural purposes, ensuring grazing rights and seasonal access to forests to tribals and pastoralists, and access to common property resources. Equally important are the technical issues concerning land.</td>
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<tr>
<td>2. A National Land Use Advisory Service should be immediately established and linked to State and Block Level Land Use Advisory Services on a hub and spokes model. These can be virtual organisations with the capacity to link land use decisions with ecological meteorological and marketing factors on a location and season specific basis.</td>
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<td>3. Indian Trade Organisation (ITO), a virtual body specialising in WTO matters and serving as an information bank on potential surpluses and shortages in major agricultural commodities. It should be set up, linked to the National Land Use Advisory Service and have continuous contact with all credible national and international sources of information on domestic and international markets.</td>
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<td>4. Agricultural universities, research institutes, Krishi Vigyan Kendras, fertiliser companies, government departments, farmers’ associations and panchayats should take up Soil Health Advancement as the theme for the Year of Agricultural Renewal, 2006-07 and plan campaign of activities.</td>
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<td>5. Set up a mechanism to regulate the sale of agricultural land, based on quantum of land nature of proposed use and category of buyer.</td>
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1.3 **Water**

1.3.1 Rainfed agriculture, however risky and vulnerable, continues to play an important role in India, contributing 60 per cent of the cropped area and 45 per cent of the total agricultural output. Out of the gross sown area of 192 million ha, only 43 per cent is estimated to be irrigated, while the rest is dependent on rainfall. Water for agriculture, including both crops and livestock, remains the most critical and perhaps the most
limiting factor on its growth. The decreasing prices of cereal grains in the world, has contributed to making the irrigation infrastructure in the developing world even more difficult to sustain. Farmers of the South find it difficult to compete with the subsidies for grain production in the industrialised world and this makes them devalue their natural capital – water for irrigation. Further, as the cost of infrastructure has increased, it has not been possible to recover the cost of the capital investment and operation and maintenance of the system from individual farmers. In most States of the country, less than 30 percent of the costs of maintenance of the system are recovered. This has led to deterioration in systems, with an estimated 20-25 million ha of surface water irrigated canals in need of desperate repair. Further, water charges are based on the area of land and type of crop and not on the volume of water used, which then leads to inefficient use and resultant scarcity.

1.3.2 The recently concluded 3rd minor irrigation census finds that as much as 62.4 million ha -- 75 to 80 per cent of the irrigation potential is under groundwater. The roughly 19 million wells – dugwells, shallow and deep tubewells – in the country form the bulk of irrigation infrastructure in the country and a large part of it is in private hands.

1.3.3 The issue of water is not just about scarcity but about its careful use and equitable and well distributed access, so water management strategies need to be carefully designed. Water management must be designed to harvest, augment and use local water resources leading to equitable local wealth generation. This new water infrastructure will need new forms of institutional management and here we must learn from our traditional community based water management systems.

1.3.4 The use of water in agriculture will face greater and greater competition from other sectors — in industrial and urban areas — and this will inevitably lead to conflict, and need policies for conserving water in all sectors. The use of water in agriculture is “consumptive”: that is the used water is consumed and ‘virtually’ transferred to us via a

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ii Ministry of Water Resources 2005, Report on 3rd Census of Minor Irrigation Schemes, Minor Irrigation Dept, GoI, New Delhi, June
product in our food. This is different from the use of water as a process, where water is mostly discharged after use and rejoins the water cycle. For instance, cities discharge 80 per cent of the water consumed as sewage back into the hydrological system.

1.3.5 In water scarce areas, emphasis should be placed on the cultivation of high value and low water requiring crops, such as pulses and oilseeds. In paddy and sugarcane, water-saving methods of cultivation like those inherent in the System of Rice Intensification (SRI) methodology should be popularised. Seawater farming should be promoted in coastal areas through the crops that thrive in salt water. Investment in research to promote water-efficient crops is essential. “More crops per drop of water” should not remain just a slogan.

1.3.6 Worldwide research suggests that groundwater is actually more productive (producing more crops per hectare) than surface water, because farmers who use groundwater can get as much water as they need, whenever and wherever they want. So that, while canal irrigation had been the main driver of irrigated agriculture in the 1970s, groundwater became the major force by the 1990s. The Central Groundwater Board estimates that groundwater is over-exploited in 65 per cent of the districts in the country. The electricity subsidy worsens the situation, with farmers using almost double the water for each unit of crop when they have access to cheap or free power, as compared to pump-sets using paid diesel. But worse, electricity supply to farmers is always uncertain and unreliable, which affects their capacity to take decisions. A policy for agricultural reform, must take into account the need to evolve programmes for recharge and management of the groundwater reserves of the country, so that extraction is limited only to what we can annually recharge. Today, much of the recharge is natural and incidental and depends on various factors like rainfall, soil characteristics and geomorphology. The Central Groundwater Board estimates that the highest infiltration is between 20 to 25 per cent (in sandy areas). There is a need to rebuild reserves through artificial recharge using rainfall and monsoon flows in rivers.

1.3.7 Water harvesting is not about an instant (annual) miracle. It will take time and investment to replenish our rural capital, like a bank account on which we have an
overdraft. Villages which have practised water conservation for 7 to 10 years at a stretch are able to build capacity to withstand even prolonged drought. But the challenge is to build this programme with farm families, as they alone can invest in their water security. In this context, the government programme to “launch a massive scheme to repair, renovate and restore all the water bodies that are linked to agriculture” is of paramount importance.

**Box II**

**WATER**

1. Reforms to enable farmers / users to have sustained and equitable access to water must be put in place. Women must be represented in Water User Associations. A comprehensive set of Aquarian Reforms must be developed to foster sustainable and equitable use of both coastal and inland waters for capture and culture fisheries.

2. Water literacy and water quality management movements should be launched with panchayats as the leading players and increasing water supply through rainwater harvesting and recharge of the aquifer should become mandatory. “Million Wells Recharge” programme, specifically targeted at private wells should be launched. Rain, river, ground, sea, and treated sewage waters should all be included for effective use of available water resources, with regulations for sustainable use of groundwater.

3. A greatly enhanced investment in irrigation sector is needed under the 11th Five Year Plan apportioned between large surface water systems; minor irrigation and new schemes for groundwater recharge. The funds under the Bharat Nirman Programme must be allocated for this purpose.

4. The National Programme for Repair and Renovation of Water Bodies linked to Agriculture, under the Union Ministry of Water Resources, must be reviewed for more effective implementation with increased investment. Funds under the National Rural Employment Guarantee Act, the proposed Backward Area Programme and the National Watershed Programme should also be targeted for soil and water conservation.

5. The private investment in groundwater by farmers needs supportive and affirmative programmes to address recharge and long-term sustainability.

**1.4 Bioresources**

1.4.1 India is well endowed with rich flora and fauna as well as microflora and microfauna. Rural and tribal families depend for their nutrition and livelihood security on a wide range of bioresources. Bioresources for spreading biohappiness among local
communities should be the motto of all research and development programmes in biodiversity rich areas. Therefore the following areas require attention from both public policy makers and technologists.

1.4.2 Livestock production in India is largely by small holders and contributes to livelihood of over 70 million rural households. Unlike land holdings, livestock holdings are fairly equitable with over 70% of all species owned by smallholders. Livestock provides a major source of supplementary income for a huge majority of rural households and sustenance during drought and other natural calamities. Fisheries both inland and coastal, also contribute substantially to food supplies and to livelihoods in coastal and riverine areas.

1.4.3 The aim of policy is to conserve the rich biodiversity resources, utilize them sustainably for the livelihoods of communities and enhanced production, and share the benefits equitably. At the same time, access of communities, especially tribals / women to sources of biodiversity, such as forests and common property, should be protected. Enabling holders of traditional knowledge (TK) about biodiversity, especially women to get recognition and reward is another important aim.

1.4.4 In addition to conservation, enhancement and improvement of crops and farm animals as well as fish stocks through breeding, is an important dimension.

1.4.5 Development of new forage varieties and popularization of proven techniques of forage conservation such as silage making should be given priority.

1.4.6 Conservation and Genetic improvement of breeds

1.4.6.1 Community-based breed conservation (i.e. conservation through use) should be the preferred policy as far as possible with a scheme of incentives to reward those who maintain pure breeds.

1.4.6.2 Ex-situ conservation (e.g. cryo-preservation of semen/embryos) of all endangered breeds should also be adopted as per international guidelines.
1.4.6.3 Export of indigenous breeds should be allowed. Farmers/livestock keepers who rear breeds for which there is good demand from abroad (e.g. Gir cattle, Murrah buffaloes, Jamnapari goats) should be encouraged and facilitated to form producer companies.

1.4.6.4 Import of suitable breeds should also be allowed to increase productivity of non-descript animals.

1.4.6.5 Private entrepreneurs and industrialists should be encouraged to set up nucleus and multiplier flocks rearing units of local breeds where scientific selection should be carried out for genetic improvement. Indirect subsidies such as tax exemption should be provided for the first five years to these entrepreneurs. The flocks will become self-sustaining by selling breeding animals after that and the breed conserved. They should be included under the venture capital scheme of NABARD.

1.4.6.6 Field based breeding and selection programs with field performance recording are necessary with farmer participation. Studies show that on the national or macro economic level, investments in breeding interventions are highly profitable, mainly due to the fact that the progress made is transferred to the subsequent generations.

1.4.6.7 Community-based organizations should be encouraged as service providers and these can become platforms for further livestock development initiatives. Establishing support services is especially important for farmer-suicide affected areas where livestock are to be provided to farmers as an alternative source of income.

**Biosecurity**

1.4.6.8 Agricultural biosecurity covering crops, trees, and farm and aquatic animals is of great importance since it relates to the livelihood security of nearly 70 per cent of the population, and the food, health, and trade security of the nation. Concerned with the impact of invasive alien species on the livelihood security of farm women and men, NCF in its first report (Dec 2004) stressed the need for a thorough review of the present
infrastructure and institutional framework in the area of agricultural biosecurity, including WTO specifications

1.4.6.9 A National Agricultural Biosecurity System should have the following principal goals:

- To safeguard the income and livelihood security of farm and fisher families as well as the food, health, and trade security of the nation through effective and integrated surveillance, vigilance, prevention, and control mechanisms designed to protect the productivity and safety of crops, farm animals, fish and forest trees.
- To enhance national and local level capacity in initiating proactive measures for monitoring, early warning, education, research, and international cooperation.
- To introduce an integrated biosecurity package comprising regulatory measures, education and social mobilisation.
- To organise a coordinated National Agricultural Biosecurity Programme on a “hub and spokes” model with effective home and regional quarantine facilities. This should be capable of insulating the major agro-ecological and farming zones of the country from invasive alien species of pests, pathogens and weeds.
Box III

Bioresources

1. Access to non-timber forest products including medicinal plants, gums and resins, oil yielding plants and beneficial micro-organisms is important, particularly to tribal families. Women in particular need access to bioresources since the task of collecting fodder and fuel wood falls on them.

2. Tribal and rural families have been playing an important role in the conservation and enhancement of biodiversity for a long time. As a result their traditional knowledge of medicinal, aromatic and other plants of value to human kind is very high. Traditional rights to access to biodiversity need to be safeguarded and strengthened. Also, their contributions to agro-biodiversity conservation and enhancement should be recognized and rewarded under the provisions of the Biodiversity Act and Protection of Plant Varieties and Farmers’ Rights Acts. Suitable and transparent methods of recognition and reward should be developed for this purpose. Such procedures must be gender sensitive since women play the dominant role in genetic resources conservation and selection.

3. Traditional knowledge systems must be protected and enriched. In the past tribal and rural families depended on more than a hundred species for their health and food security; both dying crops and vanishing wisdom must be protected and revitalized.

4. Steps should be taken to impart legal literacy to women and men in biodiversity rich areas, so that their rights and intellectual property can be safeguarded.

5. The utilization of bioresources for improvement of crops and farm animals must be done in a sustainable and equitable manner. Educational techniques like the preparation of local Community Biodiversity Registers and the organization of Genome Clubs in Schools will help to spread bio-literacy and enable the conversion of bioresources into products of commercial value. Community seed and germ plasm banks should be encouraged for both conservation and breeding purposes.

1.5 Financial Services - Credit and Insurance

1.5.1 Inspite of government pronouncements, credit is becoming increasingly difficult to access. It is obvious that dire financial straits are driving hapless farmers to take to extreme steps including suicides, which have assumed alarming proportions. Also, the credit disbursal system is ridden with corruption, of which there are numerous instances. There is also a large amount of diversion of credit for non-agricultural purposes. Distress sales by small/ marginal farmers to square off their debts or for immediate consumption purposes soon after harvest are quite common. It is normal for a farmer to get 10-15 percent discounted price for spot payment for his produce. According to reliable resources, about 50 percent of the marketable surplus of small/marginal farmers is disposed of in this manner. At present credit is generally available only for
improved technologies like hybrid crops, crossbred cows, etc., and not for sustainable farming practices.

1.5.2 The Kisan Credit Card (KCC) is a major innovation in agricultural credit, but of the nearly 4.5 crore KCC issued by the banks, very few cards have been given to women farmers, and no separate data are available in this regard. Since there are a very large number of women-headed farming families in the rural areas, a system to speed up issue of KCC to women farmers, as well as proper documentation should be evolved.

1.5.3 It is not just credit availability but the interest rate at which loans are given to resource-poor farmers that is the major problem today. Credit reform should include not only enhancement of the total amount available for farm loans, but also reduction in interest rates and support for market linkages.

1.5.4 The spread between the deposit and lending interest rates in India is high by international standards. Improved efficiency in financial intermediation must be by controlling both the transaction cost and the risk cost. Speed and manner in which the debt recovery and settlement process operates would need to be considerably improved.

1.5.5 Also, interest should be waived on loans in areas hit by drought and floods and for crops under heavy pest infestation. Compounding of interest on arrears should be applied only in the case of recalcitrant borrowers who do not pay their dues in spite of having adequate repaying capacity.

1.5.6 Lakhs of farmers have seen their insurance policies lapse after the initial payments. There are provisions in the insurance laws that allow LIC to revive the lapsed policies. If done, this would place large sums back in the farmers’ accounts and give them a sense of confidence. Crop insurance, which now covers only about 14 percent of the farmers, has to cover all farmers and all crops in a time-bound manner, with reduced premiums.

1.5.7 Natural calamities like drought, flood which are frequent and recurrent occurrences and pest infestation are serious and crippling risks. Rescheduling and
restructuring of their loans are not enough. Waiver of loans is also needed. An Agriculture Risk Fund, set up with contributions from the Central and State governments and banks in a predetermined fashion, could provide relief to farmers in the form of waivers in full/part of loans and interest.

1.5.8 An integrated micro insurance policy (Parivar Bima) providing floating cover for health and various risks will go a long way as a safety net for the poor.

**Box IV**

**Credit and Insurance**

1. The outreach of the formal credit system has to expand to reach the really poor and needy with special emphasis on women, tribals, dry land areas and for viable projects of sustainable farming practices. The rate of interest for crop loans should be reduced to 4 per cent simple, with government support. There is a need for moratorium on debt recovery, including loans from non-institutional sources, and waiver of interest on loans in distress hotspots and during calamities, till capability is restored. An Agriculture Risk Fund should be established to provide relief to farmers in the aftermath of successive natural calamities.

2. Kisan Credit Cards should be issued to women farmers, with joint pattas as collateral. Till these are available, indemnity bonds from husband or other male relative or guarantee from independent local persons of standing should be acceptable.

3. An integrated credit-cum-crop-livestock-human health insurance package should be developed and set in place. Crop insurance cover needs to be immediately expanded to cover the entire country and all crops, with reduced premiums and a Rural Insurance Development Fund may be created to take up development work for spreading rural insurance.

4. Livelihood finance, which is a comprehensive approach to promoting sustainable livelihoods for the poor, is the need of the hour. It comprises of:
   (i) Financial services (insurance for life, health, crops and livestock
   (ii) Infrastructure (finance for roads, power, market and telecommunications
   (iii) Investments in human development, agriculture and business development services (including productivity enhancement, local value addition, and alternate market linkages and
   (iv) Institutional development services (forming and strengthening various producers’ organisations such as self-help groups, water user associations, forest protection committees, credit and commodity cooperatives, empowering panchayats through capacity building and knowledge centres)
Moving From Suicide Relief to Suicide Prevention: 9 Point Action Plan

The NCF has in its various Reports addressed the issue of agrarian distress in rural areas of the country and the need to address the farmer suicide problem on a priority basis. This has to be on the basis of a three-pronged strategy, viz. i) Relief & Rehabilitation Measures to alleviate the distress and suffering of the affected families in the short term, ii) Address the issues responsible — unfavorable economics, risky technology, unfavorable weather, lack of irrigation water, institutional credit and remunerative markets, and iii) Psycho-Social Counseling. While the first measure is to provide immediate relief, the other two are preventive long-term measures.

The distress sweeping rural India flows from market failure and the gradual collapse of public services. The cost-risk-return structure of farming is adverse. Almost all the suicide and otherwise crisis-hit households record high health expenditures and are indebted to moneylenders. There is urgent need for both affordable health insurance, and the revitalization of primary healthcare centres. The National Rural Health Mission should be extended to such suicide hotspot locations on priority basis. The NCF in its Second Report stressed on the need for a Farmers’ Livelihood Security Compact. This has to be an integrated package of measures comprising:

1. **Setting up State level Farmers’ Commission** with farm men and women represented for ensuring dynamic government response to farmers’ problems.

2. **Credit**: Microfinance policies should be restructured to serve as Livelihood Finance, i.e. credit coupled with support services in the areas of technology, management and markets. The outreach of the formal credit system has to be expanded. In most cases, the indebtedness of farmers in distress areas is to informal moneylenders. The cut-off amount for debt waiver could be worked out in consultation with Panchayats and farmers’ representatives in the distress hotspot areas. Just interest waiver does not help a farmer in distress. In drought prone areas, credit should not be just for the season, but for a Credit Cycle of 4-5 years and include consumption credit, so that the farmer has the capacity to spread his/her liabilities and meet the repayment requirements.

3. **Insurance**: All crops should be covered by crop insurance and insurance relief should be immediate, with the village and not block as the unit for assessment. There should be a Social Security net with provision for old age support and health insurance. Lapsed life insurance policies of farmers should be revived as per extant rules and not allowed to expire. The integrated family insurance policy (Parivar Bima Policy) recommended by NCF in its First Report deserves to be examined and introduced to begin with, in dry farming areas.
4. **Irrigation Water:** Aquifer recharge, rain water conservation, equity, fairness and public good will have to be the basis of water policies. Decentralised water use planning has to be undertaken and every village should aim at *Jal Swaraj* with Gram Sabhas serving as *Pani Panchayats*.

5. **Access to quality and affordable inputs is crucial:** The government must urgently intervene to ensure that quality seed and other inputs reach farmers at affordable costs and at the right time and place. An integrated farming approach should be encouraged with support services in place.

6. **Technology:** Resource poor farmers have no coping capacity to withstand the shock of crop failure, particularly those associated with high cost technologies like Bt cotton. Low risk and low cost technologies which can help to provide maximum income to farmers should be recommended. Risk distribution agronomy should be propagated. Similarly, best possible advice based on remote sensing data should be used to identify locations for drilling wells.

7. **Remunerative Market and Price:** Swift action is required to overhaul the *ryuthu bazars* or farmers’ markets, most of which are controlled by traders. There is also need for focused Market Intervention Schemes (MIS) in the case of life-saving crops such as cumin in arid areas. A Price Stabilisation Fund should be in place to protect the farmers from price fluctuations. Swift action on import duties to protect farmers from international price is necessary (as in the specific instance of cotton farmers’ suicides in Vidarbha).

8. **Information Dissemination and Delivery System:** The vital role of the Agriculture Extension Officer must be recognised and the system revived and strengthened. KVKs in each district should function as *Krishi Aur Udyog Vigyan Kendra*, with a post harvest technology wing for providing training in value addition. Farm Schools maybe established in the fields of good farmers. Village Knowledge Centres (VKCs) or Gyan Chaupals should be setup in the farmers’ distress hotspots. These can provide dynamic and demand driven information on all aspects of agricultural and non-farm livelihoods and also serve as guidance centres.

9. **Psychosocial Measures:** There is need for public awareness campaigns to make people identify early signs of suicidal behavior, make them aware of different socially acceptable measures for solving problems and information on helpline centres; develop a group of volunteers from the community to provide counsel, encourage increased communication within families, media education on internationally accepted guidelines for reporting suicides and creation of taluk level mental health services. Agricultural and Animal Sciences Universities could form Hope Generation Teams (like NSS) of young male and female students who could stay in the distress villages for a few weeks and extend both technical and psychological support. An environment of Hope and Care has to be created.
1.6 Technology Development and Dissemination

1.6.1 The growing gap between technology, research and development and its clients, the farming community is becoming more and more obvious. Farmers both need and lack sound advice and expertise on a range of issues. There is also a tendency among some resource-poor farmers to take to high cost technology without the capacity to incur losses due to factors beyond their control.

1.6.2 Post-harvest technology is poor and there is little value addition particularly in the case of fruits, vegetables and spices, including a wide range of tubers and medicinal and aromatic plants. Sustainable intensification, ecologically, economically and nutritionally desirable diversification, and value addition to the entire biomass are important for raising small and marginal farm families above subsistence level. All this will call for initiating an era of knowledge intensive agriculture. Modern information and communication technologies (ICT) afford an opportunity for launching a knowledge revolution in rural India. The torch bearers of this revolution should be rural women and men. Participatory research and knowledge management involving farm women and men should be the principal pathways of research, education and extension. Farmers should be regarded as partners and innovators in bringing about agricultural transformation.

1.6.3 The Eleventh Schedule (Article 243G) of the Constitution, 73rd Amendment Act 1992, lists “agriculture, including agricultural extension” as the first among 29 items entrusted to panchayats for attention and action. There are nearly 240,000 elected panchayats and local bodies in the country and more than one million elected women members of the panchayats. If panchayats are empowered technically, financially and legally to assume these responsibilities, they could become catalysts of accelerated agricultural progress, particularly in the areas of sustainable natural resources management and productivity enhancement. At least one male and one female member of each panchayat/local body could be trained in integrated pest management, integrated nutrient supply, and scientific water management, as well as in new technologies such as biotechnology and ICT. Thus, a cadre of Rural Farm Science Managers can be established.
1.6.4 Technologies should help in promoting labour diversification and not displacement. Women farmers and farm workers particularly need to be assisted with implements and equipment which will help to reduce drudgery and the number of hours of work, while adding economic value to each hour of work.

1.6.5 Revitalisation of small farmer-friendly technologies should be based on sound principles of economics and participatory research and knowledge management. Lateral learning among farm women and men should be fostered, since farmer-to-farmer learning is based on the principle that “one ounce of practice is worth tons of theory”. In order to multiply the benefits from the experience and skills of outstanding farm men and women, Farm Schools should be established in their fields.

1.6.6 The veterinary curricula in use in the country at present generally neglect small ruminants, rabbits, camels, yak, mithun and pack animals. There should be adequate emphasis in the syllabus on these species so that veterinary graduates can ably handle the diseases and other problems specific to these species such as trypanosomosis in camels.

1.6.7 Incentives should be given to setting up hygienic medium-sized slaughter facilities that can handle 100-500 animals per day in rural areas. This will prevent their transport through long distances, generate local employment and clean packaged meat can be made available to nearby medium-sized towns and big cities.

1.6.8 Establish “Fish for All” training centres, which will enhance the capacity of fisher women and men in all aspects of the capture to consumption chain.

1.6.9 To impart a sense of grassroot realism to the capacity building programmes, there should be a system of on-farm training to farmers. Village-based farm schools can be set up with the assistance of agro-industries, Krishi Vigyan Kendras, agricultural colleges and research institutes. Agricultural graduates and lead farmers can be certified as instructors and offered incentives for establishing private farm schools to train local farmers. Farm schools should be linked to Village Knowledge Centres to provide access to multimedia training materials, computerised expert systems, and web-based technical and marketing information.
1.6.10 Technology Missions are tending to become “subsidy rich” and “technology poor”. Accountability is also lacking, with the result that in several important crops like pulses and oilseeds, domestic production is stagnating and imports are increasing. This is one of the causes for the mounting farmers’ distress in dry farming areas. The smaller the farm, the greater is the need for productivity improvement, so that the farm family can have additional marketable surplus. Enhancement of small farm productivity coupled with assured and remunerative marketing opportunities is the most effective means of reducing rural poverty. Fortunately, there is much scope for enhancing productivity even with the technologies currently on the shelf, provided market linkages can be tied up.

1.6.11 There should be a convergence of appropriate Technology Missions (like those relating to oilseeds, pulses, maize, cotton, horticulture, or milk) around a watershed or the command area of an irrigation project, together with the active involvement of panchayat institutions and local bodies. Convergence and synergy among the numerous Technology Missions now in progress will improve their utility and impact and also help to reduce overall transaction costs.

1.6.12 The cultivation of fruits, vegetables, flowers, spices, medicinal and aromatic plants is now happening in a big way in several parts of the country. Being perishable commodities, horticultural crops need effective infrastructure support in the areas of production, processing, storage, transportation and marketing. In villages adjoining large consumption centres (both for home and export markets), small farmers can be helped to organise Small Farmers’ Horticulture Estates covering an area of 200 to 500 hectares. Such estates will confer on farmers cultivating one to two hectares the power of scale both at the production and post-harvest phases of the horticultural enterprise. Specialised activities like seed production, tissue culture propagation, production of compost, vermiculture, biofertilisers, biopesticides as well as e-commerce can be carried out at those estates. Low cost greenhouses coupled with fertigation techniques can be promoted, in addition to high-tech horticulture which can be undertaken by farm and home science graduates. The production of good quality, disease-free planting material in all clonally propagated species and seeds and planting materials of varieties suitable for processing will help farmers in areas where production and processing are linked. Such symbiotic
linkages between producers and processors will facilitate sourcing of good quality raw material for the processing industry.

1.6.13 The textile sector is one of the major providers of employment and income in the national economy. With the coming to an end of the multi-fibre arrangement two years ago, our cotton producers, weavers, and the textile industry on the whole face both new opportunities and threats. Without enhanced efficiency, it is impossible to take advantage of emerging market opportunities. Technological upgrading of all the components of the cotton production-processing-marketing cycle will be needed to prevent problems and setbacks in this vital sector of our economy, particularly with reference to both employment and export earning potential. A revolution is needed in productivity, quality and value addition in cotton production and processing. To provide overall coordination and policy support it will be advisable to establish a multi-stakeholder National Cotton Council, with government participation and support.

**Box VI**

**Technology**

1. Research, education and extension systems should be revitalised to avoid both technology fatigue and technology gaps. Agricultural and rural universities, Home Science colleges and research institutes should foster participatory research and knowledge management systems with farm women and men. The linkages between agricultural universities and farm communities must be restructured and strengthened.

2. Farm Schools should be set up in the fields of farmers who have achieved outstanding success in their operations in order to foster farmer-to-farmer learning of new technologies.

3. There should be a proper match between production and post-harvest technologies and a post-harvest technology wing should be added to every Krishi Vigyan Kendra.

4. A cadre of Rural Farm Science Managers should be developed by training women and men members of every Panchayat/ local body in the management of farm technologies.

5. An umbrella organization of Farm Technology Mission should be set up for coordination and to avoid duplication and conflicting approaches.
1.7 Inputs and Services

Access to affordable inputs and services are crucial for the success of farming, especially for poor farmers.

1.7.1 Input Supplies

1.7.1.1 Input prices have shot up and are still escalating. Resource poor farm families are left to the mercy of input dealers who have emerged as the new moneylenders of the countryside. Quality control is becoming increasingly important. Control has to be exercised over false and exaggerated claims for inputs with laws in place for penalty. Companies have drastically lowered the minimum germination rate they assure farmers. In the case of seed, this has fallen to as low as 60 per cent which implies that a village buying 1000 bags of seed pays for that number, but gets only 600 in effect. Quality control is equally urgent in the case of fertilizers, bio-fertilisers, pesticides and biopesticides. There has to be a suitable agency for strict quality control of animal feed, drugs, vaccines and other biological products. Animal-rearers need to be protected from exploitation by unscrupulous manufacturers. It should be mandatory to print the digestible energy and protein content of the concentrate on the bag and the contents of the mineral brick on its packing.

1.7.2 Centralised Services

1.7.2.1 Management procedures which can confer the economy and power of scale to small and marginal farm families, such as Small Holders’ Cotton and Horticulture Estates, should be popularised.

1.7.2.2 Agriculture and aquaculture service centres run by trained managers who are available to the farmers to provide reliable technical advice, arrange for procurement of quality seed, feed and probiotics, provide information on the market and price fluctuations, should be set up with the active involvement of the farmers in different production areas.
1.7.2.3 Small farmers groups and women’s SHGs involved in livestock rearing need support services like feed and fodder banks, training in scientific rearing techniques, veterinary health care, marketing and credit and insurance.

1.7.2.4 Organized centralized support services are needed to support decentralized small scale fisheries production (e.g. Mother Ships based in Andaman & Nicobar and Lakshadweep group of islands), upgradation and construction of new minor fish harbours and fish landing centers, large wholesale markets for larger and more hygienic handling of catch and greater employment generation.

1.7.3 Rural Energy

1.7.3.1 Farm families need energy both for domestic needs as well as for farm operations. At the moment they depend largely on firewood, cow-dung and agricultural residues for meeting their domestic needs. For agricultural purposes, the major sources are electricity, where available, and diesel. An integrated Rural Energy System is recommended for the purpose of meeting the energy needs of farm families in a holistic manner. Particular attention will have to be paid (a) to harnessing renewable energy technologies such as biogas, wind and solar including solar thermal and solar photo-fuel technology and (b) to conventional energy sources including electricity from grid, kerosene, diesel and soft coke and fuel from social forestry programmes. A Comprehensive Integrated Rural Energy Programme during the 11th plan period is needed for meeting the needs of rural families in their totality. Particular attention should be paid to renewable energy technologies like Biogas Plants, Solar Photovoltaic Technology, Biomass Gasification, Mini Hydro Power and Biofuel Technologies. The availability of energy is also essential for non-farm enterprises including agro processing.

1.7.4 Protective Services

1.7.4.1 Emphasis should be on development of vaccines against diseases for which no vaccines exist at present e.g., bluetongue in sheep. The thrust should be on prevention and eradication of diseases. Disease diagnostic and investigation laboratories should be set up with a separate cadre of appropriately trained personnel.
1.7.4.2 Following the outbreak of Avian Influenza (AI) in some of the Asian / European countries, the Government of India had banned the import of various poultry products. **Quarantine and testing facilities at all ports of entry should be established** before the ban is lifted, as such safeguarding measures are absolutely necessary for the health and survival of the poultry industry and for the protection of livelihood of millions of farmers and others dependent on this industry.

1.7.4.3 A 100% quarantine of all imported birds for a minimum period of six weeks should be strictly implemented, as in countries which have a developed poultry industry.

1.7.4.4 The High Security Animal Disease Laboratory (HSADL) Bhopal is the only laboratory which is equipped and authorized for testing for Avian Influenza. A high level committee of experts may be constituted to test the suspected cases thoroughly before any declaration of bird flu and other major diseases is made, instead of leaving it to the decision of one person. It is also necessary to establish atleast one or two more laboratories equipped on par with HSADL, Bhopal,

1.7.4.5 There is no facility for testing the safety and efficacy of imported poultry vaccines before they are allowed to be marketed, as is there in the case of human vaccines. 90% of human infections and deaths due to bird flu were reported from countries where the birds were vaccinated for Avian Influenza, so imports could be allowed only after testing.

**1.7.5 Support Services for Women**

1.7.5.1 Women suffer from a multiple burden on their time due to their home making, child rearing, and income earning responsibilities. When they work the whole day in fields and forests, they need appropriate support services like crèches and child care centres. Adequate nutrition is also important.

1.7.5.2 The food-for-work programme should enlarge the concept of *work* in the case of women by including activities like running crèches and child care centres, preparing
noon meals in schools, undertaking immunisation of children and providing family planning services.

1.7.5.3 A **Gram Panchayat Mahila Fund** should be established to enable self-help groups and other women’s groups to undertake community activities that help to meet essential gender-specific needs.

1.7.5.4 Credit, insurance, technology development and dissemination, health care, education, input supply, output marketing and rural employment should all be engendered.

1.7.5.5 The feminisation of agriculture, due to male out-migration, needs specific attention with reference to gender-sensitive farm and credit policies. All research, development and extension programmes in agriculture, and all services must be engendered.

**Box VI**

<table>
<thead>
<tr>
<th>Inputs and Services</th>
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<tbody>
<tr>
<td>1. Mechanisms are required for quality control and regulation of all input supply</td>
</tr>
<tr>
<td>2. Agriculture and aquaculture service centres run by trained managers who can provide reliable technical advice, arrange for procurement, and provide information on the market should be set up, as well as centralized services to support decentralized small scale fisheries production.</td>
</tr>
<tr>
<td>3. A Comprehensive Integrated Rural Energy Programme during the 11th Plan Period is needed for meeting the needs of rural families in their totality, including both renewable energy technologies and conventional energy sources.</td>
</tr>
<tr>
<td>4. Quarantine and testing facilities at all ports of entry should be established. Safeguarding measures are absolutely necessary for the health and survival of the poultry industry and for the protection of lives and livelihoods. Testing the safety and efficacy of imported poultry vaccines before they are allowed to be marketed is a must</td>
</tr>
<tr>
<td>5. Women farmers suffer from a multiple burden on their time due to their home making, child rearing and income earning responsibilities. All research, development and extension programmes in agriculture and all services must be engendered.</td>
</tr>
</tbody>
</table>
1.8 Markets

1.8.1 The gross marketing margin in farm commodities is estimated at Rs.1009 billion, out of which nearly 70% is accounted for by marketing cost. About 77% of marketing costs are estimated to be avoidable losses during handling, storage and transport. Quality, labeling, brands, taxes, subsidies, sanitary and phytosanitary (SPS) issues, price volatility, removal of quantitative restrictions on imports and the absence of a level playing field in international trade due to the very high support (nearly 1 billion dollars per day for 10 million farming families) extended to farmers in OECD countries, are all becoming significant factors in agricultural marketing.

1.8.2 Raising the agricultural competitiveness of farmers with small holdings is a major challenge. Systems designed to confer the power of scale to small farm families both at the production and post-harvest phases of farming are an urgent necessity. Productivity improvement to increase the marketable surplus must be linked to assured and remunerative marketing opportunities. A basket of choices should be available to farm women and men cultivating 1 or 2 ha or below to enhance their income earning capacity.

1.8.3 Pre-production agreements for sale between farmers and corporate houses and processing companies are being increasingly used in the case of certain vegetables, fruits, and medicinal plants. These agribusiness models are being loosely referred to as ‘contract farming’ though in many of these cases there is no formal contract between the farmers and the prospective buyer. The advantage of such arrangements could be biased in favour of the agribusiness organisation. However, there could be beneficial effects of such arrangements to the farmers in the matter of access to adequate and timely credit, good quality inputs, new technology, employment generation, introduction to new crops, separation of production and marketing risks, better farm practices, etc. The need is to develop a comprehensive, clean, equitable and farmer-centric model agreement, which cannot be abused against the farmers. Special care needs to be taken regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, natural calamities, and arbitration mechanisms.
1.8.4 Swift action is required to overhaul the *rythu bazaars* or farmers’ markets, most of which are presently controlled not by farmers but by traders. Even the “farmers’ markets” are now heavily loaded against the small producers and cartels and trader networks manipulate these and rig prices systematically.

1.8.5 Assured and remunerative marketing for dryland farm products such as pulses, oilseeds, millets, vegetables, fruits, milk, and meat should be put in place. Due to shortage of wheat and rice in government stocks, the Government of India plans during 2006 to purchase millets, ragi, bajra, and jowar for use in the public distribution system (PDS). These "underutilised crops" are rich in micronutrients and minerals and should be referred to as "nutritious cereals" and not as "coarse cereals" as is being done now. The decision to include ragi, bajra, jowar, and other millets in the PDS should be a permanent one. This will help to enhance nutrition security, on the one hand, and the productivity and economic sustainability of improved dryland agriculture, on the other.

1.8.6 Small farmers should not be subjected to experiments in the area of crop diversification without first linking the farmers with the market for the new commodities. Crop-livestock-fish integrated production systems are ideal for small farmers since this can also facilitate organic farming. Success in agricultural progress should be measured by the growth of farmers' incomes and not just by production figures.

1.8.7 While import of wheat, pulses, sugar, and oilseeds may have been necessary during 2006 to prevent an undue rise in prices, we should avoid the danger of making this a habit. Our food budget should be managed with home-grown food, since agriculture is the backbone of our rural livelihood security system.

1.8.8 Farm families should be enabled to become quality conscious, with reference to both home and external markets. Our agricultural competitiveness in the external market can be improved only if we help farm families to increase both productivity and quality of crops in demand in the global market.
Box VII

Basmati Case Study

A case in point is basmati rice exports. Despite the Ministry of Commerce’s notified standards on basmati, several high yielding semi-dwarf stature aromatic rices are being released by research institutions under the name. Such a dilution of the pristine properties of traditional Indian basmati is now seriously threatening our export earnings from basmati rices. Also, traditional basmati varieties are being adulterated with the dwarf “basmati” grains. The appellate basmati is used only for traditional fine grain aromatic rices of great antiquity and of a specific geographic origin. The new high yielding fine grain aromatic rices can be given other appropriate names, since they have good market potential without being called basmati. They can stand on their own merit, without diluting the historic halo which surrounds the traditional Indian basmati rice.

1.8.9 With the liberalisation of procedures, the commodity future market is expanding at a fast pace. The trade turnover in the commodity exchange touched Rs. 5,70,000 crores during 2004-05. The time has come to ensure the healthy and regulated growth of this market and make small farmers benefit from its development. If spot and futures prices of farm commodities are available to farmers as well as to the agro- and food-processing industries, agriculture as a whole will benefit. Farmers given dependable data can take decisions on the crops to be sown and on post-harvest sale of commodities. The Agriculture Produce Marketing Committee (APMC) yards across the country are now being networked electronically by the Multi-Commodity Exchange of India (MCX), Mumbai. The National Commodities and Derivative Exchange (NCDEX) operates online trading through nearly 6000 terminals covering 33 agricultural commodities and linking 430 cities and towns across the country. It will be very useful if the Village Knowledge Centres are linked to NCDEX and MCX so that they can disseminate data on spot and futures price among farmers. It is also now possible to transmit such data on cell phones.

1.8.10 As a national self-empowerment measure, we should establish an Indian Trade Organisation (ITO) and our own boxes for domestic agricultural support on the
model of WTO’s Blue, Green and Amber Boxes. The value of our annual agricultural production including livestock in 2002-03 was Rs. 5,60,516 crore.iii The value of our exports of farm commodities in 2002-03 was only Rs. 34,654 crore (6.18 % of total agricultural production).iv Only a small proportion of our agricultural commodities enter the global market, since with a population of over a billion, there is a large home market. Hence, we must segregate the very modest support we extend to our farmers into two groups: those which are of the nature of life and livelihood saving support to small farm families, and those which could be considered as trade distorting in the global market.

**Box VIII**

<table>
<thead>
<tr>
<th>Markets</th>
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<tbody>
<tr>
<td>1. Commodity-based farmers’ organisations like Small Cotton Farmers’ Estates, Small Farmers’ Horticulture Estates, Small Farmers’ Poultry Estates and Small Farmers’ Medicinal Plants Estates should be promoted to combine decentralised production with centralised services such as post-harvest management, value addition and marketing, for leveraging institutional support and facilitating direct farmer-consumer linkage.</td>
</tr>
<tr>
<td>2. Implementation of MSP needs considerable improvement. Arrangements for MSP needs to be put in place for crops other than paddy and wheat, such as millets. Side by side, millets and other nutritious cereals should be permanently included in the PDS. Market Intervention Schemes (MIS) should operate for sensitive crops and a <strong>Price Stabilisation Fund</strong> for all crops should be setup.</td>
</tr>
<tr>
<td>3. Pre-production agreements for sale (contract farming) should be comprehensive, clean, equitable and farmer-centric.</td>
</tr>
<tr>
<td>4. Data about spot and future prices of commodities should be made available to the farming community through the Multi Commodity Exchange (MCD) and the NCDEX and the APMC electronic networks covering 93 commodities through 6000 terminals and 430 towns and cities.</td>
</tr>
<tr>
<td>5. The role of the State Agriculture Produce Marketing Committee Acts [APMC Acts] relating to marketing, storage and processing of agriculture produce need to be reviewed. From regulation they need to shift to one that promotes grading, branding, packaging and development of domestic and international markets for local produce, and move towards a Single Indian Market.</td>
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iv Agricultural Statistics at a Glance 2004, Ministry of Agriculture, Govt. of India
1.9 Mission 2007 – Every Village a Knowledge Centre: Knowledge Management and Dissemination

1.9.1 In its first Report submitted in December 2004, NCF stressed the need for knowledge connectivity in rural India, since farm families urgently need the right information at the right place and at the right time in order to enhance agricultural efficiency and competitiveness. The importance of developing and sustaining two-way flows of information between the farm families and experts/agencies of all kinds was emphasized. The Mission 2007 Alliance whose goal is to build a knowledge center in every village was cited as a means to realize this vision. The need for a national effort to build gateways of digital information for agrarian prosperity was identified and an alliance of data-generating organizations was also recommended, covering the public, the educational and the private sector.

1.9.2 Knowledge Connectivity has been made a key component of Bharat Nirman designed to provide a New Deal for Rural India. The NCF proposal received support in the Union Budget for 2005-06, with the finance minister announcing that the government will allow NABARD to provide Rs. 100 crore out of the Rural Infrastructure Development Fund for supporting Mission 2007 to set up a Knowledge Centre in every village by 15 August 2007, the 60th anniversary of India’s attaining Independence. The NCF welcomes the recent approval of the Cabinet to support the Common Service Centre (CSC) Scheme as a national programme under the National eGovernance Plan. While the Scheme is anticipated to be rolled out in PPP mode, it should be ensured that the principles of social inclusion guide the establishment of the 100,000 CSCs, proactively soliciting support from village Panchayats who would be both the beneficiaries as well as the main stakeholders of the services offered by the Government, the private sector and civil society. In particular, the Fellows of the National Virtual Academy could be helped to emerge as Village Level Entrepreneurs (VLEs).
1.9.3 The following steps are needed to further this thrust:

1.9.3.1 Setting up a series of nation-wide online grids for content sharing in all areas that have relevance to agrarian prosperity through forming an alliance of information sources

1.9.3.1.1 Research and educational and training organizations in our country have for long developed information materials of good quality that are useful for adaptation and use in the VKCs. The challenge however is one of timely access. These sources need to be digitized on a very large scale. The Ministry of CIT, along with several institutes, and the Carnegie Mellon University, has embarked on a large program of digitization of publications and the agricultural, health and Panchayat administration sectors should be covered on a priority basis. Agricultural and health research, development, training and educational organizations should be enabled to digitized their publications for access in the public domain in all Indian languages. The emerging practice of creating grids of information sources should be adopted. The users and facilitators at the VKC should be able to gain access to any relevant document, be it text, image or audio/video clips, irrespective of its origin or original location. The grid content of all kinds should be shareable and re-usable on a mandatory basis without the original creator losing all the copyrights, and new practices such as the Creative Commons should be adopted. The Ministries of Agriculture, Rural development and Health should take steps to initiate such a grid-creation program on a priority basis so that the equivalent of one million pages can be digitized in FY 2007-08. The IIT system has been successful in transforming itself into a consortium of quality-content institutions through the National Programme on Technology Enhanced Learning (NPTEL) program and that experience should be used in the development sector.

1.9.3.2 Forming an alliance of Educational and Training Organizations for Rural Capacity Strengthening to cover at least a million women and men in the next five years

1.9.3.2.1 Strengthening of capacity among rural families is fast becoming an urgent necessity because of the continuing deterioration in natural resources quality, increasing
pressures of trade/markets, and increased incidence of weather-induced uncertainties in production and processing in rural areas. There is a need for capacity strengthening on a mass scale in matters of NRM, weather, trade and quality literacy and in matters related to area-specific disaster-preparedness. The current paradigms of instruction and learning need to be supplemented by new approaches to mass education that requires technology-mediation on a large scale. A blend of non-formal and flexible learning approaches is necessary. An alliance of training and educational organizations should be enabled to use a range of technologies to provide new and effective opportunities for learning in rural areas. The Open Universities, adult literacy organizations, extension wings of SAU’s and rural development agencies should be at the forefront of these activities, while the alliance should also include broadcasting and mass media organizations and technology organizations for deepening reach. Community radio and local publishing are important allies in this endeavor. The experience of the Jamsetji Tata National Virtual Academy in identifying about 500 rural academicians is highly valuable, and these academicians should be considered as the nucleus of the entire process of capacity strengthening on a mass scale. The ISRO-MSSRF project on VRC’s provides a model for the new kind of rural capacity building.

1.9.3.3 E-Governance Processes in Rural Areas and Village Knowledge Centers should be rendered complementary and synergistic

1.9.3.3.1 The country is making significant investments in promoting E-governance and both the Union Government and many State Governments have started to evolve strategy-based plans of action. Studies in the patterns of usage of information in existing VKC’s reveal that nearly half the use is about government and governance information. Therefore, it would be meaningful to create synergies between upcoming E-Governance initiatives in rural areas and the practice of VKC’s. The synergies make both the processes highly effective. E-Governance processes through VKC’s should go beyond provision of government documents or petition-gathering to providing agro-advisories and livelihood-related advice that can be considered by the rural users as authentic. The national Institute of Smart Governance, which is evolving the codes of practices in E-Governance, should be encouraged to develop various scenarios of synergy. Since a
significant component of rural E-governance will relate to disaster preparedness, it would be useful to position the VKC’s as E-governance channels in relation to this aspect.

1.9.3.4 Establish a Technology Resource and Support System for the Promotion of Village Knowledge Centres

1.9.3.4.1 Implementing the foregoing recommendations requires a significant level of technological intensity and development organizations cannot be expected to handle these processes on their own. The Mission 2007 Alliance has fostered a sense of voluntarism among the partners where the technology-oriented partners support the wholly development-oriented ones. This requires to be mainstreamed. Every institution that has advanced skills in IT design/development/instruction/research should be invited to become a participant in a new National Alliance for Development Informatics and Standards, to be hosted in the IIT system. Such an alliance will make fundamental contributions in the area of share ability of content and data across institutional and linguistic boundaries. Such an alliance is also necessary to take advantage of the rapid diffusion of mobile telephony in semi-urban and rural areas, to make it a channel to promote information sharing and learning. Due recognition of such contributions in the form of the equivalent of President of India awards for invention may be considered.

1.9.3.5 Virtual and real communication linkage: Mobilising science and technology for agriculture, through the ICTs needs linking agricultural specialists with farmers through both virtual and real communication. ICTs can bridge the knowledge divide and help to overcome the prevailing knowledge deficit among our farming communities by permitting geographically distributed organizations to work together more effectively, allowing them to provide mutual mentorship and support as demonstrated in the ICRISAT’s VASAT programme. The GoI should replicate the VASAT model in all regions covering all crop, livestock and horticultural practices.

1.9.3.6 ICTs for Agricultural Trade: ICTs have the potential to offer trade opportunities for farmers by linking smallholders into increasingly globalised production
chains. What the ITC’s e-Choupal has gained can easily be replicated by the GoI through the Gyan Choupals in India.

1.9.3.7 **National Agricultural and Farmers’ Knowledge System:** Knowledge is an increasingly significant factor of production. Government could consider establishing a national knowledge management system for agriculture and farmers in all Indian languages that will facilitate interactivity between farmers and specialists; and among farmers themselves. The role of intermediaries is critical for the identification of client needs and suitable knowledge delivery methods and to provide feedback on the quality of agricultural knowledge services. Hence, the GoI should consider working closely with the NVA Fellows who champion knowledge brokerage at the local level, linking the farming community with the rest of the world.

1.9.3.8 **Gyan Choupals to Champion Agricultural Knowledge transfer:** We have already witnessed attempts to establish well-equipped Gyan Choupals (Village Knowledge Centres) with alternative models of connectivity such as the shared and inexpensive mobile phones, DVDs, CD-ROMs and offline internet models. These centres linked to the Village Resource Centres established in collaboration with the Indian Space Research Organisation have already demonstrated the possibilities of connecting farmers with their peers and specialists, a facility inaugurated by the Hon’ble President of India at the Indian Science Congress in January 2006. A combination of VRC and Gyan Choupal can help create, process, disseminate relevant content into agriculture mini-enterprises and support and the delivery of training and skills enhancement among farmers in new technologies. Integrating agricultural content development as well as capacity building for users through Gyan Choupals should be taken up in each and every Panchayat in the country.

1.9.4 **National Level Agricultural Databases**

1.9.4.1 **National Village Level Soil Database:** A database containing the physical, chemical and microbiological details of soil tested in different climatic zones. This will enable the development of mass media campaigns through Gyan Choupals about the
value of soil health and the serious hazards resulting in misuse, leading to rationalization of the use of fertilizer inputs.

1.9.4.2 National Land Information system for Planned Cultivation: A nationwide land information system for planning cultivation patterns must cover cultivatable lands, pasture lands, forests and fallow lands as well as information on land holding of small, marginal and big farmers. This would lead to appropriate strategies for providing the power of scale to small farmers through cooperative, group and self-help group farming methods linking them with contract, corporate, and State farming.

1.9.4.3 National Water Management Information System: A GIS based water information system with village level disaggregated data will enable assessing the level, status and quality of ground and surface water resources, and various water harvesting methods ranging from water aquifer recharge structures to roof-top rain water harvest. Under the Rural Employment Guarantee Scheme, local people can help map these resources and form part of a water literacy campaign using e-learning and mass media material through Gyan Choupals.

1.9.4.4 National Seed Information System: An information system for quality seed to track production, preservation and distribution will facilitate the timely procurement of quality seeds and the maintenance of seed banks and seed grids all over the country depending upon the geographical priority. This database will also help to analyse diseases and pests that affect the yield and in monitoring the use of plant protection chemicals.

1.9.4.5 National Agro-processing and Marketing Information System: An agro-processing database in Indian languages would aim to provide adequate knowledge to groups of farmers on post-harvest technologies and ICT-enabled demonstration of various tools and techniques used in agro-processing, value addition and packaging. Farmers can move from mere producers to small-scale entrepreneurs especially in food processing.
1.9.4.6 National Credit and Insurance Information and Advisory System: The linked credit plans adopted by the agricultural banks and financial institutions will need to be supplemented by strong credit information, advisory services and credit counseling to ensure social inclusion, and participation of rural poor in such schemes. A database system with sector wise information will help in developing strategies for micro-insurance schemes. Such schemes will have the potential to expand to plants, perishable commodities, animals, weather and water resources.

1.9.4.7 National Local Heritage Databases: Databases to redeem the dying practices and knowledge to ensure that the indigenous knowledge of crops, livestock and cultivation processes and methodologies are captured. A living heritage gene bank of local breeds like cattle, sheep and poultry, with pedigree information would help in protecting the genetic wealth of Indian animals and in creating a brand name based on community-based conservation methods for these species. Gyan Choupals will be the perfect vehicles for protecting the local heritage by involving the community knowledge workers, especially women, and in tribal areas.

1.9.5 With the participation of NGOs, government research agencies and the international institutions such as ICRISAT, FAO and IFPRI a national agricultural gateway to develop, adapt and disseminate digital content on agriculture and farming practices can be developed.

1.9.6 A new cadre of agricultural knowledge workers attached to Gyan Choupals and linked to the Village Resource Centre has to be created on a priority basis. India needs half a million such champions to help our farmers. These champions will play a critical role in providing feedback to specialists and at the same time provide the much-required link with farming communities. These steps will help to generate more than a million skilled jobs in rural India, since at least one woman and one man will be involved in the management of a Gyan Chaupal.
CHAPTER 2

MAKING HUNGER HISTORY

Medium Term Strategy for Food and Nutrition Security with a view to move towards the goal of universal food security over time

2.1 The Mid-term appraisal of the Tenth Plan reveals that we are lagging behind in achieving the Millennium Development Goal of halving hunger by 2015. Undernutrition and malnutrition are still widespread. National Sample Survey (NSS) data show a clear trend of decline in calorie intake. In rural India, the average calorie intake per capita per day fell from 2266 Kcal in 1972-73 to 2183 Kcal in 1993-94. It fell further to 2149 Kcal in 1999-2000. Among the lowest 30% of rural households in respect of consumer expenditure, the per capita calorie intake fell from 1830 Kcal in 1989 to 1600 Kcal in 1998. In 1999-2000, almost 77% of the rural population consumed less than the poverty line calorie requirement of 2400 Kcal. The average calorie intake in 2004-05 across the eight States of Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Orissa, Maharashtra and West Bengal was only 1907 Kcal as per provisional data released by the National Nutrition Monitoring Bureau (NNMB), indicating a declining trend. Further, 35.5% adults in these States, suffered from Chronic Energy Deficiency and 54.4% children in the age-group 1-5 years were undernourished with 16.5% suffering from severe under-nutrition. Maternal and foetal under-nutrition results in the birth of babies with low birth weight which reinforces itself in the absence of corrective measures.

2.2 Hunger Hotspots

2.2.1 The National Institute of Nutrition (NIN) Survey 2002, collected detailed data for different age groups based on the Recommended Daily Allowance (RDA) specified by the Indian Council of Medical Research (ICMR) for specific age and sex groups, including extra energy needed for special groups such as expectant and lactating mothers. There are 7 age and sex groups for which calorie intake data has been collected and compared with the recommended daily calorie intake for that age and sex group. The data
is however available for only 9 States of the country, excludes large populous States such as UP although UP is in the list of NNMB States for nutrition monitoring and refers only to rural area of these States. The findings of the study in respect of median calorie intake\(^1\) of the States for each of the 15 age and sex groups compared to the respective RDA are given in the Table 1 in Annexure 2.1. With very few exceptions, the median calorie consumption is far below the RDA levels in all the States for all groups. In all the age groups of children: 1-3 yrs, 4-6 yrs, 7-9 yrs, the RDA is higher than the median calorie intake in all the nine States, with Gujarat, Orissa, Tamil Nadu and Kerala recording the lowest levels. With regard to pregnant women and lactating mothers the median is below the RDA in seven States, the scenario for pregnant women being the worst in Kerala and West Bengal and for lactating mothers, in Tamil Nadu, Madhya Pradesh and Maharashtra.

2.2.2 The NNMB data being partial in coverage (leaving out many States where the hunger situation might be worse) and being State level data, these are not particularly helpful in identifying hunger hotspots in the country. Another source of data on food intakes and energy levels is the India Nutrition Profile (INP), last published by the Women and Child Development Department of the GOI in 1998. This also has the limitation of partial coverage, in that it is confined to a few States. However, it has the merit of providing district level data. Since it is unlikely that dramatic changes for the better would have occurred in respect of nutrition between 1998 and now, one may also use the INP data to throw light on some hunger hotspots in the country. Using INP 1998 data, the attached tables 2 – 4 in Annexure 2.1 provide a list of the districts of the States of Assam, Bihar, Haryana, Punjab and Rajasthan, which report a mean level of the relevant variable (intake of cereals and pulses in grams per consumption unit per day, energy level in kilocalories per consumption unit per day) below the RDA specified by the ICMR. It can be seen that the situation is especially serious in terms of the intake levels of pulses.

\(^1\) The median value is that value below which half the population lies. In other words, the implication is that more than half the population in each of the concerned age groups in the States mentioned, has an intake below the RDA.
2.2.3 The above findings are forebodings of serious consequence for the future physical and intellectual capital of India and need to be heeded posthaste. The consequences of child under-nutrition for morbidity and mortality are enormous. Child malnutrition is responsible for 22 percent of the country’s burden of disease. The minimal loss to GDP due to Vitamin and Mineral Deficiency (VMD) malnutrition per year is reportedly Rs. 27,720 crores. In such a scenario, addressing food and nutrition security and building a sustainable food and nutrition security system have to be flagged as urgent tasks for sustained economic progress.

2.3 Food and Nutrition Security

2.3.1 The concept of food and nutrition security implies that -

i) every individual has the physical, economic, social and environmental access to a balanced diet that includes the necessary macro- and micro-nutrients, safe drinking water, sanitation, environmental hygiene, primary health care and education so as to lead a healthy and productive life.

ii) food originates from efficient and environmentally benign production technologies that conserve and enhance the natural resource base of crops, farm animals, forestry, inland and marine fisheries. (Science Academies Summit, MSSRF, 1996)

2.3.2 This comprehensive definition of food and nutrition security provides guidelines for developing an effective operational strategy for achieving the goal of freedom from hunger.

2.3.3 Hunger has three major dimensions:

i) Chronic or endemic hunger resulting from poverty-induced undernutrition.

ii) Hidden hunger arising from micro-nutrient malnutrition, caused by the deficiencies of iron, iodine, zinc and vitamins in the diet.

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2 [http://wcd.nic.in/statewcd](http://wcd.nic.in/statewcd), presentation of Dr Saraswati Bulusu, Micronutrient Initiative India, April 2006
iii) **Transient hunger** caused by seasonal fluctuations in food availability and disruptions in communication and transport arising from natural or manmade disasters.

### 2.3.4 A sustainable national food and nutrition security system should cover all these three categories of hunger. It must also address the three issues of availability, access and absorption.

i) **Availability** of food at the household level depends upon (a) food production, and the operation of a resource-poor consumer-friendly Public Distribution System (PDS) operated with homegrown foodgrain stocks and or imports.

ii) **Access** to food depends on livelihoods / purchasing power.

iii) **Absorption** of food is influenced by access to clean drinking water, environmental hygiene and primary healthcare.

In recent years, there is cause for concern on all the three counts of food availability, food access and food absorption.

### 2.3.5 Food Availability

2.3.5.1 In the nineties, foodgrain growth rate has slowed down drastically to 1.7% and has fallen below the population growth rate of 1.9%, so that per head annual net foodgrains output has fallen by about 3.5 kg from a peak of 180 kg. in the three years ending in 1994-95 to, 176.5 kg. by the three-year period ending in 2000-01. (Utsa Patnaik, [www.macroscan.org](http://www.macroscan.org), August, 2002). The situation has not improved significantly since then.

2.3.5.2 The decline in per capita net availability of cereals and pulses over the last 15 years (from 510 grams per capita a day in 1991 to 463 gms in 2004) has been unprecedented. Estimate of requirement of cereals in 2020, range from 224 million tonnes to 296 million tonnes[^3]

[^3]: Bhalla, G S, P Hazell and J Kerr (1999), Prospects for India’s Cereal Supply and Demand to 2020, IFPRI Discussion Paper 29, Washington DC, USA
2.3.5.3 The High level Committee on Long Term Grain Policy, 2004\(^4\), arrived at a projection of 260 million tonnes, i.e. production will have to increase by 69 million tonnes from the present level of 191 million tonnes, i.e. doubling of the current rate of production. **The decline in per capita foodgrain availability and its unequal distribution have serious implications for food security in both rural and urban areas.**

2.3.5.4 In 1999-00, the *average* calorie consumption of a consumption unit in urban areas was 2637 kcal/day, not much higher than the norm of 2100 kcal/day, set for an urban adult. It is especially important to note that while there are visible signs of an enormous increase in conspicuous consumption by the urban rich, there are also signs of increasing inequality in urban areas - in 1999-00, the bottom 10 percent of urban population obtained on the average only 1890 kcal/day. That is, nearly 28 million people in urban areas have unacceptably low levels of calorie consumption. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

2.3.5.5 The Planning Commission had earlier estimated the proportion of population below the poverty line at 27.09 percent in rural areas and 23.62 percent in urban areas in 1999-2000. However, these highly contested estimates now stand revised. The Draft Approach Paper for the 11\(^{th}\) Plan notes that the proportion of households below the poverty line was as high as 28% in 2004-05 as per the most recent NSS full sample round. This is close to 300 million persons. The problem at hand is therefore of enormous dimensions. Besides, there are regional variations as well in the incidence of poverty. Across the nation, the poorest States are Orissa, followed by Bihar, Madhya Pradesh and Assam.

2.3.5.6 Though official data on poverty suggest a reduction in the percentage of population below the poverty line, there is reason for presuming that the incidence of hunger is increasing. Data on nutritional intakes suggest that income poverty is increasingly divorced from the calorie norm of 2400 kcal per consumption unit per day underlying the original official definition of poverty line. The data show that the

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\(^4\) Abhijit Sen Committee
percentage of population consuming diets providing less than 2400 kcal per capita per day is much higher now than the percentage below poverty line as estimated by the Planning Commission. Recent work by Professor V S Vyas\(^5\) suggests that in as many as eight major States, the proportion of the rural population accessing less than 1800 kcal/day (the level below which malnutrition can cause irreversible damage) exceeds 30 percent. This is indeed cause for concern.

2.3.5.7 **Farmers as Consumers**: An important feature of the Indian situation in the area of nutrition security at the level of each individual is that the producers of agricultural commodities i.e., farm men and women, constitute the majority of the population. Hence, the nutrition security of farmer-consumers becomes important to achieve the goal of hunger-free India. As mentioned earlier, in 1999-2000, almost 77% of the rural population consumed less than the poverty line calorie requirement of 2400 calories. Low productivity and income appear to be the single most important cause of endemic under- and malnutrition among farmer-consumers.

2.3.6 **Food Access**

2.3.6.1 Access to foodgrains is related to the purchasing power of the population and the nature of public distribution system that is prevalent. Purchasing power of large sections of the rural population has been weakened in recent years by the crisis in agriculture and rural livelihoods. In urban areas, the weakening of the PDS has exacerbated the problem of food insecurity.

2.3.6.2 **Rural Food Insecurity**

i) Several studies have shown that the poverty is concentrated and food deprivation is acute in predominantly rural areas with limited resources such as rain-fed agricultural areas. Agricultural labour and migrant labour are susceptible to hunger. In India, of the 310.7 million rural workers, 103.12 million are agricultural labourers. Of these, about 48.37 million are females. Female agricultural labourers are especially vulnerable to food insecurity on account of lower wages as well as the

\(^5\) Vyas V S, Moonis Raza Memorial Lecture, New Delhi, April 4, 2005
effects of migration. One-third of the rural work force is dependent on casual employment. This segment faces uncertainties of wage and work and is highly susceptible to food deprivation.

ii) About 40.14 percent of the rural workers are cultivators. Of the total 124.68 million cultivators, about 40.64 million cultivators are women with inadequate resources and credit facilities. In hilly areas and rain-fed under developed areas, often there are more female cultivators than male cultivators. Besides rural agricultural and non-agricultural labourers, small and marginal farmers also face food insecurity. Not only do they not get remunerative prices for their produce, they are also affected by the rise in retail/PDS foodgrain prices, being net buyers of grain. Input costs are constantly going up, while output price does not show commensurate rise.

2.3.6.3 Urban Food Insecurity

i) It is often presumed that, since urban areas are covered by the PDS, food security is not a major issue in urban areas. This is not true. During the 1990s, the PDS has been weakened, both by repeated increases in the issue prices of foodgrains and by the switch to a system of targeted PDS. Studies show that the bottom 10% of the urban population is not really helped by the prevalent system of PDS for accessing foodgrains. In 1999-00, average cereal consumption of bottom 10% of urban population was 9.55 kg/month in urban India. Of this, less than one kg/month was accessed from PDS (Food Insecurity Atlas of Urban India, MSSRF-WFP 2002).

ii) This brings out the need to have a system of PDS that is flexible so as to ensure larger coverage. People should be able to access grains from PDS whenever they want, wherever they want and in any quantity they want, subject to a few ground rules to prevent purchase for hoarding and subsequent sale at high prices. That is, flexibility with regard to time, place and quantity of purchase needs to be fitted in to the PDS. Accessing subsidized foodgrains is absolutely essential not only for the settled urban poor but also for the migrant population from villages.

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6 See Annexure 2.2
iii) As for purchasing power, the quality and quantum of employment of the population determine their income earning ability and therefore their ability to purchase foodgrains in the market. Casual employment normally fetches an income that is low and irregular; regular employment on a decent wage ensures a relatively better access to food. In 1999-00, in urban India only 4 out of every 10 workers belonged to the regular wage category; among the bottom 10 percent of urban population, nearly 4 out of 10 persons are casual labourers. The nature of the employment problem varies across different size classes of towns. Proportion of casual labour among males as well as females is much higher in small towns compared to the metropolitan cities or big towns. Similarly, the proportion of workers in regular employment is much lower in small towns compared to bigger towns. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

iv) Given the magnitude of the employment problem in urban India, particularly in the small towns, there is a strong case for a National Urban Employment Guarantee Programme, as part of the New Deal for Urban Areas. Such an Employment Guarantee Programme could be used for activities like sanitation, pollution control, tree planting and protection, energy generation from wastes and compost making.

2.3.7 Food Absorption

2.3.7.1 Biological absorption of food in the body is related to the consumption of clean drinking water as well as environmental hygiene. The situation on this front is serious in India. For instance, in urban areas –

i) Slums that have inadequate facilities of sanitation and drinking water provide shelter to nearly 22% of urban population in the country. In the early nineties, one third of slums did not have any drinking water facility and nearly half the slums did not have toilet facilities.

ii) Access to basic amenities - safe drinking water, toilets, electricity, are much lower for households living in small towns.
iii) In 1998-99, 15.4 % of children were severely stunted and 11.6 % were severely underweight.

iv) While there are wide variations in the nature and extent of the problem of food insecurity across urban areas, small towns are especially vulnerable.

v) Diseases like HIV/AIDS, Tuberculosis and Malaria are spreading

2.3.7.2 A National Food Security System should therefore give concurrent attention to the landless poor in villages and to casual and migrant labour families in urban areas.

2.4 Hunger-Free India: Components of Action Plan

A six-point Action Plan is suggested below for achieving the goal of Hunger-Free India.

2.4.1 Reform of the Delivery System:

2.4.1.1 The overall approach should be life cycle based and involve appropriate supplementation programmes. The delivery systems relating to all nutrition support programmes must be restructured on a lifecycle basis, starting with pregnant women and 0-2 infants and ending with old and infirm persons. An illustrative list of the programmes, which will benefit from a lifecycle based delivery system, is given in the Table below. Elected Panchayats and local bodies should be involved in restructuring the delivery system. All these programmes should be implemented throughout the country.

Table 1: Current Status of Interventions

<table>
<thead>
<tr>
<th>S.No</th>
<th>Stage of Lifecycle</th>
<th>Intervention / Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pregnant Mothers</td>
<td>Food for Nutrition to avoid maternal and foetal mal- and under- nutrition resulting in LBW children</td>
</tr>
<tr>
<td>2.</td>
<td>Nursing Mothers</td>
<td>Support needed for breast feeding, for at least six months</td>
</tr>
<tr>
<td>3.</td>
<td>Infants (0-2 years)</td>
<td>Not being reached by ICDS</td>
</tr>
<tr>
<td>4.</td>
<td>Pre-School Children (2-6 years)</td>
<td>Integrated Child Development Services</td>
</tr>
<tr>
<td>5.</td>
<td>Youth going to School (6-14 years)</td>
<td>Noon Meal Programme</td>
</tr>
<tr>
<td>6.</td>
<td>Youth out of School</td>
<td>Not being attended to</td>
</tr>
<tr>
<td>7.</td>
<td>Adults (18-60 years)</td>
<td>Food for Eco-Development (Sampoorn Gramin Rozgar Yojana), PDS, TPDS, Antyodaya Anna Yojana, Employment programmes under the REGA</td>
</tr>
<tr>
<td>8.</td>
<td>Old &amp; Infirm Persons</td>
<td>Annapoorna and Food for Nutrition Programmes</td>
</tr>
<tr>
<td>9.</td>
<td>Emergencies</td>
<td>Food during natural calamities</td>
</tr>
</tbody>
</table>
2.4.1.2 With regard to the PDS, it is high time we went back from the TPDS to a universal PDS with uniform prices. The allocation per household in the PDS should be based on the number of consumption units in the household. The cost implications of universalizing the PDS are given in the box below.

Box I

**IS UNIVERSAL PDS ECONOMICALLY FEASIBLE?**

1. Let us assume that the PDS is made universal in the sense of reaching around 80 per cent of our population who are either malnourished or at the risk of malnutrition, that is, food insecure. The PDS should only exclude (if necessary by self selection or voluntarily) the richest 20 per cent of our population. So the target group is about 800 million persons.

2. Let us assume that 80 per cent of the population is given the present BPL allocation and price, that is, 35 kg of grain at the subsidized price of Rs 4.15 for wheat and Rs 5.65 for rice.

3. If the economic cost is Rs 1286 per quintal of rice and Rs 983 per quintal of wheat (estimates for 2005-06 in the Economic Survey), then the unit subsidy is Rs 7.21 per kg of rice and Rs 5.68 per kg of wheat.

4. If 800 million persons are to be included, it can be assumed to be 160 million families (average of 5 persons per family).

5. So, first, the grain requirement for the PDS will be 160 million times 35 kg (ceiling) or 56 million tonnes. In 2005-06, the PDS offtake was 49.7 million tonnes (including Antyodaya), so this is quite feasible. (In 2004-05, the offtake was 30 million tonnes).

6. The cost of the food subsidy, assuming all the grain is distributed at the same price will be

   - For 30 million tonnes of wheat: Rs. 17,040 crores
   - For 26 million tonnes of rice: Rs. 18,746 crores
   - Total: Rs. 35,786 crores

The above estimates of a grain requirement of 56 million tonnes and a subsidy of Rs 35,000 crores is an overestimate since all 160 million households are unlikely to purchase 35 kg of grain a month.

Further, the total subsidy works out to just a little over 1 per cent of GDP. If the tax to GDP ratio, which has fallen since 1991, can be raised by 1 percentage point, then this can be easily financed. This expenditure will be more than compensated by the rise in national income arising from higher productivity as a result of eliminating endemic hunger and malnutrition.

Source: Dr. Madhura Swaminathan, ISI Kolkata
2.4.1.3 Besides foodgrain, other essential commodities such as pulses, edible oil, cloth, salt and other essential items of daily consumption should also be distributed by the PDS. This will also help ensure the viability of the PDS outlet. Ration shops should be strengthened and made viable through the provision of appropriate margins or subsidies. To ensure effective utilisation of the PDS by the public, the PDS outlets must remain open on all days. Further, the public must be free to draw their allocations on a weekly basis. Migrants should be able to access PDS allocations in the area where they work.

2.4.1.4 The centralisation that took place under the TPDS should be reversed and State governments should, in the first instance, have the right to determine the required allocation under PDS for their State. PRIs may also be actively involved in the monitoring of the PDS. Women SHGS supported by micro-credit could operate the PDS, wherever possible.

2.4.2 Community Food Security Systems

2.4.2.1 While a universal PDS and appropriate supplementary programmes funded by the government are critical to ensuring food security, there is also an important role for community based food security systems, such as Community Foodgrain Banks (CFB). Community food security systems appear especially relevant in socially cohesive communities characterised by limited income inequality and in locations, which find it difficult to access other delivery mechanisms such as PDS. To ensure sustainability, such initiatives may work closely with elected local bodies. Policy must promote the establishment of Community Grain and Water Banks, involving Panchayats and other local bodies. This programme should be based on the principle “store grain and water everywhere”.

2.4.2.2 The Community Grain / Food Bank system will help to widen the food security base by including a wide range of millets, grain legumes and tubers. While these can be operated by the nearly 240,000 Panchayats and Urban Local Bodies in the country, using flexible implementation mechanisms suited to local needs, the programme should financially supported and regulated by the State to ensure social
inclusion and sustainability. The steps involved in setting up and operating CFBs has been described in detail in Chapter II of the Second Report of the NCF (NCF Second Report, August 2005).

2.4.2.3 There is an urgent need to promote the growth of community water security systems based on a 5-pronged strategy consisting of:

i) Augment supplies through mandatory water harvesting and conservation

ii) Give attention to demand management by eliminating all sources of unsustainable use of water and promoting “more crop and income per drop” methodologies of crop cultivation

iii) Harness new technologies relating to improving domestic water use efficiency, de-salination of sea water, breeding of drought and salinity tolerant crop varieties, bioremediation, etc.

iv) To begin with, each district in the country could develop a sustainable water security system. Community action should however start at the village level.

v) Promote seawater farming through integrated agro-forestry and aquaculture production systems in coastal areas.

vi) Pay attention to water quality. The quality of drinking water is deteriorating due to pesticide and bacterial contamination in ground water. Equal attention should be paid to the improvement of drinking water quality and the augmentation of water supplies. Bioremediation techniques will have to be used for removing arsenic and heavy metals from tube well water.

2.4.3 Eradication of hidden hunger

2.4.3.1 Hidden hunger caused by micronutrient deficiencies must be addressed based on natural food cum food fortification approaches. For example, salt fortified with iron, iodine, minerals and vitamins, coupled with the consumption of beta-carotene rich sweet potato or vegetables will be very helpful to fight hidden hunger. Local SHGs can be trained to make nutritious biscuits as an income earning activity. Nutritional literacy should be promoted at the school level. High priority should go to the elimination of iron deficiency anaemia among pregnant women. The following basic recommendations are made in this regard:

- Food security is a prerequisite for nutrition security. Hence steps taken for mitigation of micro nutrient malnutrition should also simultaneously address Protein Energy malnutrition.
• While food and nutrition insecurity need to be addressed at all stages of life cycle, certain groups such as pregnant and lactating mothers, adolescents and children under three years of age need to be given special attention because of their physiological needs.

• Food and nutrition security needs to be addressed through integrated complementary strategies, namely dietary diversification, supplementation, food fortification and community and public health measures, along the following lines:

  - *Enlarging the Food Basket* – Many millets and other underutilized crops like tubers are rich in micro-nutrients as can be seen in table 2.2 below. They should hence be included in the PDS.

<table>
<thead>
<tr>
<th>Grain</th>
<th>Energy K Cal</th>
<th>Fiber %</th>
<th>Mineral mg</th>
<th>Ca mg</th>
<th>P mg</th>
<th>Iron mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>345</td>
<td>0.2</td>
<td>0.6</td>
<td>10</td>
<td>160</td>
<td>0.7</td>
</tr>
<tr>
<td>Wheat</td>
<td>346</td>
<td>1.2</td>
<td>1.5</td>
<td>41</td>
<td>306</td>
<td>5.3</td>
</tr>
<tr>
<td>Maize</td>
<td>342</td>
<td>2.7</td>
<td>1.5</td>
<td>10</td>
<td>348</td>
<td>2.3</td>
</tr>
<tr>
<td>Finger millet</td>
<td>328</td>
<td>3.6</td>
<td>2.7</td>
<td>344</td>
<td>283</td>
<td>3.9</td>
</tr>
<tr>
<td>Foxtail millet</td>
<td>331</td>
<td>8.0</td>
<td>3.3</td>
<td>31</td>
<td>290</td>
<td>2.8</td>
</tr>
<tr>
<td>Little millet</td>
<td>341</td>
<td>7.6</td>
<td>1.5</td>
<td>17</td>
<td>220</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Compared to Rice:
- **Ragi** is > 34x (times) in Calcium, 5x in Iron, 2x in Phosphorus, 2x minerals
- **Little millet** is 12x in Iron, 1.5x in Calcium and Phosphorus
- **Foxtail millet** is 5x in Minerals, 3x in Calcium, 4x in Iron

- *Dietary diversification* – increased availability of fruits and vegetables through horticulture interventions.

- *Supplementation* – rather than neglecting / abandoning the programmes that are poorly functioning, (such as iron and folic acid supplementation) we need to strengthen them systematically.

- *Food Fortification* – Iodine supplementation through iodized salt should be strengthened to ensure universal availability and accessibility and should be channelized through PDS, MDM and ICDS. Staple food should be given priority for fortification.

- *Community and public health measures* - Since nutritional security is influenced by healthcare, safe water and sanitation, these must be ensured through adequate public health measures.
- Special attention to pandemics like HIV/AIDS – There are indications that the incidence of HIV/AIDS and tuberculosis is increasing in rural India. The supply of free drugs should be extended to villages in order to contain the spread

2.4.3.2 The quality of service delivery needs to be improved. The ICDS is a very critical intervention programme and the *anganwadi* worker plays a key role in the convergence of services for the mother and the child under six years of age. She should be recognized as a regular full time employee with specific skills and her remuneration should be revised accordingly.

2.4.4 New Deal for the Self-employed

2.4.4.1 Between 1993-94 and 2004, the current daily status unemployment rate rose from 5.6% to 9.0% for rural males and from 5.6% to 9.3% for rural females. The corresponding urban increases were from 6.7% to 8.1% for males and 10.5% to 11.7% for females.

2.4.4.2 Rural employment grew at 0.67% and agricultural employment at 0.02% between 1993-94 and 1999-2000. According to the 55th round of survey of NSSO, the share of self-employed in 1999-2000 was about 53%. Of the self-employed, 58% (133 to 134 million) were in the primary sector, i.e., agriculture and allied activities.

2.4.4.3 Detailed analysis of the causes of food insecurity in rural and urban India have revealed that inadequate purchasing power due to lack of job/livelihood opportunities is now the primary cause of endemic or chronic hunger in the country. Since opportunities for employment in the organized sector are dwindling, we have to create a policy environment that enlarges opportunities for remunerative self-employment in rural India in order to avoid an era of jobless, or worse, job-loss economic growth.

2.4.4.4 It follows from our brief review of the employment scenario during the period of economic reforms that the policies of indiscriminate liberalisation, privatisation and globalisation, which, have contributed a great deal to the rural and agrarian crisis, should be reversed. The economic policies should be reoriented to provide adequate support for India’s agriculture and its vast rural population. In particular, policies must provide
adequate rural infrastructure and promote employment, besides ensuring credit facilities and remunerative prices for produce for our farmers.

2.4.4.5 The unfinished agenda of land reforms must be completed including, distribution of ceiling surplus land and attention to common property resources such as public land and water. There should be substantial increase in public investment in agriculture-related infrastructure such as irrigation and drainage, land development, water conservation, development of road connectivity etc. Such investments are specially needed in the poorer and low rainfall areas of the country.

2.4.4.6 Substantial investments need to be made in health and education especially for the rural population. This, along with reversal of macroeconomic policies so as to enhance aggregate demand, will enhance the prospects of the growth of rural employment.

2.4.4.7 Agriculture, comprising crop and animal husbandry, fisheries, forestry and agro-forestry and agro-processing, is the largest private sector industry in India, providing livelihood opportunities for over 600 million women and men. There is need to intensify efforts to create more opportunities for gainful livelihood opportunities in both the farm and non-farm sectors. According to FAO, malnutrition is high in areas where a very high percentage of population depends solely on agriculture for their livelihood. One reason for the high prevalence of hunger in villages is inadequate growth in opportunities for remunerative non-farm employment.

2.4.4.8 The menu of income earning opportunities for the self-employed needs to be enlarged. This calls for a paradigm shift from micro finance to livelihood finance. Micro-credit Banks should be developed into Sustainable Livelihood Banks (SLB), through backward linkages to technology and credit and forward linkages with management and market. NCF had recommended in its first report that all the existing Krishi Vigyan Kendras (KVKs) should be provided with a post-harvest technology wing. In addition, there is an urgent need for at least 50 SHG capacity building and mentoring centers in every State, to enhance the management and marketing capacities of members of the SHGs. Such centers can be established in existing institutions like
Agricultural, Rural and Women’s Universities, IITs, institutions operated by NGOs, etc. Village Knowledge Centres can provide SHGs with e-commerce facilities. Accounting software will have to be introduced. SHGs will be sustainable in the longer term only if they have backward linkages with technology and credit, and forward linkages with management and marketing. Sustainable Self-help Groups (SSHGs) will emerge only if we build the capacity of the key members (both women and men of SHGs). The **SHG Capacity Building and Mentoring Centres** may be financially supported by the Union Ministry for Rural Development. This should be an essential component of the **New Deal for the Self-employed**.

### 2.4.4.9 Regarding the livestock sector

There is a need for establishing a **Livestock Feed and Fodder Corporation** to assist communities, including SHGs, to produce good quality animal feeds. These may also develop into bodies, which provide seeds and planting material of improved varieties for local production. The production can be sourced and supplied by decentralized Community Feed and Fodder Banks. At present, such banks which are of great use during calamities like drought, are generally not accessed during normal season when green fodder is available in plenty, making their operation non-viable. This can be avoided by linking their operation with complete feed production units at the village level managed by veterinary graduates that will also provide local employment. The feed units should source inferior quality biomass such as dried grass from forests or agricultural by-products like paddy straw, sugarcane bagasse and mix them with concentrate and feed additives to enrich the nutritive value and compact into bricks or blocks. Special feed can be prepared for different categories of animals, growing and milching animals, dairy sector etc, depending on the local demand. Such village level complete feed production units are in vogue in Israel and can be a boon for the landless in our country to access quality fodder. The unsold fodder from the Feed and Fodder Banks can be converted into complete feed for supplying to needy farmers not only in the locality but also other areas including peri-urban areas where large numbers of landless maintain livestock. The Banks can also have linkages with procurement agencies and district administration for supplying surplus feed to needy agencies.
2.4.4.10  Agri-clinics operated by veterinary and farm science graduates can help enhance the income of dairy farmers through higher productivity. This can also help improve the nutritional value of the food basket of our population.

2.4.5  Enhancing the Productivity and Profitability of Small Holdings

2.4.5.1 Nearly 80% of the land holdings in India are below 2 ha in size. Unlike in industrialized countries where only 2 to 4% of the population depends upon farming for their work and income security, agriculture is the backbone of the livelihood security system for 2/3 of India’s population. Therefore, farmers constitute the largest proportion of consumers. The smaller the farm, the greater is the need for marketable surplus in order to get cash income. Hence, improving small farm productivity, as a single development strategy, can make the greatest contribution to the elimination of hunger and poverty.

2.4.5.2 Indian soils are both hungry and thirsty. Hence, soil health enhancement and irrigation water supply and management hold the key to the enhancement of small farm productivity. The following steps are urgently needed:

i) National network of advanced soil testing laboratories with facilities for the detection of micronutrient deficiencies. As a single agronomic intervention, supply of the needed micronutrients in the soil has the greatest impact on increasing yield. Hidden hunger is as widespread in soils as in human beings. In fact, the two have causal relationships.

ii) Million Wells Recharge Programme

iii) Restoring water bodies and promoting mandatory water harvesting.

iv) Establishment of 50,000 Farm Schools to promote farmer-to-farmer learning.

v) Organisation of Small Farmers’ Horticulture, Cotton, Poultry, aquaculture and other Estates, to promote group farming and to confer the power of scale to small producers both at the production and post-harvest phases of farming.
2.4.5.3 Farming is becoming a gamble both in the monsoon and the market. Hence small farmers urgently need proactive advice on land and water use. Land use decisions are also water use decisions. For this purpose, State Land Use Boards should be restructured, retooled and reactivated on the lines indicated in Fig 1. *This is a task of the utmost priority.*

2.4.5.4 The *Every Village a Knowledge Centre or Gyan Chaupal* movement can help to give farmers dynamic advice on meteorological, management and marketing factors.

2.4.5.5 We suggest that the following areas may receive priority in technology support:

i) Short and medium term weather forecasting, in order to assist Land Use Advisory Boards to give proactive advice to farmers on crop and varietal choice.

ii) Rapid and low cost soil testing technologies based on nanotechnology. This will enable the application of need based macro- and micro- nutrients. Factor productivity in relation to fertilizer application is low now and this enhances the cost of production. The average fertilizer response of food grain output to NPK utilization works out to 7.8 kg grain per kg of NPK. This is a very low return.

2.4.5.6 Unless factor productivity is increased, small farm agriculture will become un-remunerative. This is one of the causes for a high percentage of farmers wanting to quit farming. We must recognize the need for increasing the productivity and profitability of small and marginal farms, in order to eliminate endemic and hidden hunger in the families such farmers. The following specific recommendations are made in this regard:

- Step-up public investment in irrigation and rural infrastructure and provide other forms of State support including credit and post-harvest storage and processing

- Provide credit on reasonable terms; accept NCF recommendation of 4 per cent interest rate on agriculture loans. Target credit to the marginal, small, and medium farmers and adopt an integrated credit cycle approach.
• Strengthen the S&T and R&D systems in agriculture to generate and disseminate small farmer friendly technologies, including with respect to seeds, other inputs, water harvesting and machinery, using the KVKs, VKCs etc…

• Ensure the availability of quality inputs at reasonable prices, by putting in place an appropriate regulating system and strengthening extension.

• Expand the MSP system, based on the cost of production including reasonable rate of return on investment and ensuring a prompt and open-ended purchase for all major crops.

• Cover small farmers adequately through effective crop insurance schemes using the revenue village as the unit.

• Encourage research on technology for dry-land farming and make these technologies available to small and marginal farmers. The recently established National Rain fed Authority can have as its sole mandate the launching of a second green revolution in dry farming areas beginning with pulses and oilseeds.

• Promote water security through sustainable water use and rainwater harvesting.

2.4.6 Designing and introducing a Food Guarantee Act

2.4.6.1 We have over a century of experience in organizing relief work, under the provisions of the Famine Code in the colonial period, and Food for Work programmes in the post-independence period. It is clear that our agriculture has reached a stage when farmers will grow more only if we can consume more. A National Food Guarantee Act, combining the features of the Food for Work and Employment Guarantee Programmes, will represent a win-win situation both for producers and consumers. Following up on the NREGA and recognising that the right to food and the right to livelihood are intimately related, we need to move towards a comprehensive “Food Guarantee Act”.

2.4.6.2 A National Food Guarantee Act should lead to a decentralized network of grain storage structures and thereby help to prevent panic purchase of foodgrains during periods of drought or flood. They will also help to prevent distress sales by producers at the time of harvest. In addition, it will help to enlarge the composition of the food security basket.
2.4.6.3 Brazil, Kenya and a few other countries have announced, “Zero Hunger” programmes. **India can take the lead to give meaning and content to the zero hunger concept, by developing a National Food Guarantee Act.**

2.4.6.4 The major features of a National Food Guarantee Act were discussed at a Consultation held at the M S Swaminathan Research Foundation (MSSRF), Chennai, on 19 June 2005. The participants made the following suggestions:

- The main aim of the proposed legislation should be to integrate the features of Employment Guarantee Acts (National and Maharashtra) and Food for Work Programmes, in order to ensure that every child, woman and man has physical, economic, social and environmental access to balanced diet, clean drinking water and primary health care. This is fundamental to providing every individual in the country an opportunity for a healthy and productive life. Rural and urban populations as well as migratory labour families will have to be covered. Social inclusion should be the bottom line.

- The National Food Guarantee Act should be gender sensitive. The concept of “work” should be enlarged to cover also skilled work related to human and social development, such as, for example, establishing and running crèches, balwadis, preparing noon meals, etc.

- Payment of a part of the wage in the form of foodgrains has the double advantage of helping farmers in the area of marketing, and consumers in the form of obtaining their basic caloric requirements in the form of good quality foodgrains at a reasonable price. This will also help to enlarge the composition of the food security basket.

- Food guarantee can become a reality only if there is an implementation mechanism characterized by low transaction cost, transparency and freedom from corruption. The Gram Panchayats / elected local bodies may be able to provide such a mechanism. The Gram Panchayat / Local Body can form in the respective villages a Consortium of Agencies like SHGs, Mahila Mandals, Farmers’ Clubs etc, to provide oversight to the implementation of the integrated food for work and employment guarantee approach to the
elimination of hunger and poverty. **The Panchayat can thus provide a platform for partnership at the grass root level.** However Panchayats will need the necessary legal, financial and technical empowerment. There are a large number of tasks, which are assigned by Constitution Amendment 73 to Panchayats, but they have no capacity to discharge these responsibilities since they have not been legally or financially empowered to do so. Capacity building of women and men Panchayat members in undertaking such tasks has to proceed concurrently with financial empowerment.

- Information empowerment on entitlements is vital for success. Household entitlement cards can be distributed and full use could be made of Mission 2007: Every Village a Knowledge Centre Programme. The Right to Information Act will also facilitate the process of empowering the rural poor (often illiterate) in understanding their entitlements under various pro-poor schemes of Central and State Governments.

- Training and capacity building of all concerned with the implementation of the programme is extremely important. Suitable institutions will have to be identified for imparting training to administrators, Panchayat leaders, SHGs and others who will be involved in implementing the Food Guarantee Act.

- The Act should provide scope for including feasible land reform measures like providing dalits and the poor with space for a homestead garden where the needed vegetables and fruits can be grown. SHGs can also be given space on lease in common property land for raising nutrition gardens and fodder for farm animals.

- Integration with primary health care is exceedingly important. For example, de-worming should be made compulsory at least once in two months. Multiple fortified salts could be used in noon meal programmes in order to attack the problem of hidden hunger caused by micro nutrient malnutrition.

- The Act could stimulate a movement for storing grain and water everywhere through community food and water banks. A national network of community food banks could be established.
Nutrition and education are fundamental to enabling every individual to experience a productive and healthy life. Therefore the enactment of a Food Guarantee Act will be the best method of ensuring that we are able to accomplish the UN Millennium Development Goals.

Thanks to the extensive work done both within the country and outside on issues relating to “Right to Food”, there is considerable legal and technical expertise available for preparing a framework for Food Guarantee. We should therefore proceed with this initiative.

It will be appropriate to operationalise the Food Guarantee Act on August 15, 2007, which marks the 60th anniversary of India’s independence.

2.4.6.5 The twin advantages of this approach will be higher food production induced by enhanced consumption and the achievement of the UN MDG relating to hunger and poverty.

2.5 Road Map for Eliminating Hunger

2.5.1 In a country with a high prevalence of poverty and malnutrition, the Government of India should always retain a commanding position in the management of the food security system. This will call for a grain purchase policy, which takes into account the changes in the cost of production, (such as a rise in diesel price), subsequent to the announcement of a Minimum Support Price (MSP). Traders will give a price above MSP when they expect that prices will shoot up within a few months. As Prof Amartya Sen has often stressed, we should not forget the lessons of the Bengal Famine of 1942-43, where millions died of starvation not because there was no food in the market, but because the surplus food stocks were in the hands of private merchants. Building a sustainable food security system will require attention to both the availability of sufficient stocks and who controls them. The global wheat stocks are down this year and the political leadership of the country should decide how to ensure the food security of 1.1 billion children, women and men in an era where much of the foodgrain stocks will be controlled by national and international grain traders and cartels. National Food Sovereignty should not be lost.
2.5.2 While import of wheat, pulses, sugar and oilseeds may be necessary during 2006 in order to prevent an undue rise in prices, we should avoid the danger of making this a habit. Our food budget should be managed with home grown food since agriculture is the backbone of our rural livelihood security system. **What is important is to recognize that imports of pulses and oilseeds serve as indicators of our failure to launch a green revolution in dry farming areas, in spite of having the technologies and resources to do so.** Imports of crops of importance to the income security of farm families in rainfed areas imply generating more unemployment and misery in such areas. Import/ export of pulses, oilseeds and wheat should be resorted to only when absolutely necessary.

2.5.3 Water is a critically important resource for agriculture. Increasing privatization of our food and water security systems has important implications for the food, income and work security of small and marginal farmers and agricultural labor. The WTO agreement entered into at Marrakesh in 1994 resulted in an unequal trade bargain. **The growing privatization of food and water security systems is already leading to an unequal social bargain.** We will never be able to achieve the UN Millennium Development Goal in the area of hunger and poverty elimination, if we do not insulate the farmer-consumers from unfair trade and social bargains.

2.5.4 If we are to achieve a second green revolution covering rain fed areas, the first important requisite is opportunity for assured and remunerative marketing for dry land farm products like pulses, oilseeds, millets, vegetables, fruits, milk and meat. The decision to purchase and include ragi, bajra, jowar and other millets in PDS should be a permanent one. This will help to enhance nutrition security on the one hand, and the productivity and economic sustainability of improved dry land agriculture, on the other. There is a large untapped reservoir of dry land farming technologies and we can see a drastic rise in the productivity and production of crops in these areas if farm families are supported by credit, insurance, a fair price and assured market for their produce.
2.5.5 The six-point action plan outlined in this chapter is based on the considerations set out above. The plan recognizes that the problem of food security is both multidimensional and cuts across the rural-urban divide. Since urban food insecurity and deprivation are closely related to rural deprivation, a comprehensive rather than a sectoral approach is required. The six points in brief are:

- Reorganise the delivery of nutrition support programmes on a life-cycle basis with the participation of Panchayats and local bodies.
- Eliminate micronutrient deficiency induced hidden hunger through an integrated food cum fortification approach.
- Promote the establishment of Community Food and Water Banks operated by Women Self-help Groups, based on the principle ‘Store Grain and Water everywhere’.
- Help small and marginal farmers to improve the productivity, quality and profitability of farm enterprises and organize a Rural Non-Farm Livelihood Initiative.
- Introduce support systems to SHGs to make them economically and organizationally sustainable. Establish for this purpose SHG Capacity Building and Mentoring Centres and focus on developing Micro-Credit Banks into Sustainable Livelihood Banks.
- Formulate a National Food Guarantee Act continuing the useful features of the Food for Work and Employment Guarantee programmes and introduce it on 15 August, 2007, which marks the 60th anniversary of our independence. The Food Guarantee Act will be a powerful tool in achieving the goal of a hunger-free India. By increasing demand for foodgrains as a result of increased consumption by the poor, the economic conditions essential for further agricultural progress can be created.

2.5.6 Organisation is the greatest human invention of all time. Organization is the social technology through which human beings accomplish together far more than can be accomplished individually. This is why we have placed great emphasis both on PRIs and SHGs for overcoming the chronic problems of hunger and low productivity.
2.6 Assuring Income Security to Farmers through Minimum Support Price, and Food Security for the Nation through a Universal PDS

2.6.1 We have proposed a comprehensive and integrated Food and Nutrition Security System, which if accepted and implemented, will help to make hunger history. An important requisite for achieving these goals is the development of an income and work security system for small and marginal farmers and landless rural manual labour.

2.6.2 There is ample evidence in the country to show that our farm families will produce not only more foodgrains, but also horticultural and animal husbandry products provided they have opportunities for assured and remunerative marketing. Progress in the production of milk and poultry products was triggered by access to remunerative prices and markets. We therefore suggest the following operational procedure:

- Announce the MSP for a wide range of crops of importance to PDS before sowing, taking into account the recommendations of CACP.

- Fix the procurement price at the time of harvest, taking into account the prevailing market price. The procurement price will take into account the cost escalation in inputs like diesel, since the announcement of MSP.

- Since Government purchases are for ensuring a hunger-free India, issue a Smart Card or coupon which will entitle those farmers who sell their produce to PDS, purchase inputs like seeds, fertilizers, veterinary pharmaceuticals etc., at concessional prices (such as ten percent less than the market price). This will be an appropriate recognition of the contributions of farm families who have decided to participate in the National Movement for Making Hunger History

2.6.3 Through the above 3-pronged strategy, both, national food security and sovereignty, as well as freedom to farmers to get the best possible price, can be achieved. Large companies which wish to purchase essential commodities at a little
higher price than that offered by Government, in the expectation of making large projects later, can also be kept under check. We request that the above 3 principles may be considered and adopted in an appropriate manner as soon as possible.

2.6.4 For ensuring food security, we should move immediately to a Universal PDS as elaborated in section 2.4.1

2.7 National Food Security and Sovereignty Board

2.7.1 Keeping inflation under check by making essential commodities available in adequate quantities and at affordable prices must be a national resolve rather than just the commitment of a few political parties. Food is the first among the hierarchical needs of a human being. Therefore, eradicating hunger arising from deprivation must be a national commitment and an All Party endeavor. Given the necessary fusion of political will and action, professional skill and peoples’ participation, we can make speedy progress in achieving Gandhiji’s goal of ensuring that the God of Bread resides in every home and hut in our country. We suggest that for providing political commitment and oversight to the “Make Hunger History Movement”, a National Food Security and Sovereignty Board may be set up with the following composition:

- Prime Minister – Chairperson
- Union Minister for Food and Agriculture
- Union Ministers of Finance, Rural Development, Water Resources, Panchayati Raj, Commerce and Environment (other Ministers could be invited in accordance with the agenda)
- Leaders of all national political parties
- Chief Ministries of a few States representing both food deficit and food surplus States
- An eminent professional in the area of Food Security – Member Secretary

2.7.2 With the approval of the Chairperson, other Ministers from Central and State Governments and appropriate Secretaries to Government could be invited to participate in the meetings of the Board, based on agenda items.
2.7.3 Such a National Food Security Board can help to keep sustainable food security and sovereignty as a **National Common Minimum Programme** (in the same manner that UN MDGs represent a global common minimum programme for Human Security).

2.7.4 While the principal terms of reference to the National Food Security and Sovereignty Board should relate to the operation of MSP and PDS and the maintenance of a food security reserve, it should also review from time to time the progress being made in achieving a 4% growth rate in foodgrain production and 8% growth rate in horticulture, animal husbandry and inland and marine fisheries. Emphasis should be on food security with home-grown food, for the reasons explained earlier. Also, the Board should provide oversight to issues such as the diversion of prime farmland for non-farm purposes, and supply augmentation and demand management with reference to irrigation water.

2.7.5 The Board may also review periodically the progress being made in ensuring adequate availability of cereals and other components for a balanced diet through the following action points suggested by NCF in its Third Report (December, 2005):

- Soil Health Enhancement
- Water harvesting, aquifer recharge, conservation and efficient use of irrigation water for achieving more income per drop of water
- Credit and insurance
- Technology (production and post-harvest), and inputs for Mixed Farming Systems (i.e., crop – livestock integrated fish production systems).
- Assured and remunerative marketing

2.7.6 India is likely to have the world’s largest population by 2040 or even earlier. We also have the world’s largest farm animal population, which need feed, fodder and water. The human and animal population supporting capacity has already been exceeded in many fragile ecosystems. **It will therefore be appropriate for the National Food Security cum Sovereignty Board to foster the concept that children should be born**
for happiness and not just for existence, a concept propounded by the French Mathematician Marquis de Condorcet in 1895.

2.7.7 Also, as suggested in the earlier reports of NCF, there is need for nutritional support to families affected by HIV/AIDS, Tuberculosis, Malaria and Leprosy. Mere drug-based approaches are not adequate for the poor. Therefore a food cum drug based approach should be the approach of the National Rural Health Mission

2.8 Hunger Elimination: Achieving the UN Millennium Development Goals

2.8.1 An analysis by the Union Planning Commission has indicated that we are falling behind in achieving the proportionate targets set for 2015 under the UN MDGs. In particular, we should redouble our efforts to achieve Goal No.1 relating to hunger and poverty. Many of the goals will need integrated attention. For example, MDG 3 deals with gender equity and women’s empowerment. This is vital for achieving the goal of MDG 1. Hence, a Gender Audit Procedure should be incorporated in all programmes and policies

2.8.2 The following are some of the steps needed:

i) Agriculture plays multiple roles and is the guardian and backbone of the food, livelihood and ecological security systems. There is need for greater emphasis on integrated on-farm and non-farm livelihood opportunities, so that work and income security gets enhanced. Market driven Non-farm livelihood opportunities in rural areas are essential for achieving MDG I. A Livelihood Impact Analysis Methodology should be developed for adoption in our development and trade policies and programmes. Importing cheap and subsidized food from industrialized nations, rather than concentrating on helping small farm families to increase productivity and profitability may lead to greater unemployment and rural distress. The option of food imports has to be weighed against the collapse of livelihoods of millions of small cultivators and peasants. We should take the leadership in developing a Livelihood Security Box in the World Trade Agreement in relation to agriculture.
ii) Enhancement of small farm productivity holds the key to the elimination of hunger and poverty in rural areas. **Sustainable enhancement in small farm productivity and profitability should be on the top of the agenda for the 11th Plan. If agriculture goes wrong, nothing else will have a chance to go right.** Protecting and improving the production systems of farmers with small holdings should hence be accorded high priority.

iii) **There has to be a shift in emphasis from food security at an aggregate national level to nutritional security at the level of every individual. Hidden hunger** caused by the deficiency of iron, iodine, zinc and vitamin A in the diet, is widespread. As discussed earlier, a **Food cum fortification approach** will be necessary to eradicate hidden hunger related to micronutrient deficiencies. This will call for reviving dying crops and dying wisdom. The food security basket should be enlarged by including a wide range of millets, grain legumes, tubers and leafy vegetables like *Amaranthus* in the diet. Public distribution and school feeding programmes should include nutritious millets.

iv) An unacceptably high proportion of new born children are characterized by low birth weight (LBW) due to maternal and foetal under nutrition and malnutrition. Such children are handicapped even at birth in their ability to realize their innate genetic potential for mental and physical development. A **Lifecycle approach** should be adopted in nutrition support programmes, with priority going to pregnant women and infants. It is also necessary to emphasise the importance of providing support services to farm women, like crèches and daycare centres.

v) There is rightly much emphasis on mapping the ‘Hunger Hot Spots’ of India. Equal importance should be given to mapping the ‘Agricultural Bright Spots’, which show how to replace poverty with prosperity through agricultural progress. The factors which resulted in agricultural bright spots should be highlighted, so that the message **“we can make hunger history”** can be spread. The need for a **symphony approach** resulting in symbiotic partnerships among farm families, policy makers,
academia, agricultural experts, business and industry, and mass media, cannot be over-emphasised. Assistance should be provided for the growth and spread of Rural Prosperity Symphonies.

2.8.3 The economic, social and political aspects of hunger and poverty are not being recognized adequately; as a result social unrest, ethnic conflicts and resentment leading to violence are increasing. Keeping agriculture at the top of the global and national developmental agenda should be a priority item in our action plans relating to MDG 1. The global trade agenda should also be pro-small farmer. Adjustment of a mix of farm enterprises to maximize economic/market opportunity, as well as the promotion of integrated crop-livestock farming systems are important for the economic sustainability of farming. Agricultural and Rural Universities should undertake Rural Systems Research (RSR), designed to generate concurrent attention to on-farm and non-farm livelihoods in a holistic manner. An effective production system requires substantial knowledge of factors both within and external to the farm. This is where the mobilization of modern communication and information technologies assumes significance.

2.8.4 A self-propelling and self-replicating model of food security is the need of the hour. Through Community Food Banks, we can launch a “Farmers’ Movement for Sustainable Food Security”. This will help to promote a farmer participatory approach to building a sustainable national food security system, based on community level Gene, Seed, Water and Grain Banks. This will help to link conservation, cultivation, consumption and commerce in a mutually reinforcing manner.

2.8.5 Our response to emergencies should be designed in a manner that every calamity becomes an opportunity to strengthen the coping capacity of local communities to meet such calamities better in the future. Life saving crops like tubers should be promoted and crop live saving techniques introduced. In Tsunami affected areas, Coastal Bioshields consisting of mangroves, casuarinas, salicornia and other halophytic plants, should be encouraged. Emergencies are likely to increase in the future, as a result of climate change, and there has to be concerted efforts in avoidance, adaptation and mitigation strategies.
2.8.6 Biosecurity and food safety are gaining in importance. Government of India should help State Governments to increase their competence and capability in these areas. Capacity building is also important in the safe and responsible use of biotechnology as well as in the areas of organic farming, conservation agriculture and precision farming. Support to Conservation farming is needed, on the lines of the support being extended to their farmers by industrialized countries under the Green Box provisions of WTO.

2.8.7 The social engineering aspects of integrated natural resources management, integrated pest management (IPM), integrated nutrient management, etc, need to be emphasized. A purely technocratic approach will not help. Education and social mobilization are equally important. Water harvesting, aquifer recharge, and economic and efficient use of water should become everybody’s business. Scaling up is needed in the case of successful projects. This is where the active involvement of PRIs will be of great help.

2.8.8 Seemingly impossible tasks can be achieved by mobilizing the power of partnerships. South-South collaboration is extremely important in this respect. India should become the hub of a Knowledge Coalition for Sustainable Agriculture and Food Security bringing together CGIAR, FAO, IBRD, IMF, UNDP, WHO, WTO, UNICEF, UNESCO, UPOV, WIPO and all other relevant organizations.

2.8.9 There is no time to relax and Government of India should become the main actor in bringing about convergence and synergy in the area of elimination of chronic and hidden hunger. There should also be a distinction between projects and policy, since bad policy will make even good projects fail. A critical review of earlier programmes will show what is working and what is not working and why. We should also help to resolve conflicts and contradictions among international organisations, as in the areas of Farmers’ Rights and UPOV, and GMOs and WTO.

2.8.10 The UN MDGs represent a global Common Minimum Programme in the area of sustainable human well-being and security. We should therefore not fall behind in achieving these very modest but important goals.
### Table 1: Calorie Intake (Kcal Per Day)

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<th>S. No.</th>
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<th>1-3 year</th>
<th>4-6 year</th>
<th>7-9 year</th>
<th>10-12 year</th>
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Source: NNMB Technical Report No. 21 - "Diet & Nutritional Status of Rural Population"

Note: *NPNL - Non-pregnant & Non-lactating, S Workers - Sedentary Workers; M Workers - Moderate Workers
Table 2: Districts with Daily average Intake of Energy < RDA =2425 Kcal/cu/day

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<td>Sirohi</td>
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</tr>
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</table>

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development
Annexure 2.1

Table 3: Districts with Daily Average Intake of Cereals < RDA = 460 g/cu/day

<table>
<thead>
<tr>
<th>State</th>
<th>Assam</th>
<th>Bihar</th>
<th>Haryana</th>
<th>HP</th>
<th>Punjab</th>
<th>Rajasthan</th>
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<tbody>
<tr>
<td>Total No. of Districts</td>
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<td>16</td>
<td>10</td>
<td>12</td>
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<td>Banka</td>
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<td>Hamipur*</td>
<td>Jalandhar*</td>
<td>Rajsamand*</td>
</tr>
<tr>
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<td>Katihar</td>
<td>Bhiwani*</td>
<td>Shimla*</td>
<td>Ferozpur*</td>
<td>Hanumangarh*</td>
</tr>
<tr>
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<td>Bongaigaon*</td>
<td>Samastipur</td>
<td>Yamunanagar*</td>
<td>Bilaspur*</td>
<td>Kapurthala*</td>
<td>Jhunjhunu*</td>
</tr>
<tr>
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<td>Ranchi</td>
<td>Gurgaon*</td>
<td>Una*</td>
<td>Sangrur*</td>
<td>Sirohi*</td>
</tr>
<tr>
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<td>Karimganj*</td>
<td>Mahendragarh*</td>
<td>Kinnaur</td>
<td>Bhatinda*</td>
<td>Dungarpur*</td>
<td></td>
</tr>
<tr>
<td>6</td>
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<td>Rohtak*</td>
<td>Faridkot</td>
<td>Jaisalmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Kamrup*</td>
<td>Kaithal</td>
<td>Gurdaspur</td>
<td>Kota</td>
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<td>Ganganagar</td>
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<td>Nagaur</td>
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<td></td>
</tr>
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<td>Hailakandi</td>
<td>Karnal</td>
<td>Jalore</td>
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<td></td>
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</tr>
<tr>
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<td>Nagaon</td>
<td>Faridabad</td>
<td>Alwar</td>
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</tr>
<tr>
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<td>Dibrugarh</td>
<td>Ambala</td>
<td>Udaipur</td>
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<td></td>
</tr>
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<td>Jorhat</td>
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<td></td>
<td></td>
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<td>Lakhimpur</td>
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<td></td>
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</tr>
</tbody>
</table>

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development
Table 4: Districts with Daily Average Intake of Pulses < RDA = 40 g/cu/day

<table>
<thead>
<tr>
<th>State</th>
<th>Assam</th>
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<th>Haryana</th>
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<th>Punjab</th>
<th>Rajasthan</th>
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<tbody>
<tr>
<td>Total No. of Districts</td>
<td>22</td>
<td>50</td>
<td>16</td>
<td>10</td>
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<td>31</td>
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<tr>
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<td>Rohtak*</td>
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<td>Ludhiana*</td>
<td>Jaipur*</td>
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<td>Shimla*</td>
<td>Rupnagar*</td>
<td>Jaisalmer*</td>
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<td>Tonk*</td>
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<td>Jind*</td>
<td>Sangrur*</td>
<td>Bundi*</td>
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</tr>
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<td>Sikar*</td>
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<td>Mahendragarh*</td>
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<td>Barmer*</td>
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<td>Faridabad*</td>
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<td>Bhiwara*</td>
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<td>Ajmer*</td>
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</tr>
</tbody>
</table>

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development
Annexure 2.2

MSP and the Cost of Production

An examination of the projections of cost of cultivation for 12 foodgrain crops given by the Commission for Agricultural Costs and Prices (CACP) for the crop season 2005-06 with the MSP prevailing in 2004-05 clearly shows that C2 cost (cost of production per quintal) is not covered by the MSP in most States for the 12 crops. The data for paddy and wheat is given in Tables below. The data shows that only in four of the 12 major States producing paddy in the country, C2 is lower than the MSP and in the case of wheat it is lower than MSP in all the seven producing States except Madhya Pradesh.

Table No.1: Projected Cost of production - Paddy crop (Rs./Qtl) 2005-2006

<table>
<thead>
<tr>
<th>S.No.</th>
<th>States</th>
<th>A2+FL/Qtl</th>
<th>C2/Qtl</th>
<th>MSP (2004-05)/Qtl</th>
<th>Return/Qtl over A2+FL</th>
<th>Return/Qtl over C2</th>
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<tr>
<td>1</td>
<td>AP</td>
<td>399</td>
<td>578</td>
<td>560</td>
<td>161</td>
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</tr>
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<td>2</td>
<td>Assam</td>
<td>436</td>
<td>564</td>
<td>560</td>
<td>124</td>
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<td>365</td>
<td>512</td>
<td>560</td>
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<td>602</td>
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<td>236</td>
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<td>511</td>
<td>560</td>
<td>189</td>
<td>49</td>
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<td>12</td>
<td>West Bengal</td>
<td>445</td>
<td>573</td>
<td>560</td>
<td>115</td>
<td>-13</td>
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</tbody>
</table>

Table No.2: Projected Cost of production - Wheat crop (Rs./Qtl) 2005-2006

<table>
<thead>
<tr>
<th>S.No.</th>
<th>States</th>
<th>A2+FL/Qtl</th>
<th>C2/Qtl</th>
<th>MSP (2004-05)/Qtl</th>
<th>Return/Qtl over A2+FL</th>
<th>Return/Qtl over C2</th>
</tr>
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<td>640</td>
<td>198</td>
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<td>Gujarat</td>
<td>468</td>
<td>617</td>
<td>640</td>
<td>172</td>
<td>-23</td>
</tr>
<tr>
<td>3</td>
<td>Haryana</td>
<td>338</td>
<td>516</td>
<td>640</td>
<td>302</td>
<td>-124</td>
</tr>
<tr>
<td>4</td>
<td>MP</td>
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<td>656</td>
<td>640</td>
<td>209</td>
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<tr>
<td>5</td>
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<td>319</td>
<td>516</td>
<td>640</td>
<td>321</td>
<td>-124</td>
</tr>
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<td>6</td>
<td>Rajasthan</td>
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<td>640</td>
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<td>528</td>
<td>640</td>
<td>281</td>
<td>-112</td>
</tr>
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</table>

Source: Department of Agriculture and Co-operation, Ministry of Agriculture, GOL:"Reports of The Commission for Agricultural Costs and Prices"- 2005-2006

1 Based on paper prepared by Dr. S. Vepa, MSSRF, 2006
2 Paddy, wheat, jowar, bajra, maize, ragi, arhar, moong, urad, barley, gram and lentil
CHAPTER 3
ECONOMIC ACCESS TO FOOD – IMPROVING LIVELIHOOD OPPORTUNITIES AND INCOMES

3.1 Introduction

3.1.1 The rapid growth of population in India, particularly in the second half of the twentieth century posed threat to national food security. The threat reached dangerous proportion in the mid sixties when grain shipments from abroad were eagerly awaited for feeding the population. The situation was untenable and eventually led to launching of the Green Revolution, achievement of self sufficiency in food grains and a growing stock of surplus food grains by the mid seventies. Happily such a threat does not exist any more. Food security has been attained at macro level in the country. However, there was another problem; while large quantities of food grains had accumulated in public stocks, nearly one fifth of our population was underfed according to minimum calorific requirement for a healthy and active life. Nearly 46% of all Indian children under five years age were malnourished\(^1\). This was in stark contrast to the fact that the country had exported food grain with large subsidies. While national level food security [availability of food at macro level] is achieved, at the household level there are serious problems and the situation is quite alarming. It would be recalled that a contrasting problem for a long time was the rising financial and other costs to the State in terms of storage, interest charges, maintenance, quality and value deterioration etc. of the rising food grain stocks and the existence of hunger and malnourishment of the people at the same time.

3.1.2 Food security at the household level is primarily determined by availability of food and the ability of the household to access food. It is intrinsically linked with the source of livelihood and the nature of the public distribution system that is prevalent. The poor have to either be able to grow enough food or must have enough money to be able to buy food. The former would depend on the quality and quantum of land available to the poor and the infrastructure, credit, market intelligence and linkages etc., while the later, in a

\(^1\) United Nation’s Human Development Report [2003]
situation where the poor have little or no land, is linked with the availability of livelihood opportunities and the public distribution system.

3.1.3 Historically, poor households in India relied on traditional, family and community-based mechanisms of social protection to cope with deprivation. The traditional social security system in India was built into family, caste and socio-religious traditions under which food security to a certain extent was provided to the very poor, the service providers etc by the landlords and richer people and also the institutional feeding in Temples/Gurudwaras from the incomes including offerings etc. The kin networking was strong and the disadvantaged members of the community, the physically/mentally handicapped, widows etc were generally seen as the concern of the entire community. The process of change has eroded many of these features of our traditional social practices. Rising population, the emergence of a labour surplus economy and commercialization of agriculture have all contributed towards weakening of the social support systems. At the same time, the modern mechanism of social protection has left many gaps. The social oriented policies of the State are not adequate. Further, the risks/vulnerabilities and aspirations have increased many folds adding to the distress in rural areas. A very fundamental cause of India’s poverty particularly in the rural areas is the less than satisfactory performance of the agriculture sector.

3.1.4 The National Sample Survey data on income generated by farmer households during 2002-2003\(^2\) shows that on average a farmer household on all India basis, earns Rs. 2115 per month of which [Rs. 969 per month i.e. 46% of total income] from cultivation, followed by wages [Rs. 819 per month i.e. 39%] non farm business [236 per month i.e. 11%] and animals [Rs. 91 per month i.e. 4%]. The above monthly income estimates exclude income from rent, interest, dividend etc. The State wise disaggregated data shows considerable variations in per family income as well as the components of the income. The highest per month farmer household income was in Jammu & Kashmir [Rs.5488] followed by Punjab [Rs. 4960], Kerala [Rs. 4004], Assam [Rs. 3161] and Haryana [Rs. 2882]. The lowest income was in Orissa [Rs. 1062] followed by Madhya Pradesh [Rs. 1430], Rajasthan [Rs. 1498], Chhattisgarh [Rs. 1618], Uttar Pradesh [Rs. 1633] and Bihar [Rs. 1634]. In five States the income

from wages exceeded income from cultivation. These states were Rajasthan [62%], Orissa and Tamil Nadu [53-54%], Kerala [50%] and West Bengal [43%]. The proportionate income from animals was highest in Gujarat [[17%], Bihar [15%] and Maharashtra [6%]. The proportionate income from non farm was highest in Kerala and West Bengal [18%], Rajasthan [14%] and U.P and Bihar [11%]. The State wise break up of monthly incomes in given as Appendix- I

3.2 Income from Farming

3.2.1 The major source of income in farmer’s households is income from farming which to a large extent depends on the size of land holding, productivity level and surplus between the cost of cultivation and price of the output. These are discussed in the following paragraphs.

Distributions of Land

3.2.2 Land holdings inequality reflected in land ownership and the technical progress biased against labour had compounded the problem. In 1991-92, the share of the bottom half of the rural households in the total land ownership was only 3.33% and the top 10% was as high as 54.08%. The extremely skewed distribution of land owned by rural household under various classes of farmers [according to land holding criteria] is shown at Table 1.

Table 1: Distribution of Land

<table>
<thead>
<tr>
<th>Land Holding</th>
<th>% Of households</th>
<th>% Of land hold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land less</td>
<td>11.24</td>
<td>-</td>
</tr>
<tr>
<td>Sub-margin holdings [0.01-0.99 acres]</td>
<td>40.11</td>
<td>3.80</td>
</tr>
<tr>
<td>Marginal holdings [1.00-2.49 acres]</td>
<td>20.52</td>
<td>13.13</td>
</tr>
<tr>
<td>Medium holdings [5-14.99 acres]</td>
<td>12.09</td>
<td>37.81</td>
</tr>
<tr>
<td>Large holdings [15 acre +above]</td>
<td>2.62</td>
<td>26.67</td>
</tr>
<tr>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>


3.2.3 It is doubtful that the major part of the 85.29% of the rural households who are either landless [11.24%] or are sub-marginal, marginal and small farmers
[74.05%] could grow enough food to provide nutritional security to themselves and their families keeping in view the productivity standards and the fact that nearly 60% of the land is unirrigated. The NSS Report referred to at paragraph 3.1.4 shows that on average the total monthly income of farmers households for land holding upto 2 hectare was lower than the total consumption expenditure indicating the non viable status of these farmer households. The details are as under [Table 2]:

Table 2: Average Monthly Income from Different Sources, Consumption Expenditure and Net Investment in Productive Assets Per Farmer Household [2002-03]

<table>
<thead>
<tr>
<th>Size of land possessed [hectare]</th>
<th>Income from Wages [Rs.]</th>
<th>Income from Farm [Rs.]</th>
<th>Net Receipt from Farming of Animals [Rs.]</th>
<th>Net Receipt from Non-Farm Business [Rs.]</th>
<th>Total of Col.2 to Col. 5 [Rs.]</th>
<th>Net Investment [Rs.]</th>
<th>Total Consumption Expenditure [Rs.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.01</td>
<td>1075</td>
<td>11</td>
<td>64</td>
<td>230</td>
<td>1380</td>
<td>40</td>
<td>2297</td>
</tr>
<tr>
<td>0.01 to 0.04</td>
<td>973</td>
<td>296</td>
<td>94</td>
<td>270</td>
<td>1633</td>
<td>37</td>
<td>2390</td>
</tr>
<tr>
<td>0.41 to 1.00</td>
<td>720</td>
<td>784</td>
<td>112</td>
<td>193</td>
<td>1809</td>
<td>96</td>
<td>2672</td>
</tr>
<tr>
<td>1.01 to 2.00</td>
<td>635</td>
<td>1578</td>
<td>102</td>
<td>178</td>
<td>2493</td>
<td>151</td>
<td>3148</td>
</tr>
<tr>
<td>2.01 to 4.00</td>
<td>637</td>
<td>2685</td>
<td>57</td>
<td>210</td>
<td>3589</td>
<td>387</td>
<td>3685</td>
</tr>
</tbody>
</table>

Though the above are all India averages, it would appear that most of the farmer households with land upto 1 hectare and many farmers households with land between 1 hectare and 2 hectare may not be earning enough to meet the family consumption expenses.

3.2.4 **Since nearly 75% of the rural households are sub-marginal, marginal or small farmers improving the small farm productivity and profitability as a single development strategy could make the greatest contribution to improve the nutritional security at the household level.** Besides the general steps for raising the productivity and incomes of the farmers [discussed later in the chapter] the specific steps which focus on benefitting small and marginal farmers could be, increased investment in human resources, adequate and timely availability of quality inputs including credit, a fine tuned insurance system to cover production risks, an effective and efficient extension system, arrangements for custom hiring of agricultural machinery and development of low cost machinery for use by these farmers. There is also urgency in completing the unfinished agenda of land reforms; distribution of
ceiling surplus land, attention to common property and wasteland resources and consolidation of holdings etc. However, these would require a strong political will and determination.

3.2.5 The sub marginal/marginal/small farmers face problems in accessing inputs, use of machinery and also lack the power of scale in marketing their produce. The need is to develop and popularize various organisational structures, formal and informal on a win-win basis for all concerned. In the Fourth Report of the National Commission on Farmers, ‘Serving Farmers and Saving Farming-Jai Kisan: A Draft National Policy for Farmers’ some of the methods for providing power of scale to farmers have been discussed. Such methods could include elements of Cooperative Farming, Group Farming by Self Help Groups [informal structure], Small Holder’s Estates and Contract Farming etc. taking care that the models so developed are farmer centric and sustainable.

3.2.6 The tenancy laws could also have important bearing on the total income of the landless marginal/small farmers who have a high stake in the operations of the land lease market in their area. However, the laws relating to tenancy differ in the States. Kerala and Jammu & Kashmir have completely banned leasing out the agricultural land, while in Telangana in A.P, Karnataka, H.P, M.P, and U.P leading out of agricultural land is allowed only in case of certain disabled persons like the widows, minors, personnel of the armed forces etc. Punjab, Gujarat, Maharashtra, Assam and Haryana have not banned leasing of agricultural land but the tenant acquires a right to purchase the leased in land within a specified period of tenancy. In A.P [other than Telangana], Orissa, Rajasthan, West Bengal and Tamil Nadu there are no restrictions on leasing of agricultural land excepting that in West Bengal only the share croppers lease are allowed. In the tribal areas of A.P, Orissa, M.P and Maharashtra only competent authority could permit transfer of land. However, the various loopholes and difficulties in actual implementation of these provisions has meant that leasing of agricultural land continues to be done [around 10.36 million hectare was covered by lease arrangements in 1991-92 which formed nearly 8.2% of the total cultivated area] but in most places in a concealed manner and generally on a year to year oral lease basis with all its attendant evils, which could be more exploitative to the landless, marginal and small
farmers. The increasing cost of cultivation, falling returns, low overall surplus, non availability of irrigation and problems in accessing institutional credit are some of the factors leading to leasing out land by small/marginal farmers.

3.2.7 The tenancy laws have to be such as to encourage all sections of rural population to participate in the land lease market depending upon their resources, availability of off farm/non farm employment opportunities, the wages rate, cropping pattern and income possibilities from use of land in agricultural and activities allied to agriculture. **However, there should be no fear of loss of leased out land to others.** In areas where agriculture is well developed, wages are high and non-farm employment opportunities broad based, it may be an attractive alternative for small/marginal farmers to lease out their land and take up wage employment/start an independent tiny/micro enterprise if the law assures them that they would not be deprived of their land. On the other hand, in States where agriculture is relatively backward, wages low and alternative employment opportunities limited, the small/marginal farmers could lease in land from medium and big farmers who may like to migrate to urban areas for non-land based employment/business opportunities. Thus, a well thought out land lease policy which could protect the rights of farmers leasing out land, could benefit the farmers in increasing the size of their operational holdings for securing scale economies or alternatively encourage marginal/ sub marginal farmers to exit farming and try to earn their income from wages/business etc. while at the same time getting rent for their leased out land. In certain States, the fall out of the existing restrictive tenancy laws is that many of the farmers opt to keep land follow in the event of their moving to the towns/cities for employment/business. This not only adversely affects production but also leads to deterioration of the quality of land. This phenomena is more widespread in UP, Karnataka, Kerala, HP, Jammu & Kashmir, AP where leasing of land is either completely banned or is allowed only in the case of certain disabled categories like widows, minor, armed forces personnel etc. **A more rational and liberal tenancy system could make a substantial favourable impact on the livelihood pattern of the rural households.**

3.2.8 The landless households in rural areas may be provided with some land which would give them space for at least kitchen gardening and animal rearing to
enable them to enhance their household income and improve nutrition security to some extent.

Productivity of Agriculture

3.2.9 Apart from the size of holding, the productivity levels primarily determine the income of the farmers. Unfortunately, the per unit area productivity of Indian agriculture is much lower as compared to other major crop producing countries [Table 3]. There are also wide gaps in the yield among and within States.

<p>| Table 3: Comparative Yield of Select Crops in Various Countries [1959][Kg/ha] |
|---------------------------------------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Country</th>
<th>Paddy</th>
<th>Wheat</th>
<th>Maize</th>
<th>Groundnut</th>
<th>Sugarcane</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>2929</td>
<td>2583</td>
<td>1667</td>
<td>913</td>
<td>68,012</td>
</tr>
<tr>
<td>China</td>
<td>6321</td>
<td>3969</td>
<td>4880</td>
<td>2799</td>
<td>85,294</td>
</tr>
<tr>
<td>Japan</td>
<td>6414</td>
<td>-</td>
<td>-</td>
<td>2336</td>
<td>-</td>
</tr>
<tr>
<td>USA</td>
<td>6622</td>
<td>2872</td>
<td>8398</td>
<td>3038</td>
<td>80,787</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4261</td>
<td>-</td>
<td>2646</td>
<td>1523</td>
<td>-</td>
</tr>
<tr>
<td>Canada</td>
<td>-</td>
<td>2591</td>
<td>7974</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vietnam</td>
<td>3845</td>
<td>2711</td>
<td>4313</td>
<td>1336</td>
<td>65,689</td>
</tr>
</tbody>
</table>

Source: Agriculture At a Glance [2002] Ministry of Agriculture

3.2.10 Higher growth in productivity in agriculture would require substantial increase in public investment in agriculture related infrastructure particularly in irrigation and also in drainage, land development, water conservation, research development and road connectivity etc. The most disquieting feature of Indian agriculture is the decline in real investment in irrigation in recent years. Management of public sector investment in irrigation, power, roads etc needs improvement. The capital formation in agriculture which was 1.6% of the GDP in 1993-94 had declined to 1.3% of the GDP by 2000-01. Similarly the share of agriculture and allied sector in the total gross capital formation declined from 14.3% in 1970-71 to 7.1% in 2000-01. This trend needs to be reserved. Public sector investments are specially needed in the poorer, low rainfall areas of the country, which must now play a larger role in achieving rapid agriculture growth. These areas do not attract much private investment, which generally prefer irrigated and developed areas. It is expected that the increased public sector investment in such areas would also attract private on farm investments and also in due course increased investments in agro-based industries. The Bharat Nirman Programme and its implementation is expected to improve the
rural infrastructure including creation of additional irrigation, rural roads, improved telephone connectivity and power.

3.2.11 Soil health and seeds need urgent attention. A national network of advanced soil testing laboratories with facilities for detection of micronutrient deficiencies could be extremely important. “As a single agronomic intervention application of needed nutrients to the soil could have the greatest impact on increasing yields with a very favourable cost benefit ratio”. The KVKs could have a key role in the above development, information dissemination to farmers and in creating a low cost trained manpower in agriculture in rural areas. However, for the above purposes, the KVKs will have to strengthened, restructured [where necessary] and the staff trained adequately. Effective linkages between the KVKs and the local department of agriculture also need to be established and strengthened. Seed availability and seed replacement rates need attention. There is not only mismatch between seed availability and demand of seeds of different varieties, there is also a serious problem about the assurance of quality and prices of particularly the genetically modified seeds.

3.2.12 Investment in watershed development and the water saving technologies in the rainfed areas could help in improving the incomes of the rural households considerably. Access to even limited irrigation [small water ponds filled up by rain water] could overcome drought conditions during critical growth periods, which could substantially increase production and incomes.

3.2.13 Agricultural research which could help the farmers to diversify into higher value products and developing technologies which could reduce the impact of long dry period on crops and enable them to have a diversified income flow by mix of crops, horticulture, tree crops and animal husbandry could help in stabilising their incomes. The research which focuses on crops that are high in nutrients and crucial to the well being of the poor could be of particular benefit to them. The agriculture research has to become both farmer and market oriented. With privatization of research in other countries the farmers have to pay a high price for its usage. The need is to increase investment in local research and make the research institutions accountable.
3.2.14 The increasing complexities of production and marketing requires information dissemination and training in use of modern technologies. The weakening of the extension services in the public sector and negligible progress of private extension support, inspite of Government efforts in this direction has created a vaccume. The farmers often rely on input dealers for advice which is based more often than not on ‘business considerations’ and rarely on knowledge. Extension system needs a relook with the objective of developing both top down and bottom up flow of information between farmers, extension workers and researchers and development/dissemination of locations specific farm technologies.

Profitability in Agriculture – Income of the Farmer

3.2.15 The economic access to food for the farm households ultimately to a large extent depends on the Farm Business Income [FBI], i.e., the difference between the value of output produced and costs actually paid out. In the State of the Indian Farmer: A Millennium Study-Cost of Cultivation and Farm Income-Dr. Abhijit Sen, it was observed that per hectare real FBI had increased in every State during the 1980s, but in most States peaked in mid 1990s. In Karnataka, Maharashtra, Orissa, Bihar and Gujarat, real FBI per hectare was lower at the end of the 1990s decade than at the beginning. The all India rate of growth of real FBI per hectare decelerated sharply from 3.21 per year during the 1980s to 1.02 p.c. per year during the 1990s. Keeping in view that the number of cultivators during 1990s grew at 1.44% p.a. and the cropped area by only 0.45% p.a. in the same period, means that the real FBI on All India basis during the 1990s remained almost static [growth rate of about 0.03 p.c. per annum]. The study further reveals that only in Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Rajasthan, Punjab and West Bengal the actual average land holding was bigger than the minimum required to keep the farm family above the official poverty line; it would appear that a very large number of farmers households are unable to generate adequate income from their farms.

3.2.16 During the nineties the profitability in agriculture declined by 14.2% mainly due to stagnancy in yield growth and increase in prices of inputs outpacing the
increase in prices of output\(^3\). The margin deteriorated particularly for cotton, almost all coarse cereals and oilseeds. Even if we look at the latest cost of cultivation for major food grain crops for 2005-06 [CACP data] and compare it with MSP prevailing in 2004-05, it would appear that the C2\(^4\) costs were not covered even by MSP in many States. It would be extremely unlikely that in long run farmers would continue to cultivate those crops where the C2 costs are not recovered. Some details are given below:

<table>
<thead>
<tr>
<th>Name of the Crop</th>
<th>States where the C2 cost projection by CACP for 2005-06 were not covered by MSP of 2004-05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>A.P, Assam, Haryana, Karnataka, Kerala, M.P, Tamil Nadu &amp; West Bengal</td>
</tr>
<tr>
<td>Jowar</td>
<td>A.P, Karnataka, M.P, Maharashtra &amp; Tamil Nadu</td>
</tr>
<tr>
<td>Bajra</td>
<td>Gujarat, Haryana, U.P, Maharashtra</td>
</tr>
<tr>
<td>Ragi</td>
<td>Karnataka, Tamil Nadu</td>
</tr>
<tr>
<td>Moong</td>
<td>A.P, Maharashtra, Orissa &amp; Rajasthan</td>
</tr>
<tr>
<td>Urd</td>
<td>M.P, Maharashtra, Orissa, Rajasthan &amp; Tamil Nadu</td>
</tr>
<tr>
<td>Gram</td>
<td>Haryana, Rajasthan</td>
</tr>
<tr>
<td>Barley</td>
<td>Rajasthan</td>
</tr>
</tbody>
</table>

The above data is quite indicative of deterioration in farm incomes mainly due to increasing costs and near stagnation of yields, poor output prices and lack of support in marketing.

3.2.17 Besides other factors, the deceleration in rates of input use growth has also contributed towards deceleration in yield growth though the potential for yield growth

\(^3\) The details are as under:

<table>
<thead>
<tr>
<th>Period</th>
<th>Prices Paid for Intermediates</th>
<th>Output Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-91</td>
<td>104.2</td>
<td>112.3</td>
</tr>
<tr>
<td>2000-01</td>
<td>223.0</td>
<td>24.8</td>
</tr>
<tr>
<td>% change</td>
<td>114.4</td>
<td>100.2</td>
</tr>
</tbody>
</table>

1990-91 & 2000-01

Source: State of Indian Farmer: A Millennium Study- An Overview- Dr. Y.K. Alagh

\(^4\) C2 includes all expenses in cash and kind incurred by the farmer, interest on the value of owned capital assets excluding land, rental value of owned land [net of land revenue], rent paid for leased in land and imputed value of family labour.
with dissemination and application of known technologies is not yet exhausted. With limitations in increase in prices of output and overcrowding of subsidies, the farm incomes could be enhanced by improving productivity, more efficient use of nutrients, timeliness and qualitative improvement in availability of inputs, better extension, advice and research support, availability of information/knowledge, training, market reforms, improvement in post harvest operations, value addition and providing power of scale to the small/marginal farmers in accessing inputs and marketing of their produce etc. Improvement in risk mitigation systems and support in time of natural disasters are needed. An efficient marketing system with farmer’s organisations as important players could significantly add to farmer’s income from his produce. As a matter of fact farmer’s organisations are needed at various levels of the value chain. The small and marginal farmers suffer loss of income due to distress sale immediately after harvest and are also on receiving end against the Commission agents/traders etc. The APMCs have not given adequate attention to grading, development of village haats and ensuring an efficient business like operations at the market yards [various aspects relating to Marketing Reforms have been discussed in detail in the Third Report of the National Commission on Farmers]. The Minimum Support Prices [MSP] should be protected across the country and the Market Intervention Scheme [MIS] used effectively in the case of commodities which are sensitive in different regions/areas. The banks need to liberally provide pledge loans. However, as there are not many accredited godowns, the bankers may have to rely on storage of produce with the farmers. A system where two separate limits are fixed for Kisan Credit Card holders i.e., one for inputs and a higher limit against produce when the production risks are over would enable the farmers to avoid selling immediately after harvest and thereby get a better price for his produce. **Further, it is very important to provide safety nets to protect the interests of the crops, people and regions which are likely to be affected in the process of globalization.** Bridging the yield gaps between different regions and between the demonstration farms and farmer’s fields require no technology revolution but wide spread adoption of improved practices and timely availability of quality inputs. The WTO provisions need not be cited as a reason for not doing the above. These measures could be introduced in a WTO compatible manner.
3.2.18 The strategies for increasing the productivity and incomes of the farmers discussed in the earlier paragraphs would also improve the ability of the small and marginal farmers to produce larger crops, earn more and improve their access to food to a certain extent. In addition, they will require to augment their incomes from animal husbandry and wages both in farm and non-farm sector etc. Multi stream of incomes is essential for them for spreading the risks, having a more regular and continuous income flow and increasing the total incomes. **However, in the case of landless and sub marginal farmers, reliance may have to be mainly on activities allied to agriculture and non farm and farm employment which would be discussed in the following paragraphs.** The landless require either asset or skill and the social security support for their nutritional security.

### 3.3 Income from Animal Husbandry

3.3.1 Nearly 4% of the farmer household income on All India basis is from livestock. However, in some of the States like Gujarat, Bihar, Maharashtra, Punjab etc. the share of income from animals is higher. The important fact is that the livestock sector is of special importance to small/marginal farmers as it helps to spread the risks and provide a more even stream of income to eliminate seasonable hunger. These activities typically give higher returns per unit of land and are also labour intensive and hence more suited for these farmers. Incidentally, the ownership of livestock is much more egalitarian than the ownership of land in India. The resource poor families own a majority of cattle, buffalo, sheep and goats. Development of animal husbandry could play an important role in augmenting the incomes of small/ marginal /sub marginal farmers. They form the core of the milk production sector. Taken together the small and marginal farmers accounted for 71% of the in-milk bovine stock in 2002-03. The marginal farmers who had only 20% of the in-milk bovine stock in 1970-71 increased it to 31% in 1981-82, to 44% in 1990-91 and to 52% in 2002-03. The major constraints experienced by these dairy farmers relate to fodder, feed and animal health care facilities. As stated in the Fourth Report of the National Commission on Farmers, there is a need for establishing Livestock Feed and Fodder Corporations to assist Self Help Groups to produce good quality animal feeds. Such corporations could be developed into facilitating bodies for providing seeds and planting material of improved varieties to the Self Helps Groups.
etc for local level production. The productivity of our livestock is low and could be easily improved through better nutrition and animal healthcare. Agri-clinics operated by young veterinary and farm science graduates could be extremely helpful to enhance the incomes of the dairy farmers through higher productivity. However, till the private system establishes itself the need is to tone up the working of the extension services from the Government. There is also a need for conserving indigenous breeds of cattle while promoting appropriate cross breeds in our conditions. The cooperatives could play an important role in the development of the dairy sector as shown by our experience particularly in Gujarat and Maharashtra. The sector needs a focused attention particularly in dry and rainfed regions where there is all the more need to add to the incomes of the farmers. The promotion of the livestock sector would also help in improving the nutritional value of the food basket of our population. The lessons of the poultry sector, where the research, management, extension and marketing capabilities of the private sector has helped the development of the sector need to be studied and replicated in the dairy sector.

3.3.2 Keeping in view the importance of the livestock sector in rural incomes, it needs much more attention. However, while contribution of the sector is around 25% of the agricultural GDP, the allocations of plan funds is less than 16% of the total funds allocated to the agriculture sector. The animal power is used for nearly 60% of the cultivated area, bullock cart continues to be an important means of transportation in rural areas and the total value of meat is over Rs.40,000 crore and it provides employment to a very large population but these aspects are generally neglected. The meat sector, particularly the male buffalo calves, goats and sheep have tremendous potential for increasing rural incomes/employment and even exports provided we take up systematic rearing of these animals and create a large number of village abattoirs which are properly linked to the modern integrated abattoirs. Institutional credit could play a significant role in these developments. At present, bulk of the income in case of meat and particularly buffalo meat is cornered by the contractors/agents/middlemen. Establishment of village abattoirs and orderly development of the meat sector could enhance the incomes of the landless/sub-marginal and other farmers who could rear these animals. Similarly improvement in the quality of bullock carts would not only make these more efficient, add to the incomes of bullock cart owners but also reduce wear and tear of the roads.
3.4 income from wages

3.4.1 As stated earlier [paragraph 4.1.4] according to the NSS estimates [2002-03] on an all India basis, wages formed 39% of the monthly income of the farmer households. Further, in Rajasthan, Tamil Nadu, Orissa and Kerala, the wages formed 50% or more of the monthly income. A major connected issue is the low wage rates in rural India, though rising, these are still far too low especially in the context of irregularity in getting wage employment and also the rising expectations. A very large percentage of our population has no marketable skills and either no or little formal education. Currently only 5% of the country’s labour force in the age group of 20-24 years category have undergone formal vocational training, compared to 28% in Mexico, 60 to 80% in most industrialized countries and 96% in Korea. A strategy to improve employment prospects in future will have to be to ensure that all the new entrants to the labour market are equipped with knowledge and skill for high productivity and high quality employment. There are nearly 300 million illiterate adults in India. The literacy rate among males is nearly 50% higher than the females and is about 50% higher in urban areas than the rural areas. Out of approximately 200 million children in the age group of 6-14 years, only 120 million were in school. Further, less than 7% of the children ever pass the 10th standard public examination. Another connected issue is school drop-outs. According to India Vision 2020 [Planning Commission document] unless something is done to drastically reduce drop-out rates by the year 2016, there will be approximately 500 million people in the country with less than five years schooling and another 300 million that will not have completed high school. Very low investments in human capital means extremely low quality, unskilled, low wage rate employment prospects. Our educational system particularly for the rural areas and the vocational education system needs change in respect of location [rural rather than urban for more enrollment from rural areas], strengthening the general education component in vocational training and closer involvement of the private sector in curriculum development. The skill development has to be not only in traditional areas but in many new activities and vocations where a large number of skilled persons are needed. The private sectors including trusts/NGOs etc also need to be strongly supported for establishing vocational training centres. The Government could announce a large number of scholarships, say, a
million each year to rural students particularly from BPL and landless families for pursuing market oriented vocational education.

3.4.2 With the existing situation, the National Rural Employment Guarantee Programme [NREGP] is an important and significant step. Such a programme is strongly justified to provide additional employment opportunities to those segments of the population who had not benefited at all or benefited not adequately from the economic opportunities generated by overall growth of the economy. These are mostly people in areas which lay behind in economic growth and people who have little or no productive assets, depend mostly on wage employment for their subsistence and do not get enough of it. It is not intended to discuss the NREGP here but it is hoped that this would be continued for some years and help in building rural assets which would increase sustainable income generating opportunities in the rural areas and the programme would be implemented efficiently duly favouring the rural women, the tribals and the other distressed/handicapped population. The ultimate mission has however to be to train/retrain and improve the human capital from unskilled to skilled population to participate more vigorously in the process of development and growth.

3.4.3 Structural change in work force is taking place in India though slowly. A comparison of 1999-2000 estimates of the National Sample Survey’s [NSS] 55th Round regarding employment with those of 1961 brings out this shift [Table 4].

### Table 4: Structural Change in Workforce in India, 1961-2000

<table>
<thead>
<tr>
<th>Sector livestock</th>
<th>Percentage of Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1961</td>
</tr>
<tr>
<td>A: Agriculture, forestry and fishing</td>
<td>75.9</td>
</tr>
<tr>
<td>B: Break up into major sectors</td>
<td></td>
</tr>
<tr>
<td>[i] Crop Production</td>
<td>73.4</td>
</tr>
<tr>
<td>[ii] Livestock</td>
<td>2.0</td>
</tr>
<tr>
<td>[iii] Logging, forestry and fisheries</td>
<td>0.5</td>
</tr>
<tr>
<td>[iv] Agricultural Services</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>75.9</td>
</tr>
</tbody>
</table>


---

3.4.4 In rural areas, 7.26 crore people are employed in the non-farm sector as compared to 23.21 crore in agriculture [NSS date 1999-2000] forming about 24% of the total employment. However, the employment growth in the rural areas is continuously decelerating as shown in Table 5.

Table 5: All India Employment Growth Rates in Rural Areas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1.59</td>
<td>1.38</td>
<td>0.20</td>
</tr>
<tr>
<td>Non-Farm</td>
<td>4.54</td>
<td>3.37</td>
<td>2.34</td>
</tr>
<tr>
<td>Total</td>
<td>2.12</td>
<td>1.77</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Source: Draft paper: Generating productive Employment in India’s Rural Non-Farm Sector—A Perspective—Shiela Bhalla

The Table 5 clearly highlights one of the most important issues bothering the country. The rural employment growth rate has come down to 0.68% during 1993-94 to 1999 from 2.12% in 1972-73 to 1983 which is much lower than the growth rate of labour force. [The growth rate of employment between 1993-94 to 1999 was less than one third of the growth rate achieved in 1972-73 to 1983]. Compounding the problem is the fact that in 2002 there were already about 3.5 crore unemployeds in India, approximately three-fourth of these unemployeds were in the rural area. [India Vision 2020-Planning Commission]

Employment in Agriculture Sector

3.4.5 Bulk of the employment in the rural areas is in the agriculture sector and a large part of the rural incomes from wages [39% of the total income of the farmer household referred in para 3.1.4] is also likely to be in respect of agriculture related work. However, the employment growth rate in agriculture has been declining [Table 4]. The estimated labour days per net sown hectare [NSS estimates], increased from 290 days in 1983 to 317 days in 1987-88 to 345 days in 1993-94 to 361 in 1999-00. However, the growth in labour day per gross cultivated area [hectare] increased from 231 in 1983 to 248 in 1987-88 in 264 in 1993-94 and only to 266 in 1999-00.

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6 The Indian Vision 2020-Planning Commission, states that the growth rate of labour force was expected to be about 2% till 2020. Dr. C. Rangarajan in his V.V. Giri Memorial Lecture [2005] had stated that the rate of growth of labour force during 1993-94 to 1999-2000 had fallen to 1.05% against 2.05% in 1983 to 1993-94.
Thus, while the growth rate [compound] was 1.3% p.a. in during 1983-94 it fell down to mere 0.2% between 1993-94-1999-00. With slowing down in the growth of cultivated area, [the net sown areas had negative growth at 0.2% p.a. during 1993-00], the slow down in labour day per hectare during 1993-94 to 1999-00 meant near stagnation of employment growth in agriculture.

3.4.6 As expected there are very large variations in labour use in agricultural operations in different States. Among States, the highest labour days per hectare [net area sown] in 1999-00 were in Bihar [871] followed by A.P [493], West Bengal [447], U.P [440], Tamil Nadu [419] and Orissa [410]. The lowest labour days per hectare were in Kerala [143] followed by Haryana [175], Punjab [182] and Rajasthan [197]. Looking at crop wise labour used, it appears that in North/Western States, labour use per hectare had declined in the 1990s for almost all crops, and for wheat in almost all States. However, for other States and crops trends are mixed.

3.4.7 In the early stages of ‘green revolution’, land augmenting changes, led by irrigation expansion and use of HYV led to an increase in labour demand. Later, the institutional factors contributed towards the tendency on the part of land owners to adopt labour saving technologies. Rising wages, unwillingness of labour to abide by traditional labour norms, sociological changes [increase in education, unwillingness of different groups to participate in agriculture, withdrawal of women and children from workforce, male workers preferring migrating to towns for work rather than undertake agriculture labour] and availability of institutional credit for tractors/other machinery etc. has led to greater use of labour saving devices. The above developments coupled with slow down in capital formation in agriculture, decline in agricultural growth itself and switch over to crops and practices requiring less labour led to deceleration in growth of labour employment in this sector.

3.4.8 The growth in employment in agriculture is related to growth in intensity of cultivation, growth rate of area under labour intensive crops, level of agricultural wages, institutional and socio-economic factors. The policies which could give the

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7 Trends in Rural Employment in India with Special Reference to Agriculture Employment – Ravi S. Srivastava.
rural poor greater control over land, augment productivity of small farms, increase area under labour intensive crops [oil seeds, spices, fruits, vegetables etc.] and increase productivity [increased intensity of cropping and yields] would help in increasing the growth of agricultural employment. The need is to follow these policies during the coming years. Further the Special Group of the Planning Commission [2002] had felt that programmes focusing on horticulture, regeneration of degraded forests, waste land development, watershed development, bamboo development and medicinal plants could generate more than 3 million persons days of employment and therefore were important from the view point of employment generation. The potential for growth of employment in crop sector was considered limited; it was estimated that the switch over from cereals to oil seeds/pulses could generate 0.47 million annual man days work.

3.5 Employment in Rural Non-Farm Sector

3.5.1 On All India basis nearly 11% of the income of the farmer households [NSS Report 497 referred at paragraph 4.1.4] came from the non-farm sector. In Kerala and the West Bengal the income from non-farm was highest at 18% followed by Rajasthan at 14%. Households in the regions with low agriculture productivity or unfavorable land man ratio could add to their income by development of rural non-farm sector. A high growth in the farm sector also creates larger demand for non-farm products and services and “pulls” labour into it [per farmer household income from non-farm is highest in Punjab at Rs. 440 per month after Kerala and J & K]. Similarly, limited opportunities for agricultural development and high pressure of population on land [per farmer household monthly income in Kerala with acute pressure on land at Rs.717 from non-farm business was highest in the country] could ‘push’ labour into the rural non-farm sector. As already shown at Table 4, the growth rate of employment in rural non-farm sector has been consistently higher than the entire period of 1972-73 to 1999-2000. During 1993-94, the employment growth rate in rural non-farm sector at 2.34% per annum was nearly 12 times the growth rate in the farm sector at 0.20% per annum. Rural non-farm sector could hold the key to increasing employment opportunities in rural India.
3.5.2 The disaggregated data regarding growth of employment in different sub-sectors in non-agricultural employment in rural areas is shown at [Table 6] for the last about thirty years to assess the trends of growth.

Table 6: Annual Employment Growth Rate-Sub-Sectors under Non-Agriculture in Rural Areas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining &amp; Quarrying</td>
<td>5.13</td>
<td>4.32</td>
<td>-2.88</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4.38</td>
<td>2.34</td>
<td>1.57</td>
</tr>
<tr>
<td>Electricity etc</td>
<td>9.00</td>
<td>5.00</td>
<td>-6.35</td>
</tr>
<tr>
<td>Construction</td>
<td>3.99</td>
<td>5.19</td>
<td>6.95</td>
</tr>
<tr>
<td>Trade etc</td>
<td>5.34</td>
<td>3.62</td>
<td>3.74</td>
</tr>
<tr>
<td>Transport</td>
<td>7.05</td>
<td>5.09</td>
<td>7.35</td>
</tr>
<tr>
<td>Services</td>
<td>3.82</td>
<td>3.38</td>
<td>-0.80</td>
</tr>
</tbody>
</table>

Source: Sheila Bhalla’s Draft Paper: Generating Productive Employment in India’s Rural Non Farm Sector- A Perspective [2005]

Among the sub-sectors, noticeable growth has been primarily in transport, construction, trade and manufacturing while there was negative growth rate during 1993-94 and 1999-00 in mining, electricity and services.

3.5.3 The State-wise data shows that there was overall negative annual growth of rural employment during 1993-94 to 1999-2000 in Goa [-2.90], Himachal Pradesh [-0.13], Tamil Nadu [-1.42], Tripura [-0.67] and Arunachal Pradesh [-2.09]. In following States, the growth rate was positive but below the national level of 0.68%. Andhra Pradesh [0.24], Karnataka [0.17], Maharashtra [0.37], Rajasthan [0.51], West Bengal [0.43] and Meghalaya [0.31]. The negative or extremely low growth rate of employment in some of the larger States like Tamil Nadu, Himachal Pradesh, Andhra Pradesh, Karnataka, Maharashtra, Rajasthan and West Bengal is very disturbing. Incidentally, Maharashtra, Andhra Pradesh and Karnataka which had registered very low rural employment growth during 1993-94 to 1999-2000 had also certain Hot Spots where many farmers have committed suicides during the last five years.

3.5.4 Another important aspect is that almost all the employment growth, in the last few years, took place in the unorganized non-farm sector. Between 1993-94 and 1999-2000 the growth of employment is agriculture was only about 0.2% whereas the
growth in the non-agriculture sector was 0.59% in the organised sector and 3.15% in the unorganized sector.

3.5.5 Dr. Sheila Bhalla in her paper on Generating Employment in India’s Rural Non-Farm Sector- A Perspective has stressed three points for growth of the non-farm sector besides the development of a prosperous agriculture sector. She has observed: “[a] The foundation for accelerated employment and labour productivity growth in the non-farm sector, is infrastructure investment. For the non-farm sector, the key components are a reliable electricity supply, all weather roads and access to a landline telephone facility. A regular bus service is an important additionality [b] For non-farm sector activities, access to affordable credit is crucial. It should be available for medium scale as well as tiny and small scale units and for expansion of existing units as well as for start up of new units. Programmes providing credit needs to pay special attention to productivity raising investments; for example, the motorization of previously manual labour operations in carpenter’s shop, the electrification of small retail shop, investment in pucca structure of repair shops; motorization of human and/or animal powered transport equipment and so on [c] The non-farm development thrust should be directed to particular sector and sub-sectors where demand for the product or services is growing namely: (i) trade, (ii) restaurants and hotels, (iii) transport, (iv) construction, (v) repairs and (vi) certain services. Artisan activities and very small scale manufacturing, in general produce goods which, either because of high costs or poor quality or both cannot compete in the market. There are of course, many exceptions, but they need to be identified and promoted with caution.”

3.5.6 As regards the manufacturing activities the draft paper referred to above suggests the following: (i) Isolated, rural tiny units are a poor bet. For some closely related activities, the development of clusters may be the answer. But these must not be located in the middle of nowhere. Instead locate clusters in or near large market towns, on the peripheries of cities and along major highways or railway lines. There are nearly 6000 block headquarters as also about 7415 APMCs. Many of these centres as well as many existing industrial clusters present favourable location for focused
development and could be the starting point for concentrated action and investments.

(ii) Pessimism about the prospects of locating large scale, organised sector units in rural areas may be misplaced. In recent years roughly one million jobs have been created in the organised manufacturing in rural areas despite the job losses recorded in urban organised sector.

(iii) Proactively encourage development of ancillary units by supporting such ventures and possibly by offering tax breaks to large units which sponsor the development of small units on a contractual basis.

(iv) Promote field-to-market logistical and processing chains for perishable products of agriculture and allied activities. These could be run by cooperatives/producer’s associations or by private enterprises, but the regulation of large private enterprises entering into contractual relationship with small producers is essential. Cold storages and chilling plants may be located in large villages with reliable electricity supplies but most processing, collection or marketing centres need to be in larger market towns and cities.

3.5.7 The generally held belief among the economists is that rapid growth of rural non-farm employment would largely depend on a higher growth rate of agriculture and large public investment in rural infrastructure. A very slow rate of growth of agriculture [2% from, 1996-97 to 2001-02 and only 1.1% for the first three years of the Xth Five Year Plan] and decline in profitability in agriculture noticed during the nineties are likely to limit the purchasing power in the hands of the rural population as also surplus for investments, both of which are not conducive to the growth of the rural non-farm sector.

3.5.8 In the Fourth Report of the National Commission on Farmers a suggestion has been made to integrate all programmes for generating off and non-farm employment into one initiative like China’s Town and Village Enterprise [TVE] Programme and launch a Rural Non-Farm Initiative particularly for families without land or other productive assets. The need is for a counterpart to the National Rural Employment Guarantee Programme [NREGP] in the skilled employment sector. The initiatives like the Small Farmers Agribusiness Consortium [SFAC], Agri-clinics and
Agri-business Centres, Food Parks etc could be strengthened and made more effective. The Rural Non-Farm Livelihood Initiative [RNFLI] could have as its core the KVIC and the restructured and strengthened SFAC and bring all rural non-farm employment programmes together, in order to generate convergence and synergy among them. A Consortium approach may be considered for the purpose involving the Central and the State Governments, Academia, NGOs, public and private sector industry, banks and financial institutions etc. The programme may have to be market driven and at a massive scale to have impact across the country.

3.5.9 Though the rural non-farm sector is providing almost all the new employment opportunities in the rural area, there is no specific ministry/department to focus exclusively on this sector. The Ministry of Rural Development has been running various self employment and wage employment programmes like the Pradhan Mantri Rozgar Yojna, Swarn Jyanti Rozgar Yojana, etc. while the Small Scale Industries and the KVIC etc are looked after by the Ministry of Small Scale Industries and Agro and Rural Industries. In addition there is also the Ministry of Food Processing Industries. Keeping in view the importance of the rural non-farm sector and the need for undivided focus, it may be useful to consider some reorganization and consolidation of all programmes concerning rural industrialisation in one Ministry/Department.

3.6 Agro-Processing

3.6.1 Development of agro-processing is important to increase farmer’s income and also to create employment. It would however, be necessary to introduce reforms in the agriculture sector to facilitate greater private corporate sector investments in agro-processing not only in new units but also in modernizing the established units. The processing industry requires adequate and continuous availability of raw material for processing. Direct purchase from the growers is not possible under the existing APMC Act in many of the States and hence it has to be either routed through the APMC or the concerned State Govt. have to specifically permit the same. Further, there are many other barriers to interstate trade and commerce which come in the way of development of food processing industry. Some of these relate to poor road infrastructure, detention of vehicles, interstate and national permits and other barriers in trucking operations. There are check posts for Regional Transport Offices and Police Check-Posts [for checking documents,
driving and traffic safety etc.], Goods related Check-Posts [for taxes, octroi, sales tax, entry permit, tolls etc.] and others [checking by Flying Squads, Movement of Essential Commodities etc.]. The delays caused by these check-posts are substantial and involve payment of bribes etc. The paper work involved in trucking operations is complex, time consuming and leads to disputes etc. Simplification of the rules/procedures and limiting the check-posts only for matters relating to national security could greatly benefit movement of goods and lead to reduction of transport costs and time.

3.6.2 Further, the traditional varieties may not be suitable for processing because the requirements of food processing are different from food for direct consumption. This necessitates research back up for development of suitable varieties. There could be other cases where suitable varieties are available and the processor may want the farmers to grow the same under supervision and a specific agreement. In the case of perishable commodities, in particular, the processing industry would like contract farming arrangements or some other institutional arrangement so that adequate quantities of appropriate raw material is available in an area preferably at a predetermined prices from where it could be transported to the factory without loss of time and quality. Though various models of ‘contract farming’ have been tried in India, the success has been rather limited. The need is to develop comprehensive, clean, equitable and farmer centric model agreement which could not be abused against the farmers. Special care is required regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and the arbitration mechanism. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/ cooperatives to deal with the agribusiness unit on their behalf, one has to be rather cautious about these arrangements.

3.6.3 The food processing sector is dominated by small-scale producers including traditional village industries. However, the link up of small units with the large units including MNCs has not developed adequately. A system where initial processing could be decentralized in the rural areas in small units [creating employment and reducing transport costs] and the final processing, quality control, packaging and marketing under brand name could be done in a centralized manner
[by a farmer’s organisation or other business unit] has not developed. One reason for this is the lack of assured electric power in the rural area and also the high cost of power to the industry. Poor road connectivity is another constraint in developing decentralized food processing units in the rural areas. There is need for policy environment to support the above developments.

3.6.4 There is also a need to rationalise the tax structure for food processing industry and value addition. The agriculture sector is exempt from all taxes [like excise, income tax etc] but there are inter-State differences in agriculture cess, sales tax, mandi tax, octroi, inter-state transfer regulations etc. At the point of conversion i.e., value addition, excise, income tax and other taxes are levied. The packaging material used is also subject to taxation. All these taxes add to the costs which make processed food quite costly limiting its demand/market. The world demand of processed food is increasing. The need is to develop a competitive food processing sector. Though it may not be easy to build up a large export component in processed food, at least all attempts are needed to ensure that our growing market for processed food is not completely lost to imports.

3.6.5 Quality standards in food processing sector are extremely important for the market particularly the export market to bring our food products at par conforming to international safety and quality standards, it would be essential to set up a network of quality testing/certification laboratories across the country and also build the awareness level of our farmers, processors and traders regarding codex requirements in respect of food hygiene, food additives, pesticides residue, contaminants, labeling, presentations and methods of analysis and sampling. All products meant for sale have to be packed and labeled as per codex requirements.

3.7 The General Employment Strategy for India

3.7.1 Dr. C. Rangarajan in his V.V. Memorial Lecture [2005] has indicated that the overall employment strategy in India must seek to achieve two things. First, create productive employment opportunities to absorb the annual addition of 8 million or more labour force and second to improve the ‘quality’ of employment in several sectors such that real wages rise through improved productivity. According to him the four components of the employment strategy should be:
i) Accelerating the rate of growth of the economy;

ii) Special emphasis on relatively more labour intensive sectors and inducing a faster growth of these sectors

iii) Improving the labour skill endowment in general, paying particular attention to identifying specific skill gaps and taking effective steps to fill them; and

iv) Improving the functioning of the labour markets through such modification as may be necessary without eroding the core labour standards.

3.8 Conclusion

3.8.1 There is a general feeling of being ‘left behind’ in large parts of rural India. The widening disparity in per capita income between farm and other than farm sector, the very slow rate of growth in agriculture, the declining profitability, extremely weak social security arrangements, weakening family and community based mechanism of social protection, lack of employment opportunities etc., and the rising aspirations are building up social unrest which if not arrested could lead to threats to internal peace and security. Economic growth which bypasses a large population is joyless growth and not sustainable in the long run. Equity considerations can not be ignored for too long. Faster growth in agriculture with improvement in welfare of the rural population is important. The need is not only to register increase in agriculture production in million tons but actual improvement in rural incomes. The promises that a 9 or 10% growth rate for a decade would solve employment problem may be mathematically correct but may leave many serious problems in its trail if we do not build an effective social security net and take appropriate policy steps to improve the income of the assetless or those with very limited assets. The need is to ensure a faster and more inclusive growth as indicated in the draft approach paper to the XIth Five Year Plan. It is not too late to mount a major offensive against the deepening crises in rural areas. However, let us not forget, the time for action is also fast running out.
Appendix - I

Break-up of average monthly income (excl. rent, interest, dividend etc.) per farmer household by source in each of the major States during the agricultural year 2002-03.

<table>
<thead>
<tr>
<th>States</th>
<th>Wages</th>
<th>Cultivation</th>
<th>Farming of animals</th>
<th>Non-farm business</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>643</td>
<td>743</td>
<td>93</td>
<td>155</td>
<td>1634</td>
</tr>
<tr>
<td>Assam</td>
<td>973</td>
<td>1792</td>
<td>141</td>
<td>255</td>
<td>3161</td>
</tr>
<tr>
<td>Bihar</td>
<td>497</td>
<td>846</td>
<td>265</td>
<td>202</td>
<td>1810</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>709</td>
<td>811</td>
<td>-3</td>
<td>101</td>
<td>1618</td>
</tr>
<tr>
<td>Gujarat</td>
<td>925</td>
<td>1164</td>
<td>455</td>
<td>140</td>
<td>2684</td>
</tr>
<tr>
<td>Haryana</td>
<td>1268</td>
<td>1494</td>
<td>-236</td>
<td>356</td>
<td>2882</td>
</tr>
<tr>
<td>Jammu and Kashmir</td>
<td>2060</td>
<td>2426</td>
<td>382</td>
<td>620</td>
<td>5488</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>924</td>
<td>852</td>
<td>86</td>
<td>207</td>
<td>2069</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1051</td>
<td>1266</td>
<td>131</td>
<td>168</td>
<td>2616</td>
</tr>
<tr>
<td>Kerala</td>
<td>2013</td>
<td>1120</td>
<td>154</td>
<td>717</td>
<td>4004</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>560</td>
<td>996</td>
<td>-227</td>
<td>101</td>
<td>1430</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>799</td>
<td>1263</td>
<td>144</td>
<td>257</td>
<td>2463</td>
</tr>
<tr>
<td>Orissa</td>
<td>573</td>
<td>336</td>
<td>16</td>
<td>137</td>
<td>1062</td>
</tr>
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<td>Punjab</td>
<td>1462</td>
<td>2822</td>
<td>236</td>
<td>440</td>
<td>4960</td>
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<tr>
<td>Rajasthan</td>
<td>931</td>
<td>359</td>
<td>5</td>
<td>203</td>
<td>1498</td>
</tr>
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<td>Tamil Nadu</td>
<td>1105</td>
<td>659</td>
<td>110</td>
<td>198</td>
<td>2072</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>559</td>
<td>836</td>
<td>53</td>
<td>185</td>
<td>1633</td>
</tr>
<tr>
<td>West Bengal</td>
<td>887</td>
<td>737</td>
<td>77</td>
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<td><strong>All India</strong></td>
<td><strong>819</strong></td>
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<td><strong>2115</strong></td>
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CHAPTER 4

ATTRACTING AND RETAINING YOUTH IN FARMING:
UNCOMMON OPPORTUNITIES

4.1 Introduction

4.1.1 Agriculture continues to be central to the livelihood security of a majority of the people of India. As poverty is more extensive in rural areas and is concentrated in the small, marginal and landless farming households, which account for nearly 60 per cent of the country’s population, efforts towards its alleviation must have in place an explicit agricultural growth strategy aimed towards remunerative employment and sustained income growth. With the persisting serious yield and productivity gaps on one hand, and the centrality of high competitiveness on the other, our agricultural development must become increasingly knowledge-intensive and efficient. For this, the youth, especially the agricultural graduates, practising science- and knowledge-based agriculture, should constitute the torch-bearers of agricultural transformation in the globalised world. But, the agricultural graduates and other educated youth, although unemployed, are rarely taking to farming as a profession and it is difficult to retain even a small number of them in rural areas.

4.1.2 The worsening cost-risk-return structure of farming, the low and stagnating income of farmers and the huge and widening income divide between farmers and non-farmers are the main deterrents. So much so, as per the 59th Round of NSSO, 40 per cent of the farmers wish to quit farming. This is a serious concern and must be addressed urgently. The youth can be attracted to and retained in farming only if farming becomes economically rewarding and intellectually satisfying, and only when the rural settings encompass the barest minimum necessary energy, infrastructural, educational and primary health care facilities. In this context, the Provision of Urban Amenities in Rural Areas or PURA programme proposed by the President of India becomes important. Moreover, the process must be accompanied with suitable policies
and access to appropriate technology, services, institutional support including credit, and markets and remunerative prices.

4.2 Youth in India

Number, Literacy and Employment Status

4.2.1 Ours is a land of the youth. The National Youth Policy 2003 defines the youth in the age group of 13 to 35 years, but classifies them in two sub-groups viz. 13-19 years (adolescent age group) and 20 to 35 years. In 1997, the number of youth was about 380 million, 37% of the total population, and is anticipated to increase to about 510 million in 2016, about 40% of the total population. Nearly two-thirds of these will be rural youth. The availability of such a huge highly active human resource offers unique opportunities for achieving equally huge socio-economic transformation. But, this will call for commensurate training, skill and knowledge development opportunities, technological excellence and enabling mechanisms.

4.2.2 By the year 2016, about 246 million youth will be female and 264 million will be male. The gender divide is particularly sharp in literacy rate. Against 25% illiterate males, 46% of the female are illiterate (11th Plan Approach Paper, 2006). As a whole, India is home to one-third of the world’s illiterate youth (UNESCO, 2004), and more than 60% of these are female. Consequently, and also due to other reasons, more women than men work in low-status jobs. Thus, the differences in educational status and economic empowerment will have to be narrowed and eliminated as we move towards more inclusive growth. With the increasing feminization of agriculture, women contribute more than 50% of the agricultural workforce, particularly in hill areas. Considering the prevailing gender inequality, special effort must be made to empower women technologically for increasing their work efficiency, reducing drudgery and increasing income. Women’s education and training, thus, should receive greater emphasis.

4.2.3 With about 13% of its youth unemployed, India has the largest number of unemployed youth in the world. The figures vary from State to State, being as high
as 35% in Kerala. There has been increasing concern among policy makers that the frustration that accompanies long-term unemployment among groups of young people feeds political and ideological unrest and violence. It has also been argued that unemployed and idle youth, who have emerged in society as part of a large “demographic bulge” may question the authority of government and endanger its stability. The upsurge in naxalite movements and terrorism in recent years may partly be ascribed to the increasing high unemployment. These “left out” human resources should be empowered to employ themselves in farming and allied activities, thus mainstreamed in the nation building process.

4.2.4 India’s labour force generally remains low-skilled and illiterate – on an average the labour force has 4 years of education; more than 42% has no education and only 6% has tertiary (college) education (Table 1). Women have education attributes that are significantly worse – the vast majority have no education and only 4% have college education. The high illiteracy and unemployment or underemployment rates are closely linked with the high incidence of poverty and hunger in the country. Currently, about 80 million youth, age group 15 to 24, live on less than one dollar a day, and about 200 million young people live on less than two dollars a day accounting for about 35 per cent of the world’s youth in these categories. Likewise, nearly 45 million or 28% of the world’s 160 million undernourished youths have their homes in India (Curtain, 2004).

| Table 1: Levels of Education of the Labour Force (1999/2000) |
|-----------------|-----------------|-----------------|
| **Average years of education** | **No education [%]** | **Tertiary Education [%]** |
| All | 3.9 | 42.4 | 6.3 |
| Male | 4.6 | 33 | 7.3 |
| Female | 1.9 | 68.3 | 3.7 |
| Source: Ghose (2004) |

4.2.5 As regards the sectorwise distribution of the labour force, about 56% is engaged in agriculture, down from 65% in the early 1990s. It is important to note that although the share of agriculture in total GDP has dropped to about 20%, its share in employment is still very high, emphasizing the social value of the sector and its
importance for livelihood security of the average citizen – the social inclusion dimension.

4.2.6 Of the remaining labour force, about 13% are engaged in manufacturing and the balance are employed in the service sector which has grown from 25% to 32% of total employment over the past two decades. The organized sector provides about 8% of the total jobs and the remaining 92% is provided by the informal or unorganized sector. It is estimated that the country’s labour force is currently growing by 7.5 to 8 million persons per year. But, sadly enough, only about 6% of India’s workforce has received formal training in vocational skills, compared with 60% or more in developed and most rapidly developing countries.

4.2.7 Even though the economy has been growing at 6 to 8 per cent per annum during the past few years, there has been limited impact on job creation in the rural economy. The process of growth in the future thus must pay attention not only to the GDP growth rate, but also to growth pattern of employment. The employment growth rate in the rural areas is continuously decelerating, dropping from 2.12 percent during the decade ending 1983 to 0.68 percent during 1993/94 to 1999/2000 (Sheela Bhalla, paper prepared for NCF, 2005). The fall was much steeper in the agricultural sector as compared to that in the non-farm sector. A reduction in proportion of the population employed in the primary sector is a natural and inevitable trend that is spurred by rising expectations and changing attitudes as much as due to rising levels of farm mechanization. However, this does not mean that the potential for employment in the agriculture sector is being fully exploited. Strategic initiatives to modernize and diversify Indian agriculture, both horizontally and vertically, particularly in the areas of post-harvest management and farm-level processing and value addition, can generate quality employment opportunities for a very large number of rural people. The livestock, horticulture and fisheries sub-sectors are growing at about 3 to 5 per cent per annum, against growth rates of 0 to 1.0 per cent in crops, thus offer greater employment opportunities.
4.2.8 The State-wise data show that there was overall negative annual growth of rural employment during 1993-94 to 1999-2000 in Goa, Himachal Pradesh, Tamil Nadu, Tripura and Arunachal Pradesh. In Andhra Pradesh, Karnataka, Maharashtra, Rajasthan, West Bengal and Meghalaya the growth rate was positive but below the national level of 0.68%. The negative or extremely low growth rate of employment in some of the larger States like Tamil Nadu, Himachal Pradesh, Andhra Pradesh, Karnataka, Maharashtra, Rajasthan and West Bengal is very disturbing. Incidentally, Maharashtra, Andhra Pradesh and Karnataka which had registered very low rural employment growth during 1993-94 to 1999-2000 are also States where many farmers have committed suicides during the last five years, and the tragedy continues.

4.2.9 One of the main considerations of the youth in adopting farming as the means of his/her livelihood security is its economic viability. At the national level, the average monthly income of farmer household is Rs. 2115, with considerable inter-state variation, ranging from around Rs. 5,000 in Jammu and Kashmir and Punjab, around Rs. 4,000 in Kerala, Rs. 3200 in Assam, between Rs. 3000 and 2000 in most States and between Rs. 2000 and 1000 in Bihar, Andhra Pradesh, Uttar Pradesh, Chhattisgarh, Rajasthan, Madhya Pradesh and Orissa, in that order being only Rs. 1062 – the lowest in Orissa (NSS, 2002/03). On an average, nationally, cultivation, wages, non-farming business and animal farming, respectively, contributed 46, 39, 11 and 4 percent of the total monthly income. The scope of livestock for increasing farmers’ income and employment is generally highly under-exploited. Agricultural and non-agricultural employments must complement each other. For an agricultural graduate to return to village, he/she should have diversified opportunities for income generation. Therefore, we suggest an integrated Rural Livelihood Initiative.

Educational and Training Institutions

4.2.10 **Agriculture, Veterinary, Animal Sciences and Fishery Universities:** The National Agricultural Education System, one of the largest in the world, comprises 39 State Agricultural Universities (SAUs), 5 Deemed Universities (DUs), 1 Central Agricultural University (CAU), 3 Central Universities with Agricultural Faculty, 207
Agricultural Colleges and 50 Private Agricultural Colleges. The SAUs include 2 Veterinary and Animal Science Universities, 2 Animal Science and Fisheries Universities and 1 Horticulture and Forestry University. In addition, one Indian Institute of Technology and 16 State General Universities offer degrees in Agriculture and Allied Disciplines. The System imparts Bachelor’s level education in 11 broad disciplines which include Agriculture, Horticulture, Fishery, Forestry, Home Science, Sericulture, Dairy Technology, Agricultural Engineering, Food Science Technology, Agri-Business (including Marketing), Banking and Cooperation, Master of Science (M.Sc.) degree in as many as 95 specialized disciplines of Agriculture and Allied Subjects and Doctor of Philosophy (Ph.D) degree in 80 agricultural disciplines.

4.2.11 While the agricultural education grid of the nation has produced a large number of talented graduates and post-graduates, over 40 per cent of the farm graduates are unemployed. The mismatch between employment and education may be assumed partly to the following weaknesses in the education system:

- Lack of desired responsiveness to the changing scenario and temporal needs, especially in the Home Science
- Lack of competence, confidence and entrepreneurial ability
- Paucity of required upgradation, competence and skill development opportunities
- Inflexible, mismatch between theory and practice leading to the lack of risk bearing capacity and confidence
- Lack of adequate updating and modernisation of curricula and resources.
- Recalcitrancy to broaden the base of education for agriculture.

4.2.12 Skill development is important especially for the knowledge-based precision agriculture. Strengthening education and skill building need the attention of both the Government as well as the private sector in association with the academia. Isolation of education (even training) from the ground realities is the basic flaw of the Indian system. A serious mismatch is observed between the needs of the modern agriculture and the availability of skilled manpower. In spite of surplus graduates in general agriculture, deficits were witnessed in post-harvest management, agroprocessing, value
addition, packaging, marketing, veterinary care, integrated management of pests and diseases, handling of bioagents and application of quality standards. If Indian agriculture has to grow at around 4 per cent per annum, it will be necessary for the education and training system to produce at least 100,000 technically-skilled people every year. Notwithstanding the need for an analytical analysis and estimation of number, quality and discipline-wise requirement of trained and educated agricultural experts and preparing the necessary roadmap to achieve the target, it is estimated that the country would need an incremental requirement of about 1.5 million skilled technicians by 2015. As we move up the technology ladder and begin to produce modern products in greater volumes and provide efficient services, particularly in the fast expanding private sector, qualitative growth in skilled manpower is essential.

4.2.13 Towards women’s technological empowerment, Home Science education needs to be totally reorganized. The training during the first 3 years can deal with general topics in science and nutrition. But the final year should provide a number of options such as management of biodiversity and biotechnology, Horticulture, seed technology, food technology, renewable energy management, information technology and GIs mapping. Home Science Colleges should be named and structured as Colleges of Agricultural Technology and Nutrition for Women so as to reflect the technological and skill empowerment of women in market-driven technological enterprises and sustainable management of natural resources, and not just home occupation. Since, issues relating to nutrition security and post-harvest technology are equally important for men, some of the Home Science Colleges can be developed in Colleges of Human Sciences.

4.2.14 ICAR Institutes: The Indian Council of Agricultural Research (ICAR) is the apex organisation for conducting and coordinating agricultural research, education and extension. It comprises 4 National Institutes, 45 Central Institutes, 31 National Research Centres, 12 Project Directorates, 5 Bureaus and 91 All India Coordinated Research Projects, besides nearly 500 KVKs. With more than 20,000 scientists working for the system, the Council is one of the largest agricultural research systems in the world. Alleviating hunger, providing employment and increasing farm income through the development of new technologies, their effective transfer and the generation of
appropriate human resources are the major mandates of the Council. Each ICAR institute has a strong component of training for generating adequately trained boys and girls to strengthen agrarian economy in the country. The effort has succeeded to a considerable extent, but, in recent years, employability of the educated agricultural human resources has declined rather sharply.

4.2.15 **Krishi Vigyan Kendras (KVKs):** Krishi Vigyan Kendras (KVKs), numbering nearly 500, each district likely to have at least one KVK, constitute one of the most eminent institutional networks to impart technical literacy by using the pedagogic methodology of learning by-doing. Presently, KVKs are functioning almost independently with overall direction and supervision of the ICAR/or State Agricultural Universities. Their coordination with State Government is not up to satisfaction. It is essential to restructure the KVKs so that their activities are integrated with those of other relevant institutions for more effective agriculture extension and human resource development efforts. It is understood that ICAR is considering Report of a Committee set up for this purpose. In view of the resources, expertise and infrastructure facilities available with KVKs, it is necessary for them to take higher responsibility in providing better quality services to the farmers both at the production and post-harvest phases of farming.

4.2.16 With the onset of an era of low external input sustainable agriculture (LEISA) imparting new skills and information empowerment has become vital. Organic farming and ever-green revolution are also more knowledge intensive than chemical farming. The KVKs should thus become the hubs of the agriculture led transformation of Indian economy. They should train large number of **Soil Health Practitioners** in villages and should provide services to safeguard soil, plant and animal health and irrigation water quality. They should provide training in precision farming methods leading to land and water-saving farming practices. They should develop expertise in post-harvest technology, particularly in perishable commodities like vegetables, fruits, flowers and animal products. Accordingly, as suggested in the First Report of NCF, **the Krishi Vigyan Kendras should be renamed and restructured as Krishi Vigyan and Udyog Kendras.**
4.2.17 Young graduates and entrepreneurs can be trained by KVKs to set up their self-employment ventures and enterprises for providing quality service to farmers with superior technology. In collaboration with the restructured and reinvigorated Small Farmers Agri-business Consortium (SFAC), KVKs can prepare model project reports for such ventures to take up entrepreneurial activities. They should generate awareness about issues relating to bio-conservation, bio-security, safe application of biotechnology and the rights enjoyed by farmers under law. They may also impart training on issues relating to credit, insurance and other related areas. Depending on location, some KVKs may specialize in specific areas like agroprocessing and post harvest management of specific commodities, organic farming, medicinal and aromatic plants, and rural infrastructure for better learning. They should be connected to Village Knowledge Centres (VKC) or Gyan Chaupals and actively promote gene, biosafety, quality and food safety literacy of the farmers and other stakeholders. Finally, KVKs should function as a resource center for Agriculture Technology Management Agency (ATMA) and other such agencies, and work in congruence with them.

4.2.18 **CSIR Institutes Related to Agriculture and Food:** More than a dozen Institutes of the Council of Scientific and Industrial Research (CSIR), such as, Centre for Cellular and Molecular Biology, Hyderabad, Central Food Technological Research Institute, Mysore, Central Institute of Medicinal & Aromatic Plants, Lucknow, Institute of Microbial Technology, Chandigarh, National Botanical Research Institute, Lucknow, Central Leather Research Institute, Chennai are conducting quality technology generation and transfer programmes related to agriculture, food and rural development.

4.2.19 The ICAR, Ministry of Agriculture, Ministry of Rural Development and Ministry of Food should be closely linked with these Institutes and laboratories which have tremendous impact on training, attracting and retaining youth in farming and other rural enterprises. For instance, the Central Food Technological Research Institute (CFTRI) offers an extensive range of programmes of academic as well as industrial importance that attract participants from many regions of the world. The International Food Technology Training Centre (IFTTC) and the International School of Milling
Technology have trained a large number of national and international young scientists, several of them being self-employed entrepreneurs. The Institute also runs continuing education programmes. Its Industry-Oriented Short Courses offer national as well as international level short-term courses (of 1-3 weeks duration) on a continuing basis for technical staff from food and allied industries, academic centres and R&D units, to keep them updated on the current and emerging trends in specialized as well as general areas of food technology. Eighteen of these courses are of particular interest to farm graduates and Farming Youth. These courses also provide a forum for the R&D scientists to interact and build synergy with the industry.

4.2.20 Jamsedji Tata National Virtual Academy for Rural Prosperity: The Jamsedji Tata National Virtual Academy (NVA) of the M.S. Swaminathan Research Foundation has taken key steps of training grassroot workers to use ICTs for agriculture and rural development. The NVA aims to convey such knowledge directly to villages thereby empowering rural and tribal families to achieve a better control of their own development and to build skills and capacities relevant to enhancing opportunities for sustainable livelihoods. These trained persons will constitute the “core competence of rural India” and serve as agents of change in rural India. The Academy is emphasizing pedagogic methodology of learning by doing to bring about a learning revolution in villages. NVA Fellows represent a wide range of competencies and expertise – agriculture, education, micro-finance, environment, health, marketing, disaster management and numerous other fields. Some have, with tremendous grit and determination, raised themselves out of dire poverty or difficult life circumstances to undergo training and acquire skills for self-employment, which they have in turn shared for the benefit of their community. The aim of NVA is to enroll one million Fellows (about one woman and one man for every village) by the year 2010. They will become the torchbearers of the Rural Knowledge Revolution.

Farm Graduate and Post Graduate Outputs and Employment Status:

4.2.21 India annually produces nearly over 22,000 Agricultural Graduates and Post Graduates. One-fourth of these are women. About 40% of the Graduates remain
unemployed or highly underemployed or misemployed. Often, they hail from rural areas belonging to poor to average farming families. However, this is not true uniformly throughout the country. For instance, one-fourth to one-third of the horticultural graduates from the Karnataka Agricultural University get employment, mostly in banks and private sectors, and most of the remaining two-thirds proceed for higher studies. However, this is not the case for a large number of graduates coming out from private agricultural colleges in the North. For instance, in Haryana, there is hardly any opening for farm graduates in the public sector, about 5 percent are getting absorbed in private sector, about 10-15 percent are proceeding to do M. Sc. Ag, about 8-10 percent are diversifying for MBA and other professional Master degrees and remaining about 70 percent are unemployed. A good number of the unemployed end up doing M.Sc. Ag without adding to their employability.

4.2.22 Employment potential of the various fields of graduation differs significantly. Currently, the potential is: Good in: Veterinary, Dairy Technology, Food Technology and Fisheries; Intermediate in: Agricultural and Engineering and Horticulture and Forestry; and Poor in: Agriculture and Home Science.

4.2.23 The World Science Report (UNESCO, 1993) had revealed that during the 1980s, total number of agricultural and veterinary graduates in India had registered a growth rate of 4.1 percent and 3.4 percent, respectively. Availability of scientists in agricultural research and education was 0.028 per 1000 population against 0.1 per 1000 population for the world as a whole. A survey (1994) of supply-demand scenario of trained manpower in agriculture by 2005 had projected a shortage of trained manpower by 113,000. The M.S. Swaminathan Committee on Education for Agriculture, ICAR, 1998, had observed that (i) There is need for at least one farm graduate for each Gram Panchayat and Nagar Palika, projecting the requirement of 0.7 million farm graduates, (ii) There is an urgent need for increasing the number of Veterinary Graduates, (iii) There are serious regional disparities in the availability of farm graduates, and (iv) Private sector is emerging as a big employer in agriculture and allied fields, including R&D, farm production, seed development and multiplication, agro-processing, post-harvest
technology, dairy production and processing, poultry, meat and meat products, food-processing, biotech products, health products and extension services.

4.2.24 As per available estimates of Applied Manpower Research Institute (AMRI 2000), up to the year 2000 the country produced about 166,200 graduates in agriculture and allied areas, 78,200 post graduates and 11,400 doctorates. The employment pattern of agricultural graduates during this period has been to the tune of 50 per cent in public sector, 20 per cent in private sector, 12 per cent in research and academics, 6 per cent in financial institutions including NGOs, only 2 per cent self-employed and the remaining 10 percent in other spheres. The AMRI analysis had revealed that 43 per cent of agricultural graduates and 23 per cent of the post-graduates were unemployed. Due to economic shifts and changes in growth pattern, the employment situation has worsened. The temporary positions of Research Associates and Research Fellows in time bound short term projects add to the gravity of the problem and the uncertain prospects of regular employment of thousands of such graduates and mostly post-graduates is indeed pathetic. The paradox of co-existence of the huge unmet demand on one hand, and the huge “idle” supply (unemployed graduates) on the other, is a matter of great concern and calls for urgent and priority redressal of the mismatch.

4.2.25 Regional imbalances in agricultural growth are increasing. North East India is a case in point. The Swaminathan Committee on Agricultural Research (Planning Commission, 2004) has recommended the creation of a sub-cadre in the Agricultural Research Service (ARS) of ICAR for the North East. This will help a large number of young women and men farm graduates to render life-long service to their respective States in this natural and human resources rich region.

4.3.0 Pre-requisites for Attracting and Retaining Youth in Farming

Rural Infrastructure

4.3.1 Fortunately, several significant initiatives have been taken by the Government in recent years to improve the situation on the infrastructural and other related fronts. Some of the important initiatives are: Bharat Nirman, National Rural Employment
Guarantee Programme, Sarva Shiksha Abhiyan, National Rural Health Mission, Enhancement of Agricultural Credit and Lowering of Interest Rate, National Horticulture Mission, National Rainfed Area Authority, National Fisheries Development Board, Changes in the APMC Act (to make it farmer-friendly), Warehouse Receipt Act (making warehouse receipts a negotiable instrument, thereby helping to prevent distress sales), and Knowledge Connectivity through the e-governance and Every Village a Knowledge Centre/ Gyan Chaupal programmes. The time is therefore opportune for the graduates to avail of the above initiatives and return to rural areas for helping to revitalize our agricultural progress by making agrarian prosperity the bottom line of government investment and agricultural and rural development policies leading to increased employment opportunities for farm graduates.

4.3.2 **Bharat Nirman**: Bharat Nirman is a time-bound programme to foster job-led economic growth in villages and to bring about a shift from unskilled to skilled work in the case of women and men without assets like land, livestock or fish pond. Improved communication (roads and telephones) and provision of electricity will help to open up new opportunities in the rural manufacturing and trade sectors. Ten million hectare additional agricultural land will be brought under irrigation, thus greatly enhancing agricultural productivity and sustainability and farmers’ income. Bharat Nirman’s thrust on knowledge connectivity through Gyan Chaupal or Village Knowledge Centre will bring unprecedented knowledge-driven socio-economic transformation in our villages, particularly in the removal of many intermediaries causing the market and income slippage.

4.3.3 **PURA (Providing Urban amenities in Rural Areas)**: PURA is an example for creating rural wealth and prosperity. Knowledge powered rural development is an essential need for transforming India into a knowledge power and high bandwidth rural connectivity is the minimum requirement to take education, health care and economic activities to the rural areas. Knowledge society leading to knowledge super power can prosper and survive only in the environment of economic security and internal security. Physical connectivity by providing roads, electronic connectivity by providing reliable communication network and knowledge connectivity by establishing professional
institutions and vocational training centers will have to be done in an integrated way so that economic connectivity will emanate, as exemplified by the Byrraju PURA (Andhra Pradesh), Periyar PURA (Tamil Nadu), Loni PURA (Maharashtra) and Chitrakoot PURA (Madhya Pradesh) the Hon’ble President had observed, “The operational PURA system has increased the literacy rate, brought down the infant mortality rate, created employment opportunities for the people, increased the per capita income of the villagers and brought the smiles in the faces of villagers in that PURA cluster. In all these three PURAs, employment generation was the focus using technology experiences from the colleges and educational institutions and through assessment of markets, which can absorb the products and services.” The experience is being replicated at a faster rate and would prove instrumental in attracting and retaining the youth in farming.

4.3.4 Sarva Shiksha Abhiyan (SSA): Education is the most critical element in empowering people with skills and knowledge and giving them access to productive employment in the future. A major step was taken by the Government of India in 2004-05 to ensure effective funding of elementary education by the levy of 2% Education Cess earmarked for the Sarva Shiksha Abhiyan. The Mid Day Meal Scheme, Integrated Child Development Scheme and Early Childhood Education should be integrated with SSA and education should universalized upto High School or Class X. Agriculture should be made a compulsory subject upto High School. Specific educational curricula focusing on the needs of rural youth can enthuse them towards agriculture and enhance their skills.

4.3.5 Government Programme on Youth for Leadership in Farming (GPYLF): The ICAR should hold hands of selected rural school children at secondary level who have an aptitude and means to adopt farming as their profession. To begin with, depending on size of the State, about 50 to 150 boys and girls should be identified from each State to participate in one-week programme at an ICAR Institute or SAU or a Farm School in the region. The young minds should feel the thrill and excitement of science-based agriculture and critical appreciation of scientific principles. It should also aim at active participation in the learning process through experimentation and putting into practice the knowledge acquired in the classroom. The efforts should motivate young
people to take to agriculture as a profession. This will expose the young-ones to the multi-functionality of agriculture and the thrill of making a good living in a healthy and vibrant green environment. The interested ones should be supported to undertake repeat visits to sustain and further intensify their confidence in knowledge-led agriculture.

4.3.6 **National Rural Health Mission:** A seven year National Rural Health Mission (NRHM) has recently been launched to address infirmities and problems across rural primary health care. The Mission would converge the public health approach into primary health care and aims to empower and support Panchayati Raj institutions to manage, administer and be accountable for health services at community levels. It aims at effective integration of health concerns with determinants of health like safe drinking water, sanitation and nutrition through integrated District Plans for Health and aims to introduce effective risk proofing mechanisms and social health insurance and take advantage of local health traditions. **A Nutrition-cum-Drug Based Approach** to support rural families affected by HIV/AIDS, tuberculosis, malaria and leprosy is needed to assist in recovery and restoration to a productive life. The “sick” farmer is not able to undertake his farming duties. Therefore, is Approach should become an integral part of the National Rural Health Mission.

4.3.7 **National Horticulture Mission:** The Government has accorded high priority to horticulture by having launched the National Horticulture Mission (NHM). The Department of Agriculture and Cooperation has allocated Rs 1951 crore to NHM for the Annual Plan 2006-07 out of the total allocation of Rs. 4800 crore to Agriculture as a whole. While this huge 41 percent of the total outlay allocated to NHM underscores the pivotal role that the horticulture sub-sector is expected to play in the national economy, we hope that, unlike its forerunner project “Horticulture Technology Mission”, the benefits of NHM will reach the small and marginal farmers as well as to landless agricultural workers.

**Non-Farm Employment**

4.3.8 NSSO data 1999-2000 had revealed that in rural areas, of the employed 305 million people, 232 million people or 76% were employed in agriculture as compared to
73 million or 24% in non-farm sector. The employment elasticity of labour in the agriculture sector is now very low. Almost all the rural employment growth in the last few years took place in the unorganized Non-Farm sector - between 1993/94 and 1999/2000 almost 12 times of that of Agriculture. The opportunity in the Non-Farm sector must be captured so as to improve the income and livelihood security of the rural people and also to provide stimulus to agricultural growth, thus attracting more and more youth to take to farming and related businesses in villages and rural townships, integrating the on-farm and non-farm employment.

4.3.9 Thus, there has to be a two-pronged strategy for attracting and retaining educated youth in farming. Farm graduates who own land should be encouraged to take to farming as a profession. Farm Schools on the lines recommended by NCF in its First Report, could be established in the fields of such farm graduates who are operating agricultural enterprises efficiently. Secondly, farm graduates who do not own land can be assisted to provide demand driven services through Agri-clinics, Agri-business centres, Food Parks, etc. There should be Capacity Building and Mentoring Centres to assist farm graduates to set up Agri-Clinics and Agri-Business Centres. To the extent possible, groups of 3-4 Graduates can be formed for running these enterprises. For providing Mentoring and Hand-holding Services, professors and scientists as well as NGOs could be enlisted. Arrangements should also be made for the farm graduates to undergo apprenticeship in suitable Companies. Concurrent attention should be given to on-farm and non-farm employment so as to optimise their synergism.

4.3.10 A study commissioned by the NCF had revealed that three pillars are important for creating non-farm employment opportunities. Firstly, the foundation for accelerated employment and labour productivity growth in the non-farm sector is infrastructure investment. For the non-farm sector, the key components are reliable electricity supply, all weather roads and access to landline telephone facility. Secondly, access to affordable and timely credit is crucial. It should be available for medium scale as well as tiny and small-scale units and for expansion of existing units as well as for start up of new units. Credit should be provided by formal sources which should pay special attention to productivity raising investments, for example, the motorization of previously
manual labour operations in carpenter’s shop. Thirdly, the non-farm development thrust should be directed to particular sector and sub-sectors where demand for the product or services is growing, namely, trade, transport, construction, repairs and certain services.

4.3.11 The food-processing sector is dominated by small-scale producers including traditional village industries, although some very large companies have lately entered this sector. However, the link up of small units with the large units has not developed adequately. A system should be developed where initial processing could be decentralized in the rural areas in small units [creating employment and reducing transport costs] and the final processing, quality control, packaging and marketing under brand name could be done in a centralized manner [by a farmer’s organisation or other business unit] near or in a city in an integrated manner. In order to bring our food products at par conforming to international safety and quality standards, it would be essential to set up a network of quality testing/certification laboratories across the country and also build the awareness level of our farmers on food safety, quality and trade. Thousands of suitably trained human resources are required towards this movement.

Mechanisms and Institutions for Non-Farm Employment

4.3.12 A series of institutional, structural and strategic arrangements have been made and proposed from time to time to provide non-farm employment. These include: Khadi and Village Industries Commission (KVIC); National Rural Employment Guarantee Programme (NREGP); Agri Export Zones (AEZs); Technology Parks such as Biotech Parks, Food Parks, Textile Parks; Small Farmers’ Agri-business Consortium (SFAC); and Food, Fodder, Feed, Seed and Gene Banks.

4.3.13 Khadi Village Industries Commission: KVIC, with its 30 State khadi and village industries boards, over 3,500 institutions, over 29000 cooperative societies, 14200 sales outlets and its Boards assisting over 5 lakh artisans and having reached 2.35 lakh villages, is perhaps the largest retailing system in the country. But, its potential in the marketing system has not been fully exploited. To bridge this gap, a good number of
corporate houses have entered the retailing sector. KVIC should modernize and strengthen itself to energize the rural marketing system. SFAC, started by Dr. Man Mohan Singh, the then Finance Minister in 1992; which is yet to prove its utility of enabling small farmers to take to market driven agri-business, should join hands with KVIC in the process of setting up technical back-up units interface (TBU/Interface) with several institutes in the country to provide thrust to entrepreneurship programmes supported by strong science and technology research inputs for production activities utilizing local resources and local skills of the people. This modernized huge network should be able to provide quality employment to thousands of Farm and other Graduates in the rural areas and provide the missing market infrastructure to directly link farmers with the market.

4.3.14 **National Rural Employment Guarantee Programme (NREGP):** Work, water and power are the triple needs of rural India for accelerating economic development. NREGP will particularly promote inclusiveness and help in building rural assets particularly in these areas which would increase sustainable income generating opportunities in the rural areas and the programme should favour the unemployed youth, rural women, the tribals and the other distressed people. The ultimate aim of NREGP must be to train/retrain and improve the human capital from unskilled to skilled so as to enhance employability of rural people who could more effectively and sustainably contribute to the rural reconstruction process.

4.3.15 **Agri Export Zones:** The 60 AEZs already notified by the Government in 20 States also provide unique opportunities for self-employment of educated youth who could deliver an appropriately priced and attractively packaged quality product in the international market. APEDA supplements, within its schemes and provisions, efforts of State Governments for facilitating such exports. The products covered are mostly horticultural – fruits, vegetables, potatoes, flowers, medicinal and aromatic plants. Basmati rice, quality wheat in Madhya Pradesh, sesame seeds, vanilla, seed spices, lentil, gram and Darjeeling tea are also included. Performance of the AEZs has, however, been uneven. A peer evaluation has been conducted to assess the strengths and weaknesses and to suggest remedial measures. Action plan to give impetus to the scheme is being
framed. This initiative should be linked with related KVIC Programmes and activities to leverage employment of farm graduates and other educated youth. Some of the non-performing AEZs could be converted into Rural Economic Zones (REZs) with a broader objective of attracting the private sector to develop rural infrastructure, efficient and reliable inputs supply and rendering effective extension services geared for competitive and enhanced agricultural production and distribution. The Government should provide necessary fiscal and other concessions to the private sector, as being currently done for the AEZs. The move will create a good number of both on-farm and non-farm jobs. If successful, the model should be widely adopted. The recent initiatives of some of the leading corporate houses, the moves on farmer-friendly contract farming, NREGP and Rural Business Hubs should converge within the Rural Economic Zones through the Pan- Ministerial arrangement proposed by NCF.

4.3.16 **Technology Parks:** In order to provide end-to-end connectivity and to ensure backward-forward linkages among various components of production-processing-marketing chains, Technology Parks – Biotech Parks, Food Parks, Textile Parks etc are being rapidly established. As far as possible, these parks may not be located in large cities but should be strategically established in smaller or satellite towns contiguous to rural areas with effective transport, communication and market linkages. A good example is the Womens’ Biotechnology Park functioning in Siruseri village near Chennai. These parks should work on the lines of IT Parks so as to attract farm graduates and other Graduates with experience in Agri-Business and entrepreneurial development. The parks must become hubs of outsourcing of products of international quality, such as designer hybrid seeds, vitrocultured material, bio-pesticides, bio-fertilisers, etc. which will be particularly conducive to the expansion of organic farming. With the termination of the textile quota regime in textile importing countries, textile parks in India have huge opportunities to expand textile and garment export and thus generate sufficient additional employment. **Such parks will exert a “pull” for provision of quality raw materials and promote congruence between off-farm and non-farm employment.**

4.3.17 **Food, Water, Fodder and Feed Banks:** Food Banks or Community Grain Banks are an important component of food security package. These are congruent to the
Public Distribution System (PDS) to enhance access to food on part of the poor as well as to widen the food security base by including wide range of millets, grain legumes and tubers. Likewise, Community Water Banks, consisting of augmented supplies, demand management through the principle of “more crop per drop”, and harnessing new technologies for enhanced water use efficiency, should be established. As detailed in NCF Second Report, about 1200 Fodder and Feed Banks should be established at strategic sites, with priority in rainfed arid and semi-arid zones. These Banks should be created at Panchayat Samiti level and managed preferably with the help of SHGs and Small Farmer Estates involving also farm graduates and other youth.

4.3.18 **Seed Banks:** Seed Banks, particularly established and managed by farm graduates, could be a full time quality Non-Farm employment avenue. The Seed Banks are important especially for ensuring contingency crop production in the event of droughts and floods and other natural disasters as well as for ensuring timely planting. Seed villages for different crops, strategically located throughout the country, with at least one Seed Bank located in each large village are cluster of small villages, will ensure better income not only from seed production but also from enhanced and sustained production.

4.3.19 **Gene Banks:** Under the National Protection of Plant Varieties and Farmers’ Rights Act, the farmers and other rural communities should collect, conserve, document and utilize the indigenous genetic resources and establish Community Gene Banks. These Banks should be operated by farm graduates and other enlightened youth and should be linked with the National Gene Fund and National Biodiversity Fund. The efforts of the grassroots people in conserving the genetic resources should be duly rewarded under the Farmers’ Rights. State Farms could be used for developing **Living Heritage Gene Banks** of the Germplasm of local breeds of cattle, sheep, poultry, etc. and, wherever possible, they should be handed over to farm graduates or farmers’ organisations or NGOs for management on scientific lines and should be monitored by a committee consisting of local farmers’ representatives, scientists and NGOs.
Synergy Among Employment Programmes: Pan Ministry of Agriculture- Ministry of Rural Development Initiative

4.3.20 All programmes for generating off-and non-farm employment should be integrated into one initiative like China’s Town and Village Enterprise [TVE] Programme, and a Rural Non-Farm Initiative should be launched particularly for families without land or other productive assets. The need is for a counterpart to the National Rural Employment Guarantee Programme [NREGP] in the skilled employment sector. The initiatives like SFAC, Agri-clinics and Agri-business Centres, Food Parks etc could be strengthened and made more effective. The Rural Non-Farm Livelihood Initiative [RNFLI] could have as its core the KVIC and the restructured and strengthened SFAC and bring all rural non-farm employment programmes together, in order to generate convergence and synergy among them. A Consortium approach may be considered for the purpose involving the Central and the State Governments, Academia, NGOs, public and private sector industry, banks and financial institutions etc. The programme may have to be market driven and at a massive scale to have impact across the country. In order to achieve desired synergy among various Ministries presently dealing with Non-Farm Employment, it may be useful to consider some reorganization and consolidation of all programmes concerning agriculture-led rural industrialization preferably in a Pan Ministry of Agriculture-Ministry of Rural Development Mode.

4.3.21 The process of preparation of the Eleventh Five Year Plan has started. In the Eleventh Plan there is need for an integrated strategy of providing the services needed by farm families and for making our agriculture knowledge intensive. The strategy developed for this purpose should include providing space for self-employed farm graduates in undertaking enterprises and agri-services which will help them to earn their living. At the moment Government is running parallel services which are mostly free and therefore opportunities for earning by farm graduates are very limited. Therefore while designing the new strategy for the scientific transformation of crop and animal husbandry, fishery, agro-forestry and agri-business, there is need for integrated planning and action so that the different actors (Government, industry and farm graduates) all have
well defined spaces. There must be synergy and convergence in the different initiatives. In fact, increasingly the Government should play the role of a facilitator and withdraw from directly running agri-services particularly in those areas where successful SMEs run by rural youth have come up. Service cooperatives should play a proactive role in the REZs.

4.4.0 Generic Opportunities

Home Market

4.4.1 Nearly 94 per cent (in value terms) of our total agricultural produce is distributed and consumed domestically, and with a 1.1 billion population, we have a huge home market. NCF had recommended in its Third Report the establishment of an Indian Trade Organisation (ITO), which will safeguard the interests of farm and fisher families by providing a Livelihood Security Box to ensure fair trade. It should be emphasised that there is no level playing field between the capital, subsidy and technology driven mass production agriculture of the industrialised countries, and the ‘production by masses’ agriculture of India characterised by weak support services, heavy debt and ‘resource and technology poverty’. Reiterating that 65% of consumers in India are also producers, majority of them marginal farmers, we must jealously protect the interests of the majority producers-consumers instead the interests of traders-importers. The steps recommended by NCF for promoting an Indian Single Market need to be examined and implemented. The livelihood entitlements notwithstanding priority should be given to infrastructure development and services support for achieving sustained livelihood security. Moreover, nothing should be done which will destroy job opportunities in rural India.

Export Market

4.4.2 In relation to commodities that are exported, it will be essential to conform to WTO regulations. At present, such commodities constitute about 7 per cent of total agricultural production in the country. Quality and trade literacy programmes have to be launched across the country. Farmers’ Associations and SHGs should be helped to export on competitive terms by spreading awareness of the opportunities available for external
agricultural trade. In such cases, cost, quality and reliability of supply will determine long-term trade relationships. The agri export zones should be further strengthened and should become places where farmers will get the best possible price for their produce.

4.4.3 **Horticulture:** Registering a steady growth of about 4 per cent annually, horticulture is hoped to enhance returns to the farmers, generate rural employment, increase farm exports and expand agro-industrial base. Despite the satisfactory growth, India’s share in the world export of horticulture commodities and products is only 1 per cent. As mentioned earlier, the AEZs, most of which are structured around horticultural crops, including the fast growing floriculture industry, must convert this challenge into a great opportunity. Organic horticulture holds great promise for pushing up exports and farmers’ income. The highly diverse agro-ecological settings in the country, matched with equally diverse and rich germplasm and aromatic plants offer unlimited opportunities for niche production, such as seabuckthorn in Ladakh (leh berry), value addition and distribution (domestic and export) of veritable horticulture species, providing new opportunities for youth employment. Several of the KVKs should be designated and restructured as *Udyan aur Udyog Vigyan Kendras* to generate desired human resources and technology transfer, emphasising backward-forward linkages. In the context of very many technologies developed for a diverse range of horticulture crops, it is essential to focus on a few priority technologies and species whilst addressing establishment of primary processing centres. Establishing primary processing centres at the selected rural centres of select fruit and vegetable crops for production in sizeable quantity would serve to protect the crop from perishability and reduction in bulk, and will promote easy transportation, storage and trade including value addition, and finally greater return to the farmer. Post-harvest losses in horticultural crops are estimated at Rs. 50,000 crore annually – a huge loss. The NHM thus must concentrate on prevention of post-harvest losses, processing and value addition, and quality, biosafety and trade literacy must be actively promoted throughout the production-distribution-consumption chain. The scope of employment generation for farm graduates and other Graduates is high mainly in the upstream areas, namely, basic processing, minimal processing and extended storage and processing.
4.4.4 **Medicinal and Aromatic Plants:** Medicinal and aromatic plants provide a window of opportunity to farm graduates and other youth to be employed in concurrent strengthening of health, food, nutrition, and livelihood security of farm families. India, as one of the biodiversity rich countries with a rich heritage of traditional medicine, whose demand in developed countries is expanding exponentially, has the potential to be a leading player in this sector. But the resources are not being judiciously harnessed. Global market of MAPs is estimated at about US$ 100 billion. India’s share in this market is hardly 3 per cent. China’s annual export of MAPs is valued at nearly US$ 50 billion. In order to harness this huge potential, investment must be made to ensure safety and efficacy of products, standardization of products and suitable regulation, proper pricing for harvested and cultivated produce, and to promote a market oriented cultivation for the home and external markets. Documenting and recognition of traditional knowledge on medicinal plants, and setting up a single window information portal are the areas needing immediate attention. In addition to the AEZ on MAP, community-based herbal gardens and enterprises and **Herbal Biovalleys** on the model of the Silicon Valley may be nurtured for providing the infrastructure needed for the conservation and sustainable use and export of medicinal plants. Organic and Contract Farming are particularly suitable for MAPs, especially in hill States, and deserve necessary technological institutional and marketing support.

4.4.5 **Biological Software for Sustainable Agriculture - Biopesticides:** Biopesticides industry is yet another highly underutilized employment opportunity for educated youth. About 700 products of different microbials are currently available worldwide. In India the utilization of microbials in pest management is in a take off stage with the commercial registration and availability of at least 16 bacterial preparations, 38 fungal formulations and about 45 insect viruses’ formulations. A study carried out by the National Centre for Integrated Pest Management in 2004 has shown a wide gap between the demand and supply position of these microbials. The entire chain from production, marketing, quality control to utilization needs to be established and vitalized to ensure that the farmers have an easy, timely and cost-effective access to quality biopesticides. At present, biopesticides represent approximately 4.5 % of the world insecticide sales. The
growth rate of biopesticides over the next ten years has been forecast at 10-15% per annum in contrast to 2% for the chemical pesticides. The targeted growth rate can be achieved only if the serious constraints in the widespread adoption of biopesticides are overcome. Biopesticide registration procedure must be simplified. Trained personnel and well-equipped laboratory should comprise a network of accredited Referral Laboratories. Unemployed agricultural graduates can be trained in production, marketing and use of biopesticides and empowered to establish and operate Bioclinics, where biopesticides as well as biofertilizers could be produced and marketed. NABARD and other nationalized banks should support this initiative to establish viable small-scale cottage industries in rural area sector with technical support and provision of nucleus cultures of effective strains from SAUs and ICAR Institutes. Krishi Vigyan Kendras can function as hubs to network the rural producers in each district. Biopesticides have a crucial role to play also in organic cultivation. Due to the very nature of biopesticides, being live products, there are risks at different links of the production-utilisation chain, which should be covered through suitable insurance provisions. All the entrepreneurs/agricultural graduates engaged in biopesticide production should be given marketing help, sales and other tax waivers, and various target oriented incentives.

4.4.6 Biofertilizers: Biofertilizers, live formulations of agriculturally beneficial microorganisms, which on application to seed, root or soil can mobilize the availability of nutrients by their biological activity and help to improve the soil health, increase TFP, microbial life and soil stability, are other group of highly under-exploited biological software. India is one of the important producers of biofertilizers, annually producing 12,664 tonnes. Maharashtra, Karnataka, Tamil Nadu, Madhya Pradesh and Gujarat accounted for 30, 22, 21, 11 and 6 per cent of the national production, respectively. Several of the States, such as Punjab, Haryana, Himachal Pradesh, Assam, Bihar, Uttarakhand had negligible or nil production. Ironically, hill States, viz. Himachal and Uttarakhand, which have declared themselves as organic states, have zero production of biofertilizers. On the other hand, the country has enough scientific excellence, rich germplasm, and protocols for bulk productions. Realizing that TFP growth is declining as the soil carbon content is depleting fast, enhanced use of biofertilizers should be promoted to improve soil carbon, nutrient utilization efficiency, soil structure and product
quality. Integrated use of compound biofertilizers in combination with chemical fertilizers and other organic manures should be popularized as per the need of the cropping system prevalent in a given agroclimatic zone. In order to further enhance the effectiveness of biofertilizer use, there is a need to shift from carrier based inoculants to liquid inoculants as they have high cell count, longer shelf life and minimum contamination. Further, formulations should be developed which could be stored at room temperature for 1-2 years and quality of the product must be protected by opting for BIS standards and employing technically skilled personnel. All the suggestions made above for marketing, training, awareness raising, certification and institutional support for strengthening the biopesticides industry are equally applicable to the biofertilizer industry, and should be implemented.

4.4.7 Vaccines and Diagnostics: Vaccines and sero-diagnostics provide yet other exciting avenue for self or salaried employment in the fast expanding livestock industry. In order to avail this opportunity, the following aspects must be kept in mind:

- The consistent production of high quality, safe, potent and efficacious vaccines requires quality assurance procedures to ensure the uniformity and consistency of the production process;
- Vaccine quality, safety, potency and efficacy must be ensured by consistency in the production process; Control procedures selected should be those that best fit the conditions under which vaccines are produced and should comply with good manufacturing practices; and
- Worldwide harmonization of standards for veterinary biologicals will be of help to chief veterinary officers who must follow the instructions given in the OIE International Animal Health Code, as they apply to all biological products for use in international trade; worldwide harmonization of registration rules should be ensured to simplify and facilitate international marketing of the products.

4.4.8 Fisheries: The fish industry is also expanding fast and may prove economically rewarding to young fishers. As recommended in the NCF’s Second Report,
the National Fisheries Development Board (NFDB) will be a professional body and function on the lines of the National Dairy Development Board (NDDB) for assisting fisher families to enhance the productivity, profitability and sustainability of both inland and marine fisheries. The Board is supposed to give highest priority to infrastructure for post harvest handling, quality, processing and promotion of sanitary and phytosanitary measures towards increasing hygienic production and trade of fish. In particular, in order to enhance the market value of Indian fishes, production and marketing of special organic fish products and air-breathing fishes as health food should be given high priority. Recognising that fish production has been growing at relatively high rate of 4-5% per year, the strengthening of processing, value addition and export of fish and fish products will provide new employment opportunities particularly in coastal zones. However, with the rapid growth of aquaculture, this trend will be equally visible in inland fish production throughout the country. For instance, the large water-logged areas in Haryana could be most profitably utilized for scientific fish production, offering not only judicious use of unexplored resources but also significantly adding to the States’ income as well as to the income of the fish farmers and other associated persons in the industry.

4.5.0 New Technologies

4.5.1 Access to market and innovative technologies will not only be intellectually stimulating but also a major motivating force for the young graduates to harness new technologies. The rural women and men must be self-employed with new skills and powers, such as biotechnology, information and communication technology, space technology and renewable energy technology. On the lines of ICT revolution in which India is the main outsourcing country in the world, the developments in the cutting-edge agricultural technologies could similarly be used by the huge trained manpower in India to provide need-based products, such as high quality hybrid seeds, *vitro* plants, vaccines, diagnostics, biofertilisers, biopesticides, etc. Necessary infrastructure and technology transfer mechanisms to establish integrated production-processing-marketing system will be essential for harnessing these opportunities. In every village at least one woman and one man should be trained to be Farm Science Manager so that army of grassroot enlightened and committed people could launch an eco-technology revolution – marrying
traditional wisdom and frontier science and technology, leading to an evergreen revolution.

**Information and Communication Technology (ICT) - Gyan Chaupals**

4.5.2 Ecologically sound and economically rewarding agriculture is knowledge intensive. Fortunately, based on the recommendations of the NCF, as contained in its First Report, the Government has already taken steps to establish knowledge connectivity through the e-governance and to develop **Every Village a Knowledge Centre**. For this, the Government is committed to provide a slew of measures so that rural user can access information of value and transact business. This will include connecting block headquarters with fibre optic network, using wireless technology to achieve last mile connectivity and operating information kiosks through a partnership of citizens, Panchayats, civil society organizations, the private sector and Government.

4.5.3 Effective implementation of the Every Village Knowledge Centre Movement and management of *Gyan Chaupals* will empower rural men and women by promoting and enhancing literacy and awareness at grassroots level especially on new and appropriate farming systems and season specific technologies, prices and marketing of inputs and agricultural produce and products and on disaster management and mitigation. New ICT technologies, such as e-agriculture, whereby agricultural information can be presented in multimedia formats to improve knowledge sharing in local cultural context, should be promoted.

4.5.4 Moreover, ICT systems must strengthen research-extension-education-farmer-market linkages through public private partnerships including the synergies with KVKs (KVUKs), ATMs, SHGs, SFEs etc. With a greater emphasis on facilitating transparent and timely adoption of various regulatory standards and guidelines to enhance access to quality inputs and markets, the public sector extension and ICT system should play a leading role in the **Agricultural Renewal Movement**. The NCF recommendations on Community Radio for enhancing the access to the unreached and to harness “air waves or frequencies which are not private properties”- a sort of revolutionary development in the ICT sector, shall certainly attract farm graduates to these connectivities which will
instantly link them with the world and directly enhance their competitiveness in the domestic and international markets.

**Biotechnology**

4.5.5 Biotechnology is a revolutionary and high pace technology with unprecedented opportunity. But, its progress in India has not been satisfactory. So far the country grows only one commercial biotech crop product, namely, Bt. Hybrid Cotton, that too the technology was imported from a foreign multinational. Moreover, a part of the Bt Hybrid Variety seed distributed by some companies to the cotton farmers is “illegal.” However, when quality authentic seed was used, the technology has certainly demonstrated its impact in significantly enhancing yield and fiber quality and in reducing environmental pollution and crop maturity duration, even though the seed was highly priced and the bio-safety measures adopted by the farmers have often been unsatisfactory. Bt. Detection Kits are available and should be used judiciously and transparently to confirm truthfulness of the seed and to build up quality control and faith of the farmers in the technology.

4.5.6 The biotech revolution is primarily propelled by the private sector. As per our needs, prospects and capacity, India should adopt an appropriate policy on biotechnology which must map out ways to benefit all stakeholders, especially small farmers, and minimize potential negative effects. The potential of biotechnology should be approached with a balanced perspective by integrating it with national development priorities, private sector interests, market possibilities, potential for adoption by farmers, public perceptions of safety, and consumers' views. An autonomous **National Biotechnology Regulatory Authority**, on the lines recommended by the Swaminathan Committee in 2004, should be established. The National Commission on Farmers, based on consultations with farmers and farmers’ organisations, September 2005, suggested that the **National Policy on Biotechnology** must address the following issues: (i) value, usefulness and appropriateness of biotechnologies, (ii) risk and biosafety aspects and their management, (iii) equity and ethical dimensions, overall awareness and promotion of pro-poor features of biotechnologies, gene literacy, (iv) control of and access to
biotechnologies, the role of public and private sectors, harmonization of various regulatory provisions, and (v) investment in research and other institutional supports and partnerships for transparent and balanced harnessing of biotechnologies. It had emphasised that **Pro-poor features of biotechnology should be judiciously harnessed to attack directly the issues of food insecurity, malnutrition, and poverty.** These recommendations and the draft Policy should be firmed up and announced without any further delay. The safe and responsible use of the tools of genomics and genetic engineering will help to launch the country on the path of an ever-green revolution. The organic agricultural movement has also accepted Marker Assisted Selection as an important research tool.

**Renewable Energy: Fuel Security**

4.5.7 The spiralling high prices of petroleum and other fossil fuels have severely stressed the country’s economy. Development and judicious use of renewable energy should thus be an extremely high priority for the nation. India’s need for energy is projected to triple over the next 20 years. Energy that is now a severe drain on the growth of the local economy can be converted into an engine for economic growth by an alternative approach. Farmers and rural people have extremely poor access to regular energy supplies, which has been adversely effecting both agricultural production and on-farm agro-processing. Renewable energy technologies relevant for application in rural areas are Biogas Plants, Solar Photovoltaic Technology, Biomass Gasification, Mini Hydro Power and Biofuel Technologies. In particular, If the country makes a strong commitment to the development of bio-mass power and bio-fuels, it can act as a powerful stimulus to rural job creation and prosperity, while radically reducing India’s dependence on imported fuels. Farm graduates can lead the national bio-energy drive and help transform their own fate as well as the agrarian and overall energy economy of the country.

4.5.8 India also has the capacity to generate bio-fuels in massive quantities based on Curcas (*Jatropha curcas*). The cost of production is competitive with other fuel oils. Cultivation of 10 million hectares of this crop, often utilizing wasteland, could produce 12 million tons of bio-fuel annually, while generating year-round employment for 7.5 to
10 million people. Only proven genetically superior high oil-yielding clones should, however, be commercially popularized, otherwise the outcome will be unsatisfactory as already seen in some of the States.

4.5.9 Ethanol, which can be produced from maize, tapioca, sugarcane, sugar beet, sweet sorghum and other crops, is another bio-fuel with enormous potential. It can be mixed as a pollution-free blend with petrol and diesel. Ethanol-petrol fuel blends are utilized in more than 20 countries including Brazil, Canada, Sweden and USA. USA consumes 4 billion litres of ethanol as motor fuel per annum. Brazil consumes more than 16 billion litres of ethanol annually and meets 41% of demand for transport fuel from this source. Between 1979 and 1992, an ethanol fuel strategy enabled Brazil to reduce reliance on imported oil by 70 per cent.

4.5.10 India presently consumes approximately 40 million tons of diesel fuel and 6 million tons of petrol per annum. Assuming a 10% blend of ethanol with petrol and diesel, the total requirement of ethanol would be 4.6 million tons per annum. With engine adjustments, much higher ethanol blends can be utilized, creating a potential demand for more than 10 million tons of ethanol per annum. India’s sugar economy has been fluctuating between surpluses and deficits. The strategy for sugarcane production for sugar and ethanol production should be worked out on economic considerations keeping in mind income of the farmers and consumers’ need and economic access to sugar. Sugarbeet (tropical varieties) and sweet sorghum may offer better alternatives, which should be examined scientifically and economically and a national programme of biofuels should be developed. Likewise, maize holds promise for ethanol production in Punjab. A systems’ approach is necessary for ensuring synergies among the various components of national biodiesel programme to delineate farming areas of crops used in ethanol and other biofuels. ICAR, CSIR and SAUs should jointly undertake to work on developing suitable processes for the purpose.

4.5.11 As suggested by NCF, the Planning Commission is proposing to establish an Integrated Rural Energy Programme (IREP) in the Eleventh Plan. An outlay of Rs. 1.2 crore per year per district would be provided for the implementation of the Programme,
total outlay being of the order of Rs. 4000 crore. The funds are proposed to be mobilized from the State Plans, as well as from NABARD, RBI and the communities and their beneficiaries. A major human resource development component would be included in the programme benefiting all stakeholders – from farmers upward. It is projected that as a result all India’s villages will be energized during the next ten years.

**Space Technology - GIS and Precision Farming**

4.5.12 Space technologies, particularly Remote Sensing (RS), Geographical Information System (GIS), Global Position System (GPS), etc. are being used for forest cover monitoring, biodiversity mapping, regulating pollution, land and water resources management, pest forecasting, developing decision-support systems and disaster management. These developments will go a long way in estimating gaps between current production and agroecological potential by systems’ modeling and in generating and transferring technologies to promote precision agriculture, leading to efficient use of resources and inputs for attaining sustainability and enhanced productivity. Monitoring of the Himalayan eco-system will greatly help in monitoring climate change and its management. But, are these technologies being adequately used in the country?

4.5.13 Using the various technologies and tools, emphasis should be placed on precision agriculture leading to the development of agricultural management system that takes care of within-field site-specific variability. It is the only viable alternative to optimize input and maximize output – a necessity for increasing India’s agricultural competitiveness in the globalised and liberalized world. Adequate financial and human resources should be provided to develop necessary hardware and software. These should be made available to each KVK and ATMA center. The Farm graduates and other educated youth should find these developments particularly stimulatory to attract them to science-led precision farming. Synergistic interventions of scientists, field functionaries and farmers are called for. A National Institute for Space Applications and Precision Farming should be set-up jointly by ISRO and ICAR to provide the necessary technological leadership to assist the States and decentralized institutions in different...
agro-ecological zones of the country to apply the new techniques towards precision agriculture and resource conservation and use.

### 4.6.0 Opportunities in Major Agro Ecological Zones

#### Hill Areas

4.6.1 Mountain and Hill ecosystems cover nearly 50% of the total national geographic area and occur in almost all the agro-ecological zones of the country. The Himalayas, extending 2,500 km in length and 250 to 400 km in breadth, the tallest water tower of our planet, occupy about 80% of the mountain and hill area of the country. This ecosystem is the richest repository of biological and agrobiological diversity, and the snow and glacier fields act as reservoirs for terrestrial and aquatic species and snow micro-organisms. Pashmina goats, yak, aromatic rices, landraces of sorghum, veritable fruits and vegetables, multicob maize, saffron, orchids, bamboos, cold water fishes and the like constitute unique germplasm treasures of the hills and mountains. Several rare genes have been used from Himalayas and Western and Eastern Ghats for enriching our major crop species.

4.6.2 **Organic Farming:** Some of the hill States have declared themselves as organic States. The world trade in organic agricultural products is currently of the tune of about US$ 40 billion and has been growing at an annual rate of 15% in the recent years. India’s share in the global trade is, however, only 0.3%, but has the potential to be raised to 20%. Several national and international enterprises, business houses and investors are attracted to organic farming, besides individual organic farmers and organic farmers’ associations. Organic farming is ideally suited to hill agriculture, especially for MAP and horticultural species and to jhuming. Around 50 tonnes of different varieties of organic spices were produced annually under the auspices of the Spices Board which has formulated well-developed protocols for organic production of spice crops, their certification system and market links. To begin with, the hill States should concentrate on production of organic spices (ginger, turmeric, black pepper, large cardamom) and different medicinal and aromatic plants. Assuming that a market growth of organic spices in Europe, US and Japan is approximately 10% per annum, export of organic spices will
get a significant production boost in the coming years. Same is the case of organic tea, where international demand is very high and smallholders’ organic tea gardens promise high socio-economic returns. About 25,000 model Organic Villages or contract farms of the strategic commodities should be developed in the hills during the next five years, and local farm graduates and other youth should be assisted to lead this movement.

4.6.3 Although the GOI has already taken steps to have indigenous certification system to help small and marginal growers and to issue valid organic certificates through certifying agencies accredited by APEDA / Coffee Board / Tea Board / Spices Board, the situation is far from satisfactory. A focused national movement on organic agriculture with a credible certification of the process and produce, coupled with quality and trade awareness and literacy is a sine qua non for mainstreaming and integrating organic farming in the national agricultural economy. In many countries, certification is covered by legislation, and commercial use of the word organic, outside of the certification framework, is illegal. It must be emphasized that establishing and running credible organic farming systems is much more complex and demanding than the usual inorganic-based agriculture. But, it is do-able and should be done for harnessing the unique opportunities in India and abroad. The National Programme for Organic Production (NPOP) has already developed internationally agreed standards for products and labelling. The Hill States should not only be linked with the NPOP, but should be given priority because of the obvious comparative advantages.

4.6.4 Debate on institutional back up support for organic farming to succeed in the hills or in other agro-eco systems should be widened and intensified. R&D institutions are still very weak and States will need to work out policies providing enabling environment for promoting organic farming. Also, organic agriculture research and technology generation is changing the whole concept of innovators. The International Federation of Organic Agriculture Movement (IFOAM) has defined organic agriculture as “all agricultural systems that promote the environmentally, socially and economically sound production of food and fibres”. It does not permit use of any chemical agents or transgenic crops in the schedule of organic farming. Therefore, much of the Green Revolution technology protocols, methodologies and perspective, which are
based on seed-agrochemicals-irrigation synergy, are of little relevance to organic agriculture. However, the concept of Evergreen Revolution, which necessarily involves pathways which do not adversely affect soil health, water quality, biodiversity, atmosphere and renewable energy sources, is compatible with organic farming concept where the emphasis is on precaution and responsibility and not on risk assessment and management (Kesavan and Swaminathan, Current Science, July 2006). Since organic agriculture is about following ecological principles in farming and its technological options are sensitive to ecological conditions of a farm, a farmer –scientist partnership is a must to undertake on-farm technology development and refinement.

4.6.5 For farm graduates, the following opportunities in organic farming exist:

• Organic farming – a value addition *viz.* Tarai Organic Farmers Amity is exporting organic Basmati Rice and is pursuing organic essential oils agribusiness
• Organic Enterprises
• Consultancy Services
• Supply chains management
• Trading linkages, both in the home and external markets
• NGOs – service provider
• Jobs with organic agencies/Consultancy services
• Own agribusiness/retail stores/trade.

Organic farming requires greater scientific inputs than chemical farming. This area of research hence needs high-level multidisciplinary attention. Internationally recognized food safety analysis and certification procedures are also needed at affordable cost. Further, organic farming zones could be created particularly in medicinal plants, fruits and vegetables, spices, tea, aromatic high quality rice, cotton and other crops which are likely to be in demand in national and international markets.

4.6.6 In order to realise the self-employment and entrepreneurship opportunities in organic farming, adequate training and retraining opportunities for graduates should be established. Courses on organic agriculture and agribusiness both for degrees and
diplomas should be included in academic programmes of the State Agricultural Universities and other Universities/institutions. Most importantly, appropriate policy and financial support for investment in organic farming would be essential for encouraging the young graduates to take to organic farming. The Graduates could particularly be helped in preparing and using Organic Farming Tool Kits based on IFOAM principles, which will prove extremely helpful in inspiring international confidence in the quality of organic processed foods and other products from India.

4.6.7 Mini Hydro Energy: The mountain topography and the water richness manifested through various waterfalls and fast flowing streams and riverlets provide unique opportunities for harnessing this renewable, low cost and clean source of electricity. A small plant of about 10 KW, costing between Rs. 10 lakh and 15 lakh could be most appropriate for electrification of an average size village. Recently, some leading private sector agencies have shown interest in harnessing the water energy by developing hydro energy plants. The mini or micro units could be linked with the macro units constituting a power grid. As energy is often a limiting factor for establishing and operating energy-based rural and agro based industries, local availability of assured and cost effective energy will greatly contribute to rural industrialization and create large number of jobs. The Central Government as well as State Governments and beneficiaries should provide necessary financial and services inputs for the establishment and operation of micro hydro energy networks.

4.6.8 Mega-Biodiversity Areas: The rich natural resource endowments of the hills and mountains include the bulk of the country’s forest resources/reserves, timber and non-timber forest products, besides possessing rich reservoirs of medicinal and aromatic plants and tremendous opportunities for various kinds of tourism, including agro-ecotourism. Due to the high pace of deforestation and other development pressures, the biological treasures of hill and mountains are eroding fast. Several of the species have entered the Red Data Book. These must be saved on highest priority through an integrated germplasm conservation approach. All concerned institutions and universities and college students in the region should be mobilized for the purpose, in collaboration with local communities. Necessary training, logistic support and conservation facilities,
including in situ conservation, should be provided. Although commercialization of forest products can help mountain communities achieve sustainable livelihoods, sustainable use of these bio resources should be ensured through appropriate institutional support and awareness raising. Panchayati Raj Institutions should be suitably strengthened to mobilize local communities to lead the conservation and utilization. Gene sanctuaries for selected species, using IK, TK and scientific knowledge, should be established and judiciously managed in a participatory mode. The local communities should be a partner in the conservation process and duly compensated as per the PPVFR Act. New crops from the Himalayan wild biodiversity constitute the greatest strength of the medicinal plants farming sector, and their end-to-end development should be institutionalised. Biovalleys should be organised in the Himalayas and in Western and Eastern Ghats to enable the local population to convert biodiversity into bio-wealth.

4.6.9 **Biovalleys:** The Silicon Valley of USA is well-known for the heavy concentration of the forward-edge companies in digital technology. What USA has done in Information Technology through the Silicon Valley, we should do in Biotechnology through Biovalleys. Biovalleys are areas rich in biodiversity and where the necessary infrastructure and venture capital funds will be provided for assisting young entrepreneurs and Women Self Help Groups to initiate enterprises designed to convert biodiversity into bio-wealth in an environmentally sustainable manner. Enterprises in the Biovalley will include the production of herbal products, health foods, biopesticides, veterinary pharmaceuticals, etc. The enterprises chosen should have market linkages. The following Biovalleys may be organized during the 11th Plan period:

a) **Himalayan Biovalley:** Suitable areas in Western, Central and Eastern Himalayas may be identified for this purpose.

b) **Western Ghats Biovalley:** This may cover the Konkan area, Goa, Karnataka (Malnod area) and Kerala (Silent Valley – Wayanad area)

c) **Eastern Ghats Biovalley:** This may cover Orissa, Andhra Pradesh and Tamil Nadu.
Enterprises in Biovalleys may be organized by **Biovalley Cooperatives or Companies**. Government should provide the infrastructure under Bharat Nirman. The private sector through CII, FICCI, etc. should extend marketing support to the Biovalley enterprises.

4.6.10 **Horticulture**: Horticulture is a very high priority in the mountain and hill ecosystem. Fruits like apple, pear, plums, peaches, oranges, cherry; new emerging fruits like passion and kiwi fruits in some States; and speciality species like seabuckthorn in cold arid zone, cardamom in Sikkim, organic tea in SFEs of Assam, ginger and turmeric in Meghalaya and Mizoram offer unique employment and economic opportunities. In some States, however, there is high concentration of one or two fruit crops, which may not be advisable in the long run. For instance, in the post WTO regime, import of apple from China, Australia and New Zealand is competing out the Himachal apple – the backbone of the State’s agrarian economy. The very special niches for other lesser known but native/indigenous horticulture crops, if promoted, will provide exclusive comparative advantage over markets and ecological suitability. Based on market research and agro-ecological mapping and matching, through inter-State consultations, commercial production and distribution of selected priority species should be systematically undertaken by commodity-specific SHGs or SFEs or through contract farming. High value crops like saffron and *Kala Zeera*, with due R & D support, can prove much more remunerative. Considering profitability, low perishability and ecological compatibility, greater attention should be paid to the production and marketing of fruit nuts *viz.* walnut, pecan and hazelnut. Anthuriums and orchids, through group farming and marketing, could become major commercial enterprises in the Himalayas.

4.6.11 The Land Use Boards, NHM and NHB and the concerned States should play a proactive role in delineation of production regimes and promotion of marketing to create win-win situation for all the partners. The Agriculture and Horticulture Universities and Colleges and other concerned institutes in the hills should design course curricula to internalize the local realities and possibilities. Their vocational and agribusiness courses and programmes should have commodity-specific hands on training programmes to
enable their Graduates and other trained youth to take to entrepreneurial activities around the speciality commodity.

4.6.12 Creation of clientele clusters with integration of production-processing-marketing will be helpful in generating meaningful employment and retaining the hill youth in their villages linked with their lands and families rather than migrating to cities in large numbers. It is proposed to train 300,000 farmers and 500 trainers at various levels in specialized areas to promote production, processing and marketing of the priority species. Farm graduates could particularly be engaged in establishing and maintaining quality mother plant nurseries both for root stocks and desired scion materials. State Plans for flow of quality planting materials of apples and other priority crops should be number one priority of Himachal Pradesh and Uttaranchal. The National Horticulture Mission should, in close consultation with the stakeholders, allocate desired financial and technical supports to this most critical area. In a public-private partnership mode, Seed Villages, Horticulture and Plantation Crop Rural Nurseries, Seed and Planting Material Self Help Groups, especially Women Self Help Groups, should be organized and supported. At least 30,000 such units should be established. Their stocks should be inventorised and the list made available for general use. Incentives should be provided to the nursery growers at least in the early stages. Individual institutions, Universities - public or private, and Government Departments should be responsible and duly empowered to timely supply breeder and mother planting materials and foundation seeds. Each State should develop annual plan for timely, quality, adequate and rationally priced production and distribution of seeds and other planting materials and should have a credible system of monitoring and correcting the unhindered flow of quality seed from the breeder/originator to the farmer.

4.6.13 Ecotourism: The landscape, water bodies, waterfalls, lakes, snow covered hills and unique flora and fauna should be harnessed to promote eco-tourism. Some of the unique livestock resources such as yak and local horses are of great tourist attraction and utility. Flower and fruit farms and arboretums conserving local wild flora are other tourist attractions. Necessary infrastructure facilities and logistics should be in place for
harnessing the opportunity. But, all care should be taken to avoid any damage to the environment.

4.6.14 **Farm Tourism:** Farm tourism can be promoted by farmers for generating additional income. This will on the one hand help address the lacuna of people in urban areas and especially the urban children not getting an opportunity of knowing what farming and farm life is all about – **Holidays on the Farm** could become a national movement. On the other hand, it will generate more employment on the farm and youth engaged in farming will gain pride in talking about their profession. Farm Tourism Hostels may be put up in suitable farms. There are a few farmers in our country who are already practicing and popularizing farm tourism (for example see www.sagunabaug.com). We need many more such initiatives across the country.

4.6.15 **Agroforestry:** In the North Eastern Region, agroforestry is a major source of livelihood and employment security. The indigenous tribes like Lepcha and Limbu used to collect large cardamom from natural forests, which were later on domesticated. Among three dozen shade tree species in large plantation areas, alder (*Alnus nepalensis*) is most abundant and preferred tree, which is a non-leguminous nitrogen fixing tree. Besides large cardamom, many food crops like maize, millet, potato, barley, chillies and colocasia are grown with alder. If a village with 100 families could set aside about 120 ha of land to grow alder trees, all families would be able to get sufficient fuelwood every year and at the same time raise crops under the alder in about 30 ha area every year. Cultivation of coffee, ginger, cardamom, turmeric and medicinal plants under the shade of naturally growing trees in Meghalaya is one of the best examples of successful combination of trees with annual crops. Many trees are lopped for their green fodder which is rich in crude protein and calcium, thus integrating the livestock sector. These are mostly grown on terraces which are widely spaced, thus causing least yield reduction of inter-crops. Different trees provide fodder at different times of the year sustaining the supply of fodder throughout the year. Department of Agriculture in Mizoram has developed its own contour trench-farming for jhum areas on hills where top portion is of undisturbed forest, middle portion is with horticultural crops and down the hill, terraced rice is cultivated with pineapple and grasses on contours, thus providing diverse options.
Many species of bamboo, palms and rattans are cultivated widely in north-eastern areas as mixed or boundary plantations. Pasture in forests is also a common practice. Sericulture based system must be a highly relevant and attractive system to the youth. Mulberry with frenchbean-groundnut followed by mustard is a profitable cropping system. With mulberry, guava/lemon/pear and pineapple in paired rows and grasses on the bunds is an ideal system for silk production and additional income from fruits and cattle rearing. Pedi-cum-sericulture is said to be more viable as the cash returns are more frequent. Agroforestry is an extremely important component of biomass generation and income gain throughout the country. A leguminous MPT, *Accacia nilotica*, is an excellent agroforestry species and should be promoted for soil protection and enrichment, charcoal making, fodder and wood.

4.6.16 In the North Western Himalayas, 60 to 70% requirement of the firewood is met from the arboreal components and several MPTs along the bunds of agricultural lands or scattered trees on the pasture lands are common agroforestry system. High rate of net primary productivity has been reported in agri-hortisilvicultural systems or agri-horticultural systems and the species number in these systems is as high as 15 tree species. Hedge-row intercropping is feasible and important on sloping hilly lands when prunned biomass during cropping season can be used for fodder and fuelwood. Kinnow based horti-silvi-agricultural system at Dhaulakuan is a model programme. To accommodate the demand for wood for packing of horticultural produce in the region, a horti-silvi-pastoral system has also been developed growing trees of Santa Rosa plum and field boundary were utilized for growing *Populus deltoids* with excellent economic returns. The strategy to develop Agroforestry systems in Western Himalayas should be based on the economy of fruits supplemented with cattle, keeping in view the soil conservation aspect. Therefore, fruit trees must be grown with forages, food crops, vegetables and MPTs on small watershed basis. The timber woodlots for supporting cottage industries may help to improve the socio-economic status of rural people. The establishment of Y.S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh, is a laudable development to meet the training and research demands of the
State. However, the Business and Post-Harvest components of the University programme need to be strengthened. This experience should be replicated by other States.

**Arid Zone: Convert Arid Land into Oasis**

4.6.17 **Horticulture:** In Arid Zone also, Horticulture is the most important sector, along with Livestock to provide diverse employment and economic opportunities. Fruits like aonla, custard apple, pomegranate and citrus (kinnow, sweet orange), medicinal plants like isabgol and seed spices like cumin are the income leaders and export items from Rajasthan and Gujarat. The cold arid region is suitable for quality production of temperate and rare fruits such as seabuckthorn, exotic vegetables and vegetable seeds. Apricot is a commercial crop in Ladakh and sold as dried apricot. Kargil area is well known for dried apricot. Top working of seedling trees of apricot with improved cultivars amenable for drying has been standardized, thus helping in upgrading the quality of the produce and income from the existing orchards. Post-harvest technologies for drying through osmotic dehydration have also been developed. The youth should be trained and provided assistance for establishing small dehydration units which will provide additional employment as well as increase income of the growers - returns from osmotically dried apricot is about five times of that from traditionally dried fruit.

4.6.18 Farm graduates in cold arid areas have excellent opportunities for employment and income from vegetable and vegetable seed growing under **low cost polyhouses. The ‘trench technology’** has also revolutionized off-season cultivation of vegetables and strawberry. Among spice crops, identification of high yielding genotypes of *Kala Zeera* and standardization of agro-techniques including propagation have helped its commercialization. Similarly, R&D efforts in standardising both production and post harvest technology in saffron have already started paying dividends by enhancing production and quality of saffron in J&K. Hand holding by SFAC and NABARD will go a long way in promoting gainful self-employment of graduates in production and marketing of the high value low volume commodities in J&K and help in bringing prosperity and peace in the valley. The AEZs in Rajasthan for seed spices are yet other employment channel.
Livestock: Livestock is the main source of livelihood in semi-arid zone. For instance, it provides income support to two-third of the population in arid Rajasthan and is the mainstay of desert people. Most importantly, ownership of livestock in arid agro-ecosystem is positively egalitarian. Livestock-based agro industries, producing and marketing milk and milk products, leather goods and other by-products, are main source of off-farm and non-farm employment. Drought-hardy breeds of cattle, sheep and goats are required to be integrated in farming systems of the region, looking into the aspects of breeding, feeding and management of livestock. Farming systems involving animals + grasses + crops + trees + shrubs + horticulture, may bring about perceptible change in the socio-economic status of the people. Off-farm employment and per capita income of the rural people can be considerably increased through appropriate farming systems involving livestock.

The arid region constitutes 30 percent of total sheep, contributing around 40 per cent of total wool production of the country. The sustainability of the sheep production, however, is facing challenges as the pasture and common grazing lands are shrinking everyday and there is increase in pressure on these lands. Intense effort is required to develop research based, regionally relevant, ecofriendly and economically viable sheep rearing practices, meat and wool technologies that could be adopted in different arid settings of the country with varying scale of inputs and investments. Socio-economic survey of sheep and goat breeders undertaken by ICAR’s Central Sheep and Wool Research Institute, Avikanagar, has shown that average annual real income of sheep breeders has been increasing by 8 percent per annum. This magnitude of return should entice youth, especially Animal Husbandry Graduates, to take to sheep-husbandry, handling end-to-end management.

Arid agro ecosystem, with nearly 23 million goats, accounts for about 16 per cent of the country’s goat population, against 12 per cent of the total geographic area, highlighting relatively higher concentration of goats in arid agro ecosystems. Goats in the cold arid contribute about 40 metric tonnes of Pashmina, the costliest animal fiber for garments. Goat meat has the advantage of being preferred by all the communities and the demand invariably exceeds the supply. The goat milk contributes more than 4 percent of
total milk produced in India, yet its greatly dietary value and superior milk products have not been recognised and exploited for export. The skins of Indian goats are considered to be of very high quality. **The poor man’s cow, especially in arid zones and in isolated cold hilly regions, goats offer new nutrition, income and employment opportunities.** The SAUs in Rajasthan and the adjoining Gujarat and concerned ICAR Institutes in the region should establish model training, production, processing and product utilization centers on livestock, especially sheep and goat. Their academic programmes must have production-processing-business courses both theory and practical to generate need-based humanwares.

**Semi-Arid Zone**

4.6.22 **National Rainfed Area Authority (NRAA):** Yield, productivity and income gaps are particularly large in rainfed areas. Keeping this in mind as well as recognizing that rainfed areas have much higher concentration of poverty than the irrigated areas and their potential is highly under exploited, the NCF had recommended (Second Report) the establishment of a National Authority to holistically address the challenges of rainfed areas. Fortunately, the Government has now cleared the establishment of the National Rainfed Area Authority (Box I).

4.6.23 **Preparing to Meet the Challenges of Climate Change:** Climate management could be another area where educated youth can perform a valuable role. **Climate Management Centres** may be promoted by the National Rainfed Area Authority, where young farm graduates will be engaged in preparing **computer simulation models** of different weather possibilities, particularly with reference to temperature and precipitation. Based on the simulation model, they can help in fostering anticipatory action both to mitigate the adverse impact of aberrant weather, and to take advantage of good monsoons. NRAA could promote village-level Climate Manager by giving them appropriate support.

4.6.24 The extremely low and uncertain income is the main cause of reluctance of the younger generation to enter rainfed farming. Therefore, the basic mandate of NRAA should be to help farm families to achieve income and work security by promoting
farming system approach to foster water harvesting, conservation and sustainable and equitable use of rainwater to provide income and livelihood security to rural communities through increasing sustainability and productivity of crops, livestock, forestry and fisheries. The NRAA should be a highly professional body to synergise ecology, economics and employment to meet its mandate. Management of food, feed, seed and water banks, risk management and promotion of conservation farming should be vital functions of the Authority. Increasing imports of oilseeds and pulses - the predominant rainfed crops (livelihood crops), amount to importing poverty and hunger for the rainfed people. The NRAA must develop and strive to implement rational policies on import.

Box I

National Rainfed Area Authority (NRAA)

The problems of rainfed agriculture have received the attention of the Government at the highest levels with Prime Minister announcing to the Nation in his Address on 15th August, 2005, “Large parts of our country are still dependent on rainfall and we will focus on removing the problems of farmers in dryland areas. We are considering setting up a ‘National Rainfed Area Authority’ for this purpose.”

A series of high-level meetings, including the First and Second Meetings of the Agriculture Coordination Committee (ACC), Chaired by the Hon’ble Prime Minister, had deliberated upon the structure and function of the Authority. The Cabinet has now approved the Note for setting up the Authority.

The NRAA will be an experts body to provide the much needed knowledge inputs regarding systematic upgradation and management of country’s dryland and rainfed agriculture. The Authority will be a Policy-making and monitoring body. Besides, it will bring about convergence and synergy among the numerous ongoing programmes and will advise, guide and monitor their implementation as its mandate will cover all aspects of sustainable and holistic development of rainfed areas, including appropriate farming and livelihood system approaches. It would also focus on issues pertaining to landless and marginal farmers as they constitute the large majority of inhabitants of rainfed areas. However, each participating Ministry will be responsible for implementation of its line programmes after clearance from NRAA, based on the common guidelines.

The NRAA will be a two-tier structure. The first tier is a Governing Body that will provide necessary leadership and appropriate coordination in implementation of programmes. The second tier would be the Executive Committee consisting of technical experts and representatives from stakeholder Ministries. The Agriculture Minister will be the Chairman of the Governing Board of NRAA and Minister for Rural Development its co-Chairman. Ministers in-charge of Water Resources, Environment & Forests and Member (Agriculture), Planning Commission alongwith Secretaries of Agriculture & Cooperation, DARE, Rural Development, Water Resources, Environment and Forests, Panchayati Raj, Chairman, NABARD and one farmer representative/organization (to be nominated by Ministry of Agriculture) would be the Members of the Board. The Chief Executive Officer would be the Member Secretary of the Governing Board. The NRAA would be serviced by Ministry of Agriculture.

unholy nexus of poverty, hunger and resource degradation. The NRAA should be structured somewhat like National Dairy Development Board with clear-cut functions in the areas of policy formulation, resource mobilization, employment generation,
coordination with all concerned Ministries, Centre – State linkages as well as with Bharat Nirman, NREGP, etc.

4.6.25 The main goal of NRAA should be more crop and income per drop of water. It should seek and promote effective indulgence of the youth in managing this most vital resource. Increasing supply through rainwater harvesting, recharge of the aquifer and water conservation should become mandatory. Demand management through improved irrigation practices and crop planning and care, should receive priority attention. The youth must be trained and empowered to lead this movement and should launch a water literacy campaign particularly for the sustainable use of ground water and conjunctive use of water. Seawater farming should be promoted in coastal areas. They may assist the Panchayats in launching water literacy and water quality management programmes and in promoting participatory irrigation and efficient water use management.

Irrigated Zone: Evergreen Revolution

4.6.26 The future of our agriculture and food security and even national sovereignty depends on our ability to increase productivity per units of arable land and irrigation water in perpetuity without associated ecological harm, a process known as “Evergreen Revolution”. The national agricultural research, education and extension, development, marketing, pricing and institutional system must focus on the small farmers who are most concentrated in irrigated areas, and the holding fragmentation continuing unabated, and whose toil is the engine of nation’s food security - ushering in Small Farm Revolution. Building on the gains of the Green Revolution and avoiding its pitfalls, we must move towards an Evergreen Revolution by concurrently resorting to a three-pronged strategy: (i) Protecting yield and productivity gains, (ii) Extending the gains to new areas, and (iii) Enhancing yield ceilings and achieving new productivity gains. Bridging yield gaps, minimizing post-harvest losses, augmenting value addition and improving productivity and farmers’ income; and promoting eco-technologies, including conservation farming, rooted in the principles of ecology, economics, equity and employment are the major synergistic and converging pathways towards Evergreen Revolution. Integrated crop
care encompassing integrated pest management, integrated plant nutrient management and integrated natural resource management is the way to “Green Agriculture.”

4.6.27 The farm graduates and other educated youth will be called upon to use the latest developments in biotechnology, ICT and other cutting edge technologies and synergistically link these technologies with conventional and traditional technologies and knowledge. The need for orienting training and tooling of our Graduates to get actively linked with the various steps and components in the research-education-extension-farm-market-business chain can hardly be overemphasised. They must become the service providers and mobilise the community to practice green agriculture with high pay off. The educationists, research and technology developers must ask themselves as to whether the Graduates and field workers are equipped enough to launch the Ever-green Revolution. If not, the human resource development programme must be revamped, as discussed later.

Coastal Zone and Islands

4.6.28 More agro-based industries should be developed in coastal areas to create more employment through value addition to products based on coconut, oil palm, honey, cashewnut, rubber, fruit, fish and shrimp, milk, beverage, medicines, poultry, sea food and mangrove products. Large areas under coconut plantations are neglected and remain open for grazing. Through self-employment or leasing arrangements, the youth may convert these areas under multistoreyed cropping systems. The rural youth should be trained also to take to skilled planting of mangroves. All along the coast as well as in the Andaman and Nicobar Islands and Lakshadweep Group of Islands, agro-aqua farming systems will open up great opportunities for income and employment generation on a sustainable basis, provided they are based on sound ecological principles. The tyranny of distances of islands could be somewhat economically moderated by promoting eco-tourism, conserving the genetic heritage and by establishing offshore quarantine. The youth should be sensitised to help adopt proactive measures like the erection of mangrove and non-mangrove based bioshields in order to safeguard the lives and livelihoods of island populations in the event of sea level rise due to global warming.
To provide integrated training in all aspects of capture and culture, fisheries ranging from capture/culture to consumption, Fish for All Training Centres should be established.

7.0 Young People’s Mission and Action: India A Major Agricultural Outsourcing Hub of the World

4.7.1 Ours is a “rich country inhabited by poor people.” The challenge before us is as to how to convert the rich human capital, natural recourses wealth, gene reservoirs and agro-ecological diversity into more jobs and income in perpetuity. As already experienced under the ICT revolution, the Evergreen Revolution can render India as a major agricultural outsourcing hub of the world, particularly for hybrid seeds, in vitro culture propagation material, biological softwares (biofertilisers and biopesticides), botanical medicinal and aromatic products, organic products, such as organic fruits and vegetables, organic wine and beer, eco-textiles and processed foods. Thus, today’s Agriculture must be seen also as an important source of quality employment and global outsourcing hub. Excellent opportunities exist also for global outsourcing hub in the areas of plant and animal genomics and ICT, involving large number of village people linked through the Gyan Chaupals.

4.7.2 Young graduates should be duly trained for specialized production of the various products and dynamically linked with the world information on their agri-business. Appropriate Regulatory measures, particularly Sanitary and Phytosanitary measures, Food Safety Standards, IPR, Geographical Indicators, TRIPS, etc. should effectively be in place and fully functional. Selected SAUs and ICAR Institutes may establish Centres of Outsourcing Business in Agriculture. Some of the KVKs could take lead in specializing in specific commodities in one or the other of the areas mentioned above and develop the necessary expertise and infrastructure to ensure production and supply of quality standard products as per international standards. A campaign to promote gene literacy, bio-safety literacy, IPR literacy, etc. should be undertaken to sensitize all the partners in the production-distribution chain. As mentioned under the Section, “Organic Farming”, internationally-recognised certification facilities must be provided before starting large-scale outsourcing of organic products.
4.7.3 With the above developments, Indian villages and even small farmers can be linked with the global markets and agri-business centers in USA, Japan, Europe, etc. In several of these domains, there are tremendous opportunities for farm graduates and other educated youth to be self-employed or regularly employed. For instance, in the seeds sector, the value of planted seed in the world has reached staggering proportions – an estimated US$55 billion annually. At the same time, the demands of biotechnology, communications, and intellectual property protection have created new challenges and opportunities. This underlines the necessity for creation of world-class infrastructure for competitive quality production, accessing and assessing the global market through critical agri-business analysis, thus linking science, technology, industry and market.

4.8.0 Institutional Structure

Small Farmers’ Agri-business Consortium (SFAC)

4.8.1 The Small Farmers’ Agri-business Consortium (SFAC) was started by the Prime Minister Dr. Manmohan Singh in 1992, when he was the Union Finance Minister of India, to enable small farmers to take to market-driven agribusiness. But, unfortunately, such an excellent programme never took-off though explicit budgetary provisions for the programme still exist. We need to have the situation critically assessed and render it effectively functional and professionally-managed so that the graduates and other educated young farmers could receive the guidance, training, tooling and initial hand-holding for establishing rural entrepreneurial activities to expand rural markets and direct access to market. The SFAC should work closely with selected KVICs, AEZs and Agri-business centers for their enhanced efficacy.

Agri-clinics

4.8.2 The Central Government has launched agri-clinic and agribusiness centres programmes to provide a single window access to multiple inputs, expert services and advice to farmers on cropping practices, technology dissemination, crop protection from pests and diseases, market trends and prices of various crops in the markets and also
clinic services for animal health etc. which would enhance productivity of crops and animals. Some of the programmes of the private sector, such as Haryali Bazar, also provide diesel/petrol pumps and banking facilities. However, before setting up agriclinics and agribusiness centres, interested agricultural graduates are supposed to be provided specialized trainings to inculcate in them required managerial and some technical skills for setting up and running the center/ venture. The training courses would be provided free of cost in various State Agricultural Universities and Departments and public sector institutes. Initiated by Small Farmers Agri-business Consortium (SFAC) and coordinated by National Institute of Agricultural Extension Management (MANAGE), the courses comprise entrepreneurship development, business management as well as skill improvement modules in the chosen areas of activity. There are several projects/ ventures in agriculture which can be taken up by any unemployed youth with some prior training from an appropriate institution.

4.8.3 While necessary support should be extended to farm graduates to establish and operate agri-clinics, including extension advisory activities, input dealership should primarily be given to agriculture graduates who besides ensuring timely distribution of quality inputs would also be proactively involved in rendering extension services to their clients. A single licensing system should be put in place. Those agri-clinics which do not have farm graduates on their establishment, should be obliged to hire agricultural graduates. As regards institutional support, quality credit packages and their delivery and comprehensive farm family insurance plans must be in place to strengthen the programme. **One Agricultural Supervisor (Agricultural Graduate) for every 2 Panchayats is recommended.**

**Agri-business Centres**

4.8.4 Agricultural, Veterinary, Fisheries, Rural and Women’s Universities should restructure themselves to be able to help every scholar to become an entrepreneur so that they can organize Agriclinic and Agribusiness centers. The Universities should expand their current Placement Bureaus in order to provide a special **one-stop window** for generating awareness of self-employment opportunities. Job Fairs can also be organized.
Industry representatives feel that there is considerable unmet demand in relation to the range of services needed to farm families. There is therefore considerable scope for training farm graduates to provide demand-driven services. Agricultural entrepreneurs are needed in large numbers for achieving successful farming systems diversification and value addition and for providing the right inputs at the right time and place. Mobile phones have made communication easy. Farmers will be willing to pay for value-added services.

**Harnessing Group Dynamism**

4.8.5 The National Commission on Farmers (NCF) had recently organised a National Consultation on Attracting and Retaining Youth in Farming. Over 50 participants, including Vice Chancellors of selected Agricultural Universities, heads of private companies, senior representatives of the Govt. of India and ICAR, representatives of international organisations, executives of banks and 17 agricultural graduates both employed and unemployed, had participated in the Consultation. It was heartening to note that several of the farm graduates and other Graduates have joined hands and formed Groups and are operating and managing agriclinics and agri-businesses as well as are involved in precision agriculture including greenhouse production of high value crops/commodities and vitroplants, honey, mushroom and fingerlings. These Groups are particularly helpful in ensuring the supply of quality seed and other inputs and in undertaking integrated pest management, integrated nutrient supply, scientific water management and adoption of improved post-harvest technologies. Some of them are successful in forging backward linkages with latest technology and credit and forward linkages with processing and marketing organisations.

4.8.6 Some of the farm graduates are participating in contract farming. This is particularly encouraging as with their participation the interest of other partner farmers is expected to be safeguarded. Needless to mention, contract farming based on a well-defined Code of Conduct will be helpful to small producers in getting good quality input, a fair price as well as prompt payment for their produce. **A Code of Conduct for Contract Farming** will have to be developed for major groups of farm commodities like
vegetables, fruits, flowers, medicinal plants, tuber crops, pulses, oilseeds, sugarcane, cereals, cotton etc. Both production and marketing contracts are growing. Available evidence indicates that direct contract between the producer and purchaser is more advantageous to small farmers than indirect contract through intermediary agencies.

4.8.7 A National Federation of Farmers entering into contract cultivation will be useful to identify the best pro-farmer practices that will ensure a win-win situation for both producers and purchasers. As also emerged at the State-level Consultations, many prefer a tripartite contract involving the farmer or farmer group, the procurer and the concerned Government, the latter required primarily for dispute settlement, if any. Though various models of contract farming have been tried in India, the success has been rather limited. The need is to develop comprehensive, clean, equitable and farmer-centric model agreement which could not be abused against the farmer. Special care is required regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and the arbitration mechanism.

4.8.8 In its earlier reports, NCF has recommended the formation of Small Holders’ Cotton, Horticulture, Herbal, Poultry and Aquaculture Estates. The aim is to promote group cooperation among farmers living in a village or watershed or the command area of an irrigation project in improving productivity, reducing the cost of production and entering into marketing contracts with textile mills, food processing industries, pharmaceutical companies, fish marketing agencies etc. Such Small Farmers’ Estates can also manufacture products under brand names and enhance income security. Group insurance will then become feasible. Agri-clinics and Agribusiness Centres run by farm graduates could be linked to such Estates. Cooperatives, particularly service cooperatives, and SHGs are other group mechanisms which could provide power and economy of scale to small farmers and the youth in their production-distribution ventures. While the reforms are overdue in the cooperative sector, the SHG could be upgraded to sustainable Livelihood Group through training and monitoring.
4.9.0 Education and Training

Education for Agriculture: The Need of the New Millennium

4.9.1 Establishment of a large number of SAUs and the resulting human resources have played an important role in strengthening and spreading the Green Revolution since the 1960s. Now new demands are being put up on the system, which it must meet in order to remain responsive and relevant. Generally, the knowledge explosion in ICT, Biotechnology, Space Technology, nanotechnology, etc. and the fast changing international environment, particularly in the globalised and liberalized world, and trends and implications of increasing divides on the income, digital, gender and social fronts have not been internalized in curricula of most SAUs and colleges and the graduates are becoming increasingly removed from global realities. Basic and strategic research is drying fast and the teachers, especially the senior ones, are not abreast of the latest developments, hence routine and mundane teaching continues. The agricultural education at SAUs and agriculture colleges must be revamped to become education for agriculture. For this, multidisciplinary teaching, adequate infusion of basic and social sciences and linkages with relevant institutions in the country across Ministries should be ensured to develop holistic and enriched education for agriculture to increase awareness on the challenges and opportunities of new and complex interrelated issues and developments.

4.9.2 Since Independence, the annual output of farm graduates has swelled 15 fold. The number of unemployed graduates has also multiplied likewise. There is a mismatch between employment and education. While the number of employment opportunities is rising more or less at the same rate, as the growth rate of the work force, the type and quality of these opportunities hardly match the expectations of many educated job-seekers. This reflects inadequacies both in the type of employment generated and the type of education being imparted to youth.

4.9.3 Reorientation of education for agriculture within a reasonable timeframe and its visible impact on employability should be launched as a mission to introduce necessary structural changes in the system so as to capture modern realities, challenges
and opportunities. Reforms to forge partnership with various stakeholders, who influence and are influenced by the quality of agricultural education, should receive high priority. Emphasis of futuristic agricultural education should be on introduction of a revised course curricula embracing new teaching and learning areas (typical examples being agribusiness and entrepreneurship, biosecurity, diversification of farming, processing and value addition, natural resources and environment management, marketing, international trade and treaties and biotechnology) and delivery systems (information and communication technology), deployment of highly qualified faculty, creation of infrastructure for extensive practical sessions and linkages with private partners to support career-building training. Genome clubs may be formed in schools to promote genetic literacy and the opportunities opened up by the new genetics for strengthening food and health security.

4.9.4 There is need for a few Centres of Excellence in Agriculture (Crop and Animal Husbandry, Fishery and Forestry) on the model of IITs and the IIMs. The Agricultural Universities Association should not only bring about curriculum reform for imparting more practical training, but also reforms in the pedagogic methodology taking into account the new opportunities opened up by ICT for promoting a learning revolution among our students. By suitably restructuring the pedagogic methodology using ICT tools, it will be possible to save time for practical work. Agricultural Universities should also organize more non-degree training programmes. All Farm Universities should adopt the motto “Every Student an Entrepreneur”. Entrepreneurship and innovation must be the key goals of Universities.

4.9.5 Adequate financial support should be made available to the SAU’s and other educational institutions which are acutely starved of funds. While the State Governments have rather liberally been establishing new agricultural and related universities, there is negligible increase in the overall financial allocation to agricultural education. It is suggested that one time substantial catch up grant should be provided to the agricultural education institutions for establishing State of the art equipment, training modules and their deliveries and other facilities. Centres of distance education should also be
strategically established. In order to avoid inbreeding, a certain percentage of faculty and
students must be recruited and admitted from outside the State.

**Revamping University curricula – Mainstreaming Business Management and
Applied Courses**

4.9.6  The Universities must adjust the formal and non-formal training programmes,
syllabi and outreach programmes, particularly of their **KVKs for employment oriented
activities related to agro-processing, value-addition and other post-harvest activities**
which are bound to create additional employment opportunities. The Universities could
promote not only entrepreneurial abilities of the graduates but also help them establish
businesses for themselves, such as agriclinics, soil and water-testing facilities, agri-
machine hiring and repair facilities, seed production and distribution, etc. **University
centres should establish employment and business advisory services** and promotion
centres not only for their own graduates but also for other youths. As seen from Box II,
convergence between science and agribusiness, University curricula and course
contents are fast evolving towards enhancement of employability of the
professionals and for the mutual benefit of the science and industry – a win-win
situation.

4.9.7  The following key issues must be addressed towards increasing employment
and retention and attraction of farm graduates in farming:

i)  Poor and deteriorating quality of graduates and deficiency of practical and
business skills for self-employment.

ii)  Poor infrastructure and facilities in rural areas, especially irregular and highly
inadequate electricity and other energy resources and the lack of desired
educational and health care facilities.

ii)  Poor communication and information connectivity; lack of technology-
market-and employment-related database.

The main reasons for the above shortcomings are:-

i)  Routine, mundane, static and stale university curricula; mismatch between the
dynamic need/demand of new skills, expertise, talent, tool and techniques and
the actual formal training imparted and technologies/approaches available or developed for the purpose.

ii) Shortage of competent and spark-creating teachers, and large number of teaching, research and extension positions lying or kept vacant.

iii) Intake quality compromised, as in several States no minimum is fixed for entrance examinations.

Box II

Master of Science in Seed Technology and Business
Iowa State University of Science and Technology
College of Agriculture, Seed Science Centre, Ames, Iowa, USA

Iowa State University – College of Agriculture and Business have teamed up to meet up to meet the needs of seed industry, professionals with four-year degrees: the new Online Master of Science Degree in Seed Technology and Business.

Programme Features:

- Science, technology and business courses with a focus on decision-making in the seed factor.
- Flexible and convenient for working professionals: content available on CD’s for flexibility.
- Student remain part of an interactive group
- Creative component replaces thesis.
- 33-month study course – 36 to 37 credits depending on scope of creative component – paced for working professionals.
- Administered by the ISU Seed Science Centre through Continuing and Distance Education.
- Quality content taught by highly regarded faculty.

The Centre also offers two graduate certificates: one in Seed Science and Technology and another in Business Management.

4.9.8 The curricula revision stems from the fact that the setting-up of responsive curriculum systems is a key step by which the target of training qualified personnel can be accomplished. New curricula may include the components like physical conditions, broad knowledge including knowledge of humanity, ideological accomplishments, practical ability, scientific theory, professional knowledge, knowledge of related disciplines, and technical skill training.
4.9.9 The education and teaching methods must be improved to do justice with the contents, as suggested below:

- Teaching methods are the ways of carrying out curricula which directly influence the effects of knowledge transformation.
- Using heuristics and discussions in teaching may be adopted in classrooms.
- Obtaining new knowledge, analyzing and solving problems through full use of various resources and a computer-aided teaching system are essential components of improving all-round abilities with a practical outlook.

4.9.10 Practical teaching links must be improved, as suggested below:

- Practical teaching links include teaching practice, scientific research, technical development, extension activities and social services.
- Practical teaching is an important link not only in examining the exact results of curriculum systems and teaching methods being used, but also in training the abilities of innovation, experience and creativity.
- The contents of experimental curriculum systems should be reformed and new teaching practice systems should be established to train operational ability according to specialty or discipline.

4.9.11 The curricula changes should duly reflect national and global visions of food and agriculture and the most appropriate farming system to enhance income, profitability and sustainability under the ever-increasing competitiveness. As the employment in the private sector is fast increasing and also keeping in mind the need for enhancing self-employment, the curricula should emphasize skill development aspects. The major employer and other main stakeholders, namely, the public sector, private sector, industry, agri-business and progressive farmers should be involved in curricula development. For hands on experience due emphasis should be placed on internship.

4.9.12 Emphasising skill development, vocational education is expected to create middle level trained human power, particularly trained persons to run agri-clinics and to serve as technology agents and to meet the varying demands of private sector and for promoting entrepreneurship. In this context, experiential learning of about 1 year integrated skill orientation following 3 year courses during the graduation programme
will be essential. For Home Science graduates, 2 years course work followed by 1 year each for courses and attachment to industry etc. is recommended. Under the WTO regime, specialized courses on export procedures, quality control, management of agri export, commodity trade, commercial agriculture and precision farming should be emphasized. New and emerging areas like value addition, marketing, biosecurity, IPR, INM, SPS, quality standards should be adequately covered.

4.9.13 Hands on experience of developing agri business management modules towards enhancing confidence and analytical skill of farm graduates is essential for promoting new enterprise ventures. In order to give the necessary boost to post harvest management, processing and value addition, adequate training facilities and hands on experiences in these areas should receive highest priority. KVKs, ATMA Centres and other such institutions should be duly strengthened for training in post-harvest management and marketing.

4.9.14 Farm graduates, empowered through need-based vocational training, should be encouraged to embrace agriculture-related and other manufacturing activities. They should be organized in groups and helped to establish clusters of small units. These clusters should be located in or near large market towns, on the peripheries of cities and along major highways or railway lines. There are nearly 6000 block headquarters as also about 7415 APMCs. Many of these as well as many existing industrial clusters present favourable location for focused development.

4.9.15 In the case of medical and veterinary sciences, there is a system of registration of practitioners. It would be useful to develop a system for according recognition to farm graduates to provide Extension and other services by recognizing them as Registered Farm Practitioners. It may be necessary to set up an All India Agricultural Council on the model of the Medical and Veterinary Councils to give such accreditation. This will also be an oversight mechanism to ensure the quality and credibility of the services provided by farm practitioners.
4.9.16 Areas like the North Eastern Region and Jammu & Kashmir requires special attention from the point of view of providing Fram Graduates with opportunities for gainful self-employment. For this purpose each State should organize a Recognition and Mentoring Programme (RAMP). In the hilly areas there is a particular need for service centre for farm machinery. A sub-cadre of agricultural graduates may be established for the NER under the ICAR’s ARS to recruit scientists from the region and for the region so that the positions could be filled effectively. Special training and tooling should be done for these graduates on a regular basis.

4.9.17 The Tenth Plan has called for paradigm shift from food security at the national level to nutritional security at the individual level. There are very large numbers of Home Science Graduates who are unemployed or in-appropriately employed. A new scheme should be formulated for organizing Nutritional Clinics on the model of Agri-clinics which will provide an opportunity for Home Science Graduates to ensure the success of ICDS and mid-day meal programme and to fight hidden hunger caused by the deficiency of micro-nutrient in the diet.

4.9.18 The facilities for practical training for farm graduates must be expanded. The Vidya Dairy at Anand which impart end-to-end training as well as the Fish For All Training Centre which is being established by MSSRF at Nagapatnam are good examples of imparting skills through learning-by- doing. This move could be extended to all important commodities like lac, sericulture, ornamental fish production, etc.

National Alliance For Self-employment of Farm graduates

4.9.19 There is need for a National Alliance for facilitating self-employment. Such an alliance can bring together all the stake-holders – Private and Public Sector Institutions, Commercial and Cooperative Banks and farm graduates Associations. Such a National Alliance can provide oversight for the implementation of a national strategy for the knowledge and skill empowerment of rural families and for imparting quality and trade literacy. They can also monitor progress in achieving the goal of every student entrepreneur in our Agricultural and Veterinary Universities.
4.9.20 We have to achieve the following revolutions, as we wish our agriculture to become economically rewarding and intellectually stimulating to attract and retain educated youth in farming:

- Productivity revolution
- Quality revolution
- Income and livelihood revolution
- Management and marketing revolution,

In the above context, we should review how our vast research, educational and extension infrastructures could be retooled and restructured to meet the challenges of today and tomorrow. The most urgent tasks today are enhancement of productivity per units of land and water and farmers’ income as well as achieving a quantum jump in quality improvement. Quality has to be judged by culinary, organo-leptic, nutritional and processing characteristics. The management and marketing thrust must confer on small producers the advantages of scale both in the production and post-harvest phases of agriculture.

4.9.21 Central and State Governments should not expand official extension departments, if opportunities for remunerative self-employment are to become available to farm graduates. We need a new deal for the self-employed in terms of public policies which promote and not obstruct socially relevant enterprises. Private sector industry can help agricultural progress, particularly in the area of perishable commodities like fruits, vegetables, flowers, fish and animal products by undertaking contract cultivation and entering into buy-back arrangements, duly covered under a Code of Conduct. In their respective catchment areas, industries could provide a wide range of services, as is already being done by the tobacco and sugarcane industries. In particular, private sector should give management and marketing support to agriclinics and agribusiness centres and set up in major production centres computer-aided market information system.

4.9.22 Groups of motivated, like-minded and skilled farm graduates, by themselves or through public sector support or through partnership with established industrial houses,
could create organized large-scale manufacturing units in rural areas. Moreover, they can proactively encourage ancillarization. The Government should support such ventures possibly by offering tax breaks to large units which sponsor the development of small units on a contractual basis. Such farm graduates, even though not directly involved in hardcore farming, their mere presence in rural areas will be a great moral-booster to their own as well as to other families, besides rendering occasional extension and advisory services to the farmers.

4.9.23 China has succeeded in providing work opportunities for its vast rural youth, through an integrated approach to on-farm and non-farm employment. China’s twin strategy comprises of: (a) improve small farm productivity and profitability and (b) withdraw surplus labour from unskilled on-farm to skilled non-farm employment through Township Village Enterprises (TVEs). We suggest that the Ministries of Agriculture and Rural Development may initiate a Pan-Government of India Programme Designed to Provide Work Opportunities for All in Rural India.

4.9.24 The vast trained manpower now being created in the areas of agricultural biotechnology and information technology, provides an uncommon opportunity for India becoming a world leader in taking up assignments on behalf of other countries – both developing and developed – in the areas of software development for agricultural ICT, hybrid seed production, tissue culture propagated plants, biological software for sustainable agriculture, genome mapping, gene mining, Indian health systems like Ayurveda, Unani and Siddha. We should ignite a spirit of imagination, pride and innovation in our youth, so that they become the torchbearers of the New Agriculture Movement.
CHAPTER 5

IMPROVING COMPETITIVENESS OF INDIAN AGRICULTURE

5.1 Introduction

5.1.1 The issues connected with competitiveness of Indian agriculture have assumed considerable importance in the light of the WTO Agreement on Agriculture. Given the limitations of a developing country and inadequate investments in infrastructure and frontier areas of science and education, Indian farmers are being exposed to international competition in an unequal playing field. However, there is also no doubt that if appropriate infrastructure combined with adequate incentives and support becomes available, Indian farmers are quite capable of producing many crops and animal and fish products efficiently and competitively. The globalization and opening of trade could therefore also offer new opportunities provided focused attention is given to improving competitiveness of Indian agriculture with a sense of urgency.

5.1.2 There has been a major change in the macro policy framework after launching of the economic reforms in 1991. The sharp devaluation of Indian Rupee [about 24 percent in June 1991] improved competitiveness of many agricultural commodities [though export subsidies were withdrawn] and resulted in a fairly rapid growth of their exports, leading to an impression that Indian agriculture would greatly benefit from economic liberalization. The annual export growth for agricultural products in value terms was most significant during 1992-97 at 16.04 percent as compared to 5.34 percent during 1986-91 and -3.08 percent during 1980-85. During 1992-97 the import value index of agricultural products also increased by 25.76 percent as compared to -13.91 percent during 1986-91. Another development was the large increase in input prices and also the Minimum Support Price [MSP]. The MSP of wheat and rice increased from a level of Rs. 225 [per qtl] and Rs. 205 [per qtl] in 1990-91 to Rs 475 and 380 respectively. The increase in MSP of wheat in six years was over 111% and in paddy over 85%. Since

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1 Summary of major provisions under the Agreement on Agriculture [AoA] as were applicable to developing countries by 1995 – 2004 are indicated at Annexure – I.
in the beginning, the world prices of agricultural commodities were rising, it did not adversely affect their competitiveness. However, after 1996, the world prices started falling due to heavy subsidies in EU & USA which led to fall in competitiveness of Indian agricultural products and a slow down in exports.

**Competitiveness of Agricultural Products**

5.1.3 In no trade situation, comparative advantages and allocations of land within agriculture can be decided by the value of output per acre of land or per unit of input cost. The higher the ratio, the greater is the internal comparative advantage or efficiency in producing the commodity under consideration. However, as land is restricted within the borders of a country and the movement of labour, particularly the unskilled, is restrictive, the above mentioned measures of competitiveness cannot be used to achieve efficiency of allocation of resources between different countries. On the other hand, in a fully liberalized and globalised situation, unlike most factors of production, the commodities could be freely exported or imported. Therefore, the prices in other countries, transportation and marketing costs and the cost of processing influence the resource allocation. With increasing globalization, assessment of global competitiveness has become one of the tools for taking resource allocation decisions.

5.1.4 In due course, the globalization would be characterised by exploiting comparative advantages of nations and by reliable assessment of demand and supply in relation to commodities of importance in international trade and integrating them into global management of the value chain. It would mean a very strong drive for performance competitiveness among countries and between producers within a country. However, the road is long and participating in the long march is not without serious local problems and also constraints.

**Measurement of Competitiveness**

5.1.5 How is competitiveness measured? The idea of comparative advantage focuses on the cost of production of different commodities in the country vis-à-vis in the major trading countries of the world. However, the actual trade takes place on the basis of
prevailing prices rather than the costs. These prices are distorted due to market structures and business strategies. The standard system for assessing the competitive advantage is to assess the effective rate of protection provided by a country. It is also necessary to make the assessment on the basis of say, 5 to 15 years data so as avoid abrupt fluctuations in prices in some years. There are various measures of competitiveness. The Net Protection Coefficient [NPC] could be used for measuring the competitiveness of domestically produced goods with imports and also for exports. The transport costs have to be added to the export price while assessing the competitiveness for imports and exports. For import competitiveness, the agricultural produce of India at the port should be cheaper than the import price at the same port of the same quality goods and vice-versa for exports. In operational terms, for assessing the import competitiveness, the exporter to our country pays the freight, transport charges etc. while if we were to assess export competitiveness of our products, the freight, transport and handling charges to the destination will have to be added to our local cost of production. The transportation and handling costs both internal and international could make a big difference in the international competitiveness. Another method of assessment of competitiveness is the Effective Protection Coefficient [EPC]. This is a refinement of the Net Protection Coefficient as it takes into account the variation in domestic and international prices of the tradable inputs. It is the ratio of value-added at domestic prices to the value added at border prices expressed in local currency. In simple words it is the ratio between the value added commodity at domestic prices [domestic price of a commodity minus the value of all inputs required to produce a unit of that commodity] divided by value added at world reference price of all traded inputs at border price equivalent minus prices of all traded inputs at border price adjusted for transportation, handling and marketing expenses etc.

5.1.6 The most widely used and comprehensive measure of resource use efficiency is the Domestic Resource Cost [DRC] method. The DRC is the value of domestic resources [primary, non-traded factors of production] needed to earn or save a unit of foreign exchange through import substitution by production of a commodity. The value
of non-traded inputs like land, labour and capital has to be in terms of their shadow prices or opportunity cost to take-care of the market distortions.

**Competitiveness of Indian Agriculture**

5.1.7 As per on early work of Dr. A. Gulati\(^2\). India was moderately to highly competitive in rice, wheat, bananas, grapes, sapota, litchi, mango, onions, tomato, mushroom etc. in 1989-90 to 1992-93. In sorghum, apple, mango pulp and apple juice India was not competitive, while maize was a marginal case. The situation became different in the analysis based on 1990-91-1997-98 data. While rice and banana remained highly competitive, wheat, gram, mango, grapes, sapota, onion and potato were only moderately competitive and maize, sorghum, bajra, barley, arhar, groundnut, rapeseed mustard, soybean, sunflower, apple, tomato were non-competitive [NPC above 1 and ranged between 1.14 for tomato to 1.85 for barley].

5.1.8 The study of competitiveness of crops over 1990-91 and 1999-00 for selected commodities in major producing States by Prof. G.S. Bhalla\(^3\) reveals that based on the Net Protection Coefficient [NPC] calculations, India was an efficient producer of wheat, rice and maize and could effectively compete against import of these commodities. In the case of tur, gram, rapeseed and cotton India was import competitive but the same could not be said of sugarcane. During 1997-98 to 1999-2000, groundnut was also import competitive. wheat, rice, tur, gram, maize and jowar were also export competitive. However, in case of cotton, while Punjab and Karnataka were export competitive during 1995-96 to 1998-99, Andhra Pradesh, Gujarat and Maharashtra were not export competitive in 1998-99. However, due to large variations in international prices of cotton, the degree of competitiveness keeps on changing.

5.1.9 The competitiveness of most of our agricultural commodities would change very favorably of the developed countries withdraw the huge domestic support which they extend to their agriculture. However, it may also be noted that import

\(^2\) Export Competitiveness of Selected Agricultural Commodities, 1994  
\(^3\) Prof. G.S. Bhalla-State of Indian Farmer-Millennium Study-Globalization and Liberalisation of Agriculture
competitiveness of our agriculture is getting reduced due to various factors like increase in input prices and consequent hike in their MSP year after year, the deceleration of the productivity growth rates and the world trend of downward movement of prices of agricultural commodities till recently.

**Box I**

**Bright Spots and Some Concerns**

As stated earlier, India is competitive in several major agricultural commodities. However, the movements of international prices are continuously influencing India’s competitiveness. India’s traditional exports such as tea, coffee, tobacco and spices are likely to continue as significant constituents of our agri-exports. However, there are emerging exporters challenging us and eating into our export markets like Vietnam. In rice, wheat, cotton etc. we could increase our exports as also in certain fruits, vegetables and fish. However, the productivity levels could be further improved with focused attention to add to our competitiveness. Pulses and other cereals are generally import competitive. The major non-competitive commodity is oil seeds and edible oils. However, we are very short in pulses and oilseeds for our domestic consumption. Per capita consumption of pulses is very low in relation to dietary needs.

Competition from cheaper imports would be a serious concern for our farmers and the Government will have to be very vigilant.

We have to also take care that we do not move from higher value addition to lower value addition in our exports. There is need to guard that the safety standards are not abused as non-tariff barriers against our exports. Needless to say we also have to be more quality conscious and our farmers need more knowledge and training in the matter. The future lies in demand management. The idea is to first identify an international demand and then move backward to the farm. Along the way, identify short comings/weaknesses and attend/rectify those to capture the market.

5.1.10 Huge subsidies provided by the developed countries has greatly affected international prices and the competitiveness of our agriculture. Some indications of domestic subsidies provided by these countries can be seen from the following table:

**Table 1: Agriculture subsidies [PSE] and its percentage of Agriculture GDP in select countries**

<table>
<thead>
<tr>
<th>Countries</th>
<th>Base-Year 1986-88</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subsidies % to GDP</td>
<td>% to Agri GDP</td>
<td>Subsidies % to GDP</td>
</tr>
<tr>
<td>Canada</td>
<td>5698</td>
<td>1.51</td>
<td>34</td>
</tr>
<tr>
<td>USA</td>
<td>41,890</td>
<td>1.34</td>
<td>25</td>
</tr>
<tr>
<td>Japan</td>
<td>53,637</td>
<td>3.04</td>
<td>67</td>
</tr>
<tr>
<td>EC</td>
<td>95,214</td>
<td>1.79</td>
<td>44</td>
</tr>
<tr>
<td>OECD</td>
<td>2,46,226</td>
<td>1.67</td>
<td>40</td>
</tr>
</tbody>
</table>

Source: Agriculture Statistics At a Glance: 2005, Ministry of Agriculture, GOI
The per hectare subsidies in Japan in 1999 were \( $11,792 \) in EC, \( $831 \) in OECD, \( $218 \) in USA. In India it was \( $53 \). Similarly, the per farmer subsidy in 1999 was \( $26,000 \) in Japan, \( $21,000 \) in USA, \( $9000 \) in Canada, \( $17,000 \) in EC and \( $11,000 \) in OECD. In India, the same was \( $66 \). The aggregate subsidy for agriculture in India was estimated at \( $8.50 \) billion in 2001-02 as against \( $49.08 \) billion in USA, \( $47.20 \) billion in Japan and \( $115.33 \) in European Union.

5.1.11 The Aggregate Measure of Support [AMS]\(^6\) does not include support directly to producers, infrastructural services, pest control, environment programmes, inspection and market intelligence etc., which are clubbed under green box and exempted from reduction commitments. The developed countries have been providing very substantial support to their agriculture under ‘Green Box’ so much so that it would appear to be more apt to term Aggregate Measure of Support as Partial Measure of Support\(^7\). As per available data, out of total domestic support provided by developed countries very large amounts are included in Green Box [Table 2]

<table>
<thead>
<tr>
<th>Table 2: Subsidies to Agriculture in Developed Countries</th>
<th>US $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>1995</td>
</tr>
<tr>
<td>Total Domestic Support</td>
<td>60,926</td>
</tr>
<tr>
<td>Green Box</td>
<td>46041</td>
</tr>
<tr>
<td>Blue Box</td>
<td>7034</td>
</tr>
<tr>
<td>De minimis</td>
<td>1641</td>
</tr>
</tbody>
</table>

\(^4\) \$ is US $  
\(^6\) WTO agreement envisaged two kinds of support to agriculture, viz. domestic support and export subsidies. The domestic support is classified into five categories: [a] Aggregate measure of support [AMS] which includes product specific and non product specific support, [b] Green box support [c] Blue box support [d] De minimum support and [e] Special and differential [S & D] treatment box. Out of these, agreement requires reduction only in AMS and export subsidies, whereas support under all other heads is exempted.  
The AMS includes [a] sum of total subsidies on inputs like fertilizers, water, credit and power etc. and [b] market price support measured by calculating the difference between domestic administered price. Normally, the term AMS gives the impression that it is the sum total of all kinds of support. But in reality it is not and huge subsidies provided by developed nations to its agriculture are hidden in blue box.  
\(^7\) Dr. Ramesh Chand- Trade Liberalisation WTO and India Agriculture.
In view of the above, it is clear that the AMS covers only a part of the support extended by the developed countries and unless all kinds of support are clubbed together and reduced, the developing countries would find it extremely difficult to improve their trade.

5.1.12 The competitive advantage is a dynamic concept and the position changes with the changes in prices and yields. **However, the competitiveness in costs alone is not enough to succeed in exports. The quality of the produce and reliability of supply are other very important factors.** A significant increase in productivity could improve competitiveness of products which are not competitive at the current levels of yields and prices. The large gaps between the domestic and world yields reflect that the potential for raising productivity is immense provided appropriate steps are taken. **Table 3** shows the average Indian yield as a percentage to the average world yield and to the yield of top five exporters.
Table 3: Gaps between Domestic and World Yield [1999-2001]

<table>
<thead>
<tr>
<th>Crop</th>
<th>Indian Yield as a percentage of Average World Yield</th>
<th>Indian Yield as a percentage of Average Yield in top five exporting countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>0.76</td>
<td>0.64</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.98</td>
<td>0.81</td>
</tr>
<tr>
<td>Pulses</td>
<td>0.77</td>
<td>0.29</td>
</tr>
<tr>
<td>Oil Seeds</td>
<td>0.45</td>
<td>0.41</td>
</tr>
<tr>
<td>Seed Cotton</td>
<td>0.41</td>
<td>0.28</td>
</tr>
<tr>
<td>Onion</td>
<td>0.57</td>
<td>0.29</td>
</tr>
<tr>
<td>Tomato</td>
<td>0.63</td>
<td>0.18</td>
</tr>
<tr>
<td>Potato</td>
<td>1.16</td>
<td>0.47</td>
</tr>
</tbody>
</table>


5.2 Measures to Improve Competitiveness

A. Crop Productivity Related

Deceleration in Growth Rate – Need to Strengthen the Resource Base of Agriculture - More Investment Needed

5.2.1[i] The slow down of yield growth rate of crops in India during the nineties is very clearly is shown in Table 4.

Table 4: Trend Growth Rates of Yields 1970-71-2000-01

<table>
<thead>
<tr>
<th>Period</th>
<th>Yield Growth Rate Foodgrains [Annual]</th>
<th>Yield Growth Rate Non-Foodgrains [Annual]</th>
<th>Yield Growth Rate All Crops [Annual]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-71 to 2000-01</td>
<td>2.13</td>
<td>1.66</td>
<td>1.93</td>
</tr>
<tr>
<td>1970-71 to 1979-80</td>
<td>1.06</td>
<td>1.00</td>
<td>1.03</td>
</tr>
<tr>
<td>1980-81 to 1989-90</td>
<td>2.71</td>
<td>2.28</td>
<td>2.52</td>
</tr>
<tr>
<td>1990-91 to 2000-01</td>
<td>1.30</td>
<td>1.08</td>
<td>1.19</td>
</tr>
</tbody>
</table>

The deceleration of yield growth during the nineties becomes more worrisome if we compare India’s yield rank globally as shown in Table 5.

Table 5: India’s Global Rank in Major Agricultural Crops 1999-2000

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area</th>
<th>Production</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>1</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>Wheat</td>
<td>1</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Coarse Grain</td>
<td>3</td>
<td>4</td>
<td>125</td>
</tr>
<tr>
<td>Pulses</td>
<td>1</td>
<td>1</td>
<td>138</td>
</tr>
<tr>
<td>Oil Crops [Primary]</td>
<td>2</td>
<td>5</td>
<td>147</td>
</tr>
<tr>
<td>Jute &amp; Jute like fibers</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Tea</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Cotton Seed</td>
<td>1</td>
<td>4</td>
<td>77</td>
</tr>
<tr>
<td>Coffee Green</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>2</td>
<td>2</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: FAO

5.2.1[ii] The slow down in capital formation in agriculture in the eighties and nineties, was one of the major reasons for deceleration in agricultural growth. The gross capital formation in agriculture which formed 15.44% of the total capital formation and 9.92% of the Agriculture GDP in 1980-81 came down to 7.96% of the total capital formation and 8.02% of the Agricultural GDP in 1999-2000. Further, trend rate of growth of Gross Capital Formation in Agriculture [GCFA] which was 5.05% per annum in the 1960s accelerated to 8.7% per annum during 1970s, fell to 0.331% in the 1980s and marginally recovered to 2.89% per annum during the 1990s. The share of public sector capital formation to the total capital formation in agriculture also came down from 51.3% in 1980-81 to 25.34% in 1998-99. It is important to remember that private sector investment is not a substitute for public sector investments. Private sector investment is mainly in well endowed irrigated areas [almost bypassing rainfed areas] and in projects with comparatively shorter gestation period. The public and private sector investments need to compliment each other. The investments in storage, post harvest management, processing, tubewells etc. could be more efficiently handled by private sector and the Government needs to encourage it by creating enabling/encouraging environments for the purpose. Measures like developing a suitable scheme for compensating the farmers on
failure of borewell and encouraging development of water markets i.e., sale of well water by farmers owning/installing tubewells etc. could help in private sector capital information. However, the public sector investments in agriculture related infrastructure particularly irrigation including assured supply of water, power, research and other development works is crucial for a well spread and sustainable high growth rate. Completing incomplete irrigation projects, modernizing and improving irrigation structures where necessary and improving the quality of irrigation should get a very high priority besides the creation of new irrigation facilities. The need to improve productivity of public sector investments [roads, irrigation, power etc.] by better management including maintenance/distribution can hardly be over emphasized.

**Box II**

**Infrastructure Investment fund for Farmers (IIFF)**

The investment in agricultural sector has nearly stagnated during the last three five year plans. However, the Government have paid attention to investment in agriculture of late. It set up Rural Infrastructure Development Fund (RIDF) in NABARD in 1995-96 to provide loans to the State governments for projects in irrigation, electricity supply, marketing of agricultural products and rural roads, rural development etc. The RIDF investment falls short of requirements for rural infrastructure needs of the country. There is need to have an Infrastructure Investment Fund for Farmers (IIFF).

Can the funds be raised from any other sources? Is there such a source available?

India has accumulated foreign exchange reserves (FER) of $165 billion equivalent to about Rs.7.2 lakh crore. These have been sterilized. A part of FER is non-debt creating which means there is not much fear of flight of foreign exchange in respect of such amount. Considering the need to utilize the idle FER, Dy. Chairman, Planning Commission, took up the issue with the Ministry of Finance for utilizing FER for increasing investment in industrial infrastructure. Appreciating this novel move, the Finance Minister in his Budget 2005-06 made provision of Rs.10,000 crore for funding viable infrastructure projects through Special Purpose Vehicle (SPV) for utilizing FER for roads, ports, airports and tourism sectors at low interest and long maturity period. The pattern of earnings of FER shows that the return on FCA and gold, after accounting for depreciation, decreased to 2.1% in 2003-04 from 3.1% during 2002-03.

The proposed IIFF could be used mainly for infrastructure investment for farmers, targeting and monitoring income generating schemes, and improving marketability of their produce. The IIFF can also be funded by floating Farmers’ Development Patras (FDP) and other resource raising measures.

India is not the first country to use its FER for infrastructure investment. The Chinese government used FER of $45 billion to fund a new institution, the Central Huijin Investment Company, like our SPV, which in turn funded the Bank of China and China Construction Bank for infrastructure development. Recently in April 2005 Chinese government authorized a $15 billion bailout package to financially weak lender-Industrial and Commercial Bank of China-(ICBs).

5.2.1.[iii] During the nineties the profitability in agriculture declined by 14.2% mainly due to stagnancy of yield growth and increase in prices of purchased inputs outpacing
increase in output prices. The declining profitability in agriculture also led to stagnation of private sector capital formation from towards the end of the nineties. The private sector investment in agriculture during 1999-00 was Rs 35,319 crore (New series at 1999.00 prices) which increased to Rs 38,215 crore in 2001-02 and consistently fell thereafter and reached a low of Rs 30,532 crore in 2004-05 (quick estimates). The data regarding capital formation from 1990-91 is given in Table 6.

Table 6: Capital Formation in Agriculture - Share of Public and Private Sector – Percentage to GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment in Agriculture</th>
<th>Share in Gross Capital Formation</th>
<th>Investment in Agriculture as a percentage of GDP at Constant Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td></td>
<td>Old Series (1993-94 Prices)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91</td>
<td>14,836</td>
<td>4,395</td>
<td>10,441</td>
</tr>
<tr>
<td>1995-96</td>
<td>15,690</td>
<td>4,849</td>
<td>10,841</td>
</tr>
<tr>
<td>1996-97</td>
<td>16,176</td>
<td>4,668</td>
<td>11,508</td>
</tr>
<tr>
<td>1997-98</td>
<td>15,942</td>
<td>3,979</td>
<td>11,963</td>
</tr>
<tr>
<td>1998-99</td>
<td>14,895</td>
<td>3,870</td>
<td>11,025</td>
</tr>
<tr>
<td>1999-2000</td>
<td>17,304</td>
<td>4,221</td>
<td>13,083</td>
</tr>
<tr>
<td></td>
<td>New Series ( at 1999-00 Prices)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-00</td>
<td>43,473</td>
<td>7,754</td>
<td>35,719</td>
</tr>
<tr>
<td>2000-01</td>
<td>38,176</td>
<td>7,018</td>
<td>31,158</td>
</tr>
<tr>
<td>2001-02</td>
<td>46,744</td>
<td>8,529</td>
<td>38,215</td>
</tr>
<tr>
<td>2002-03</td>
<td>45,867</td>
<td>7,849</td>
<td>38,018</td>
</tr>
<tr>
<td>2003-04</td>
<td>47,833</td>
<td>12,809</td>
<td>35,024</td>
</tr>
<tr>
<td>2004-05*</td>
<td>43,123</td>
<td>12,591</td>
<td>30,532</td>
</tr>
</tbody>
</table>

Source: Central Statistical Organisation - Published in RBI, Annual Report 2005-06.

These trends have to be reversed and the resource base of our agriculture needs to be strengthened and private investments encouraged on a priority basis.

**Soil Health Enhancement**

5.2.2 Soil health enhancement holds the key to improve productivity and returns from investments in inputs like seeds, fertilizers, other nutrients and water. As recommended in the Action Plan for the Year of Agricultural Renewal [Second Report of
the National Commission on Farmers] the need is to re-tool and re-equip all Soil Testing Laboratories [STL] in order to enable them to provide each farm household with a Soil Health Card, containing integrated information on the physics [soil structure, occurrence of hard pan in subsoil etc.] chemistry [soil organic matter, macro and micro nutrient status] and microbiology [occurrence of earthworms, soil microorganism etc.] of the soil and also establish new STL where needed. The soil health cards should stimulate efficient use of plant nutrients and amelioration of micro-nutrient deficiencies which could go a long way in improving competitiveness of our agriculture by improving productivity and reducing cost per unit of output.

**Extension Services**

5.2.3 Extension has become extremely weak [the vigour of the Green Revolution years is no more visible], with nearly all the States keeping large unfilled vacancies in the Department and the available staff being engaged in sale/distribution of seeds etc. rather than doing extension work. The role of the extension system is to act as a conduit between the scientists and the farmers. With the near collapse of the extension services and only a few instances of private enterprise entering the field of extension of technology, the main source of information on modern inputs for the farmers are the input suppliers who have a field day in ‘educating’ farmers in the use of purchased inputs. They naturally have a vested interest in increasing the use of inputs they might be dealing in irrespective of their impact on productivity. Field studies are suggestive about the disproportionate use of all inputs on farms, leading to excessive costs without corresponding increase in productivity. While efforts need to be continued for encouraging private entrepreneurs in extension services, the present situation is not satisfactory. The Krishi Vigyan Kendras [KVKs] have also not performed to their potential. The Central Government and the State Governments need to work together to improve their effectiveness. The State Agriculture Department at the district level needs to have close and effective linkages with the KVKs. The KVKs should also have well equipped laboratories for detailed soil testing and also trained manpower for the purpose of testing and advising the farmers.
Research and Technology Related Issues

5.2.4[i] Another important aspect is that international research is increasingly getting privatized, the outcomes [seeds and other scientific inputs] are likely to be supplied by multinational companies at a very high price [as experienced by Indian farmers in respect of Bt Cotton seeds] leading to various problems. Dependence on multi-national companies for supply of seeds including genetically modified seeds would place the small and marginal farmers to a great disadvantage due to the very high prices. As nearly 80% of farm holdings in India are less than 5 acres [small and marginal holdings] the costs of purchased inputs have a strong bearing on its usage. It is crucial that research efforts in frontier fields are increased within the country, which would require much larger investments and a high degree of accountability of the research institutions. The research has to be market oriented with focus on technology development and reaching the farmers. The progress in achieving yield growth need not wait till new technologies become available. However, different approaches based on local socio-economic and agro-ecological conditions would be required. According to Prof. M.S. Swaminathan, technologies should aim at three time dimensions-

- **Immediate:** Technologies already developed and available for immediate dissemination
- **Medium-term:** Technologies in the pipeline which need testing, incubation and adaption.
- **Long-term:** Strategic research aimed to develop new technologies through the use of new genetics and other areas of frontier science and technology. Anticipatory research is also needed to meet potential changes in climate, particularly temperature and precipitation.

5.2.4[ii] There is a silver lining to otherwise gloomy situation. With a large pool of capable scientists available across the country, it is possible to considerably improve the in house research and technological support to our agriculture. According to Prof. M.S. Swaminathan,\(^8\) “Among the frontier technologies relevant to the next stage in

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\(^8\) Enhancing our agricultural competitiveness – Current Science, Vol 85, No. 7, 10 October 2003
agricultural revolution, the foremost is biotechnology.” In his view, India has a natural advantage in becoming a world leader in food and agricultural biotechnology due to a large biodiversity which serves as feedstock to biotechnology. According to him, the work already done in India in molecular breeding techniques etc. reveals the immense potential for breeding new Genetically Modified varieties [GM varieties] possessing tolerance to salinity, drought, some major pests, diseases with improved nutritional value. The National Commission has already recommended developing a National Food and Agricultural Biotechnology Policy together with implementation structures including an autonomous, professionally manned and managed Biotechnology Regulatory Authority.

Bridging the Technology Gap

5.2.5 Another important area is the dissemination of existing research knowledge and bridging the technology gap between different areas in the country. There is huge yield variation in different areas [For example, more than two thirds of the crop areas have an average yield below national average] which shows that the untapped production reservoir in the country even with the available technologies is quite high. The need is for special attention to dissemination of known technologies and reach in all parts of the country.

Knowledge Revolution

5.2.6 There is a need for greater stress on harnessing power of information and communication technologies for enhancing our agricultural competitiveness. Knowledge revolution in rural India would hold the key to improving productivity and competitiveness. The farmer has not only to have knowledge about various measures to increase productivity in the area of research/technologies, availability of inputs, their prices but also trade literacy regarding the market, time of demand, export practices etc. and the quality norms [codex standards and the sanitary and phytosanitary measures [SPS] applicable in the importing country]. The SPS conditions in different countries for different commodities also need to be consolidated for widespread dissemination. The

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9 sanitary and phytosanitary' measures mean any measures adopted by a country to protect human, animal or plant life or health within its territory from risks arising from the entry or establishment or spread of pest or disease-carrying or causing organisms, animal, plants or beverages or foodstuffs.
Government of India have recently decided to support the Common Service Centre [CSC] Scheme as a national programme under the national e-governance Plan. This scheme [establishment of 1,00,000 CSCs] is integral to providing knowledge connectivity to farmers. Some of the basic guidelines suggested for knowledge resolution are:

- Connectivity and content should receive constant attention;
- Training should be imparted to farmers to access information;
- Information provided should be demand-driven and should be relevant;
- The Centres should operate on the principle of social inclusion and a revenue model.
- To be effective, linkages of lab to lab, lab to land, land to lab [flow of traditional knowledge and wisdom from farmers to technical experts] and land to land [lateral learning among rural families] have to be developed and maintained.

Input Use-Quality of Delivery-Improvements Needed

5.2.7 Precision farming techniques and improvement in qualitative aspects in the delivery of inputs including seeds, fertilizers, farm machines and implements water, energy, credit would increase productivity and reduce per unit cost of production. Qualitative aspect of seeds, pesticides/insecticides and their pricing needs urgent attention. Matters concerning seeds in relation to research, multiplication, availability, assurance regarding the qualitative aspects and prices have become extremely important and deserve urgent attention. Availability of quality seeds in different parts of the country in time and at appropriate prices is crucial. Availability of quality farm machinery and implements is also important. Most of the farm implements continue to be reserved for small scale industries [SSI]. The policy requires a relook to improve the quality of inputs and lowering of prices which could be possible with scale economies of production. The potential for export of these implements to Asian and African countries also needs to be explored. While credit delivery and increasing credit flow and the interest rates are getting considerable attention for the last 3-4, years the need for improving outreach, flexibility, simplification and timeliness of institutional credit requires a much
greater focus. Doubling of institutional credit without adequate attention to bringing in new borrowers and adequate expansion of investment credit would not be of great significance keeping in view the agricultural growth rate of less than 2% and nearly stagnating yields.

B. Marketing, Trade and Quality Related Issues

Efficient Marketing System

5.2.8 Marketing is becoming increasingly important. If appropriate technologies and remunerative marketing opportunities get integrated, impressive production gains and improvement in competitiveness could be achieved. In international trade, in addition to competitive cost and desired quality, the stability in supply is equally important. An efficient marketing system requires cost effective channels of transfer of produce, good infrastructure support, liquidity and market orientation among the producers. Extremely poor infrastructure, connectivity and a complete absence of market information means that the farmers can in no way respond to market signals. High transport and other market related costs could negate advantages of a cost effective production system. While commercialized agriculture is the basis of globalised agriculture, the Indian farmers are operating with a support system which is at best suitable for subsistence farming. This needs attention. Our agriculture marketing system is restrictive and regulated due to a plethora of laws which have also restrained private sector investments in this sector. The APMCs and State Agriculture Marketing Boards need to change their role from regulatory to promotional and developmental. These agencies should focus more on developing new markets for the local products. Their entire functioning, management, operations and disposal of surplus need a relook. The need is also to encourage and support the farmer’s cooperatives and private sector to operate the wholesale agriculture produce markets and provide competition to APMCs. [Various aspects connected with agricultural marketing reforms have been discussed in detail in the Second Report of the National Commission on Farmers, Aug 2005]
Box III

Quality Literacy on Codex Alimentarius Standard and SPS Measures among Farmers

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement in Technical Barriers to Trade (TBT) both encourage the international harmonization of food standards. The SPS Agreement cites Codex standards, guidelines and recommendations as the preferred international measures for facilitating international trade in food. As such, Codex standards have become the benchmarks against which national food measures and regulations are evaluated within the legal parameters of the Uruguay Round Agreement.

The word Codex Alimentarius is taken from Latin and means a code of food standards for all nations. Codex was established in 1962 when the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) recognized the need for international standards to guide the world’s growing food industry and to protect the health of consumers. The significance of the food code for consumer health protection was further underscored in 1985 by the United Nation Resolution 39/248, whereby guidelines were adopted for use in the elaboration and reinforcement of consumer protection policies. The Codex Alimentarius Commission (CAC) is an intergovernmental advisory body under FAO/WHO with current membership of 174 member countries.

The Government of India has been harmonizing its standards with the Codex requirements for food products. For the overall development and economic growth of the country it is essential that all players down to level of farmers and growers, food processors and trade understand the essence of international food regulations and standards such as Codex and WTO. A farmer has tremendous responsibility to produce agri-product of quality which satisfies the Codex requirement.

The Codex Alimentarius includes standards for all principal foods, whether processed, semi-processed or raw for distribution to the consumer. It includes provisions in respect of food hygiene, food additives, pesticide residues, contaminants, labeling and presentation, methods of analysis and sampling. Codex Food Standards, codes of practice and other guidelines protect consumers from unsafe food and fraudulent practices. At the same time, they allow food producers, processors and traders access to markets by breaking down artificial non-tariff barriers to trade. All products meant for sale have to be packed and labeled as per code requirement.

The benefits of international trade can be reaped only when the messages of Codex and SPS and TBT requirements reaches the farmer. This can be taken up as a societal programme by the Government and non-governmental agencies to disseminate the standard requirements and rules and regulations under Codex and WTO agreements. Emphasis may be given to them regarding how to reach the standard requirements by adopting Good Agricultural practices in the Farm and HACCP in the processing of agriproducts. Farmers must also be informed about the higher dividend he/she gets by adopting such practices consistently and continuously.

Post Harvest Operations and Value Addition

5.2.9 Post harvest infrastructure is grossly inadequate resulting in huge inefficiencies and wastages. In the Third Report of the National Commission of Farmers it was suggested that about 60,000 lab to land demonstrations may be organised in the post-harvest handling, processing and value addition. Help of CSIR and the Central Food Technology Research Institute [CFTRI], Mysore may be taken by the ICAR while designing these programmes. It was also suggested that a post-harvest technology wing should be added to every Krishi Vigyan Kendras. Poor quality standards, and
absence of grading, low value addition make our products comparatively uncompetitive/unacceptable in the international markets. This is also partly due to the obsolete methods of processing which need to be modernized. Agriculture and food processing activities require modernization and standardization not only in terms of investments but also in terms of enabling rules and regulations and a policy framework for operating in the globalised environments, attract greater investments and encourage the exports. **World over, the demand of processed agricultural products appears to have great growth prospects.** Being a very large producer of agricultural commodities, India can not continue to be a spectator in this sector. There is a need to harness export potential in the processed food sector and also more importantly to ensure that the domestic market is not lost to imports. However, entering or building export markets in processed food is not likely to be easy and require a strong policy support including liberal tax benefits/concessions etc. to start with and maintaining high standards of quality to meet Codex standards.

**Box IV**

**Lab to Land Technologies**

Utilising science for value addition for agricultural resources for sustainable livelihoods is crucial. Several technologies have been developed by the Central Food Technological Research Institute (CFTRI), Mysore, many of which have also been implemented successfully. The Agricultural Engineering Division of the Indian Council of Agricultural Research (ICAR) is also supporting a programme for developing region and commodity specific post harvest technologies through All India Coordinated Research Project on post harvest technologies with 33 centres across the country and is expecting to cover 60,000 farmers over a period of three years.

The lab to land programme has to aim at plugging the gaps between demonstration of feasible technologies and make farmers understand the need for total adoption of the package. The ultimate objective is that the innovation of the laboratories must reach the farmer and the grower for value addition to their agriculture products and lead to increased farm incomes. A large number of technologies are available off the shelf with CFTRI. The available technologies range from processing of fresh fruits and vegetables to cereal based products like rice flakes and papads, spices and condiments, with the capital investment required ranging from Rs. 1 lakh for papad to Rs. 35 lakhs for making jowar flakes.

Any fruit and vegetable processing unit requires a license from the Ministry of Food Processing Industries and all products have to comply with regulatory standards of the country viz, Agmark, BIS. Transfer of Technology also has to be accompanied by training on Good Harvest Practices and Good Manufacturing Practices and packaging.

Availability of such off the shelf technologies backed by technical and financial support can lead to growth of a large number of small, tiny, cottage and village industries providing employment in rural areas and help cascade the production by masses into mass production.
Trade Responsive Measures

5.2.10 Indian agriculture will have to become progressively more and more trade responsive to meet the challenge of globalization. For this purpose reliance may have to more on market related instruments like tariffs, credit policies, public investments complimenting community initiatives and to develop market structures etc. The need is, therefore, to build markets, design financial institutions and strategic organisational structures which work and provide finances for communication, processing, standardization, quality upgradation and trade.

Box- V

Common Commodity Organizations (CCO)

Out of 178.25 million farmers, 138.85 million (76.7%) are food grain farmers and 13 million farmers produce cotton and sugarcane. They have suffered income erosion during the last five years and prospects of improvement does not appear to be very bright. The specific commodity-farmer centric measures that will improve their lot will have to be designed. The CCOs could evolve supply demand management suitning the market changes and thereby increase farmers’ incomes. CCOs will work as pressure group to monitor farmers’ income and safeguard their economic interest.

The need has arisen for CCOs when surpluses have arisen in agricultural commodities and markets are getting unfriendly to farmers resulting in falling incomes of the farmer and sometimes suicides. The CCOs is a common feature in European Union (EU) and USA such as the National Cotton Council, American Soyabain Association etc. Recently American Soyabain Association prevailed on President of USA to increase Soya fuel mix with petrol to 20% that benefited the Soya farmers by $2000 per farmer. The Tea, Coffee and Spices Boards are examples of such CCOs in India.

C. Other Issues

Small and Marginal Farmers – Institutional Support

5.2.11 Institutional measures that could help the small and marginal farmers in sharing the potential gains of growth and increase the exports are needed. According to Prof. G.S. Bhalla, a proactive policy should be designed to involve the small and marginal farmers in deriving the benefits of exports through innovative institutions like the milk co-operatives of Gujarat and contract farming etc. However, contract farming arrangements are often a contract between two unequal players. Complaints about inadequate guidance in input use and farm practices as well as non-enforcement of contract are voiced frequently. However, where contract farming is organised in the cooperative mode, with major say of the producers at all the stages of value chain, it may
help in improving productivity and give a better share to the producer from the consumer’s rupee besides insulating him from the market risks. The efforts on production front have to be supported by creation of specialised institutions like trading houses, market intelligence services and creation of network of information regarding national and international prices for benefit of farmers and more particularly small farmers. Cooperatives could be a good organisational structure for these institutions.

**Priority for Switching Over from Low Value Agriculture to High Value Agriculture**

5.2.12 The need is to move Indian agriculture from low value agriculture to high value agriculture and from low yielding activities to a dynamic competitive sector capitalizing on its inherent advantages. **Dr. Y.K. Alagh**\(^{10}\) has suggested that to make the agriculture competitive, the farmer has to be supported in terms of cost of production of efficient farming. Those costs monetize existing practices, meet the immediate cost of technology adoption and learning and would sometimes embody in new inputs. Many of these would be of immediate kind and after initial thrust and support; the farmer would compete on its own. While the capital cost for such an economy at the margin would be higher than the historical costs, the current output costs would be lower per unit of output. This shift would require larger working capital.

5.2.12[i] **India could also become a potential outsourcing hub for agriculture due to its vast size and diverse agro-climatic conditions provided we take steps to enhance global competitiveness of some selected commodities in specific areas where we have strength.** For that purpose apart from taking general steps like improving productivity, support of research and extension and market reforms, a broad strategy as under could be considered.

- Identifying specific regions having strengths in particular commodity to promote exports by improving competitiveness [for example organic spices, niger and other products in tribal areas of Orissa, Chattisgarh or “basmati” rice in Punjab and Haryana or fruits in Maharashtra].

\(^{10}\) “Prospects and Problems” in Yojana, August 2006.
• Value addition through vertical integration of farmers with agro-processing industries since efficient value addition would enable the processed product to focus on appropriate market segment to gain competitiveness. Agro-processing and value addition can also be taken up by Farmers’ companies, cooperatives, groups with professional management.

• Improving rural infrastructure in these identified regions to ensure production of international quality processed goods.

Need for Proactive Advice – Land Use Boards – Restructuring

5.2.13 The existing Land Use Boards are not equipped to provide proactive advice to farmers on land use planning. Without economically and ecologically sound and proactive advice on land and water use, farmers have to fend for themselves in taking decisions on what to grow, how much to grow etc. With the spread of agricultural globalization, this could be disastrous to the economic health of the farmers. **There is urgent need for National Land Use Advisory Services, linked to State and Block Level Land Use Advisory Services on a hub and spokes model.** As recommended in the Second Report of the National Commission on Farmers, these could be virtual organisations with capacity to link land use decisions with ecological, meteorological and marketing factors including exports/imports on location and season specific basis.

Indian Trade Organisation [ITO]

5.2.14 The National Commission on Farmers has recommended establishment of the Indian Trade Organisation [ITO]\(^\text{11}\) specializing in WTO affairs and ensuring adequate livelihood protection of Indian farmers. It could be a virtual organisation to serve and assist the Government in taking informed and proactive decisions. The proposed National Land Use Advisory Service and the ITO may have to work in close coordination to be able to render proactive advice on land and water use keeping in view the local and international markets and trade opportunities.

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Agriculture in the Concurrent List

5.2.15 Agriculture by its nature cannot be centrally managed in a very efficient manner even at a local level. At the same time a vast number of farmers cannot effectively confront liberalized and globalised market condition; they must come together to safeguard their interest and also to make a better deal for themselves. The European Union [EU] has handled agriculture differently than the industries. The members of EU have virtually given up their independent decision making as relating to agriculture and introduced a Common Agriculture Policy [CAP]. This is in sharp contrast to the situation in India where agriculture is a State subject, although crucial decisions relating to credit input, output pricing and research and extension are made at the centre. The States could have different and even conflicting policies with respect to issues like standards, environment etc. As a matter of fact, the States do have differences in octroi, local taxes, charges levied by APMCs for marketing, levies etc. The need is perhaps to bring more uniformity and move towards a Single Market\(^\text{12}\) by facilitating/simplifying movement of goods [replacing annual road tax and removal of fitness certificate by a life time payment/system, introducing National Permit for plying commercial vehicles anywhere in India], fiscal matters [introduction of uniform VAT all over the country, uniformity in taxes on commodity, withdrawal of octroi and local taxes] matters relating to tax administration [avoid using the border posts for collection/verification of payment of taxes] etc. These measures would help in enlarging small regional markets into a large national market, reduce transportation cost and improve competitiveness of our agriculture. It may be useful to consider bringing agriculture to at least the Concurrent list, so that the principles of an India Single Market as well as issues relating to prices, production, diversification etc. could be examined by the Centre and States in a participatory mode in the overall interests of farmers and farming.

5.3 Need for Greater Support to Backward Regions/Communities

5.3.1 While agriculture is moving towards liberalisation and globalization let us not forget that agriculture is a way of life for most of our rural population and their only

means of livelihood [most of them have neither education nor skill nor capital to take up any alternate livelihood]. Agriculture is also the embodiment of country’s culture and environment. **We need to give highest priority to our people and local requirements.** About 120 million farming families represent over 60% of our population. It is absolutely necessary to take care of the interests/concerns of this vast rural population and particularly the economically [mainly agriculturally] backward regions and communities. The vast majority of our farmers have very small holdings [less than 5 acres] and do not have either the resources or capability to easily move away from the crop rotation being followed by them and take up new crops. The cost of making such changes in terms of crop specific investments, arranging seeds/other inputs and marketing is likely to be beyond them. These farmers would find it difficult to respond to take advantage of market signals and are likely to suffer greatly from cheaper import of crops produced by them howsoever, small the imports may be. The Government would require to closely watch such imports and take prompt and appropriate tariff measures to minimize the adverse impact on them. Further, the developed countries have exploited various exemption clauses and the ‘Green Box’ under WTO and are able to protect their farmers and farming. [Annexure II gives details of various programmes which support farmers and are exempt from the AMS]. We have therefore to be very careful in tariff related matters to ensure that the livelihood of our farmers is not adversely affected.

### 5.4 Conclusion

5.4.1 Indian agriculture is undergoing structural changes in recent years and this has enhanced the market induced vulnerability of a large section of our farmers. The progressive integration with global economy means that our farmers are also increasingly being exposed to price fluctuations at the international level. These changes have taken place when the rate of growth in agriculture production is decelerating, farm sizes becoming smaller and smaller, inputs becoming costlier and the farmer having to rely more and more in purchased inputs for cultivation. The cost-risk return structure of farming is becoming increasingly adverse. **As the risk mitigation measures are not effective across the country and the prevailing safety net provisions, are either**
grossly inadequate or delivered very inefficiently, it leads to a near crises situation for farmers in many regions of the country.

5.4.2 Various measures are necessary mainly in insurance, credit, employment creation, social security, empowerment, education, skill building and improving sharing of information and knowledge to save the vulnerable sections of our rural families on an urgent basis [most of these could be WTO compatible as already stated in earlier paragraph]. **We also cannot ignore the challenge being faced by Indian agriculture in the wake of liberalisation and globalization.** The process of integration with the world economy would continue bringing many more challenges and also some opportunities.

5.4.3 **The need is to build on our strengths to take advantage of some opportunities that come our way.** The diverse agro-climatic conditions, the rich biodiversity, one of the World’s largest agriculture research system, a vast domestic market, largest irrigated area in the world, huge land size and arable area, innovative and hard working farmers who have a record of succeeding in adverse conditions present a huge potentials and opportunities to our agriculture. **Improvement in delivery of services (credit, insurance, extension, research/technology support) availability of quality inputs like seed, energy and water, increased investments for strengthening the resource base of agriculture, relook at the various laws/enactments and policies would be needed to take advantage of the developments by improving competitiveness of our agriculture.** These developments coupled with regular supplies, quality consciousness and reducing transport costs, statutory charges, market handling charges, processing costs etc could improve our exports more so if the developed countries reduce their subsidies and play the game as per the spirit of the game and give increased market access to the developing nations. It would be equally necessary to be watchful in the international front regarding imports which could seriously impact the livelihood of our farmers by watching the subsidies given by other countries and fine tuning our tariffs.
5.4.4 Let us also not forget that international agriculture markets are not perfectly competitive in character. Trade in agricultural commodities is dominated\textsuperscript{13} by a few very large international companies [mostly from US, Western Europe and Japan etc.] which enjoy considerable clout and unique position. The agricultural trade liberalisation could minimize tariff and non-tariff barriers to trade but cannot ensure perfectly competitive market structures. The apprehensions are that the developing countries would end up paying higher price [than what it would have been in a perfectly competitive market] for their imports and get lower price than what would have been possible for exports in a perfectly competitive market [Indian experience so far is not much different]. Further, the improvement in exports may also not translate much to the growth of welfare of the farmers as their supply response is not very elastic. The need is, therefore, to try for very substantial reduction in the export subsidies and domestic support given in the developed countries and simultaneously improve our irrigation, power supply, research support, extension, input supply etc., to bring about improvement in factor productivity to reduce the cost of production and improve competitiveness of our agriculture. However, we would require a differentiated approach to meet the emerging challenges of liberalisation. Our agricultural exports form only about 6.2\% of the value of our agricultural production. Thus, only a small proportion of our agricultural commodities enter the global market. It is of utmost importance that we take care of the farmer who produces to meet nearly the entire requirements of our population of 110 crores. The crops, including by products/processed products where we have export competitiveness need to be developed for export markets, with appropriate policy and other support measures ensuring all along that these are WTO compatible.

\textsuperscript{13} Three to six of the big companies handle 85\% or above share of world exports in wheat, coffee, cotton and jute. While 60\% of the World export of sugar, 70\% of rice, 70-75\% of bananas and 80\% of tea trade is handled again by 3-6 companies/firms.
Annexure -I
Summary of Major Provision under the Agreement on Agriculture-Developing Countries Implementation by 1995-2004

<table>
<thead>
<tr>
<th>Item</th>
<th>Implementation Schedule</th>
</tr>
</thead>
</table>
| Domestic support            | a) Total AMS to be brought down by 13.3% in 10 years  
  b) Product specific support in excess for 10% of the total value of a product included in the current total AMS [Article 6.4b]  
  c) Non product-specific support [subsidies on electricity, credit, fertilizer, irrigation, transport, livestock feed, crop insurance etc.] in excess of 10% of the value of total agricultural production included in current total AMS.  
  d) Minimum trade-distorting items like Govt. assistance on general services like research, pest & disease control, training, extension and advisory services, public stock holding for food security purposes, domestic food aid, direct payment to producers through Govt. Participation in income insurance, and safety nets, relief from natural disasters and environmental assistance programmes, referred to as ‘Green Box’ measures are exempt from AMS calculation.  
  e) Measures like investment subsidies and agricultural input services to low income and resource poor producers are exempt under special and differential treatment. |
| Export Competition - Export subsidy - Expenditure and Quantities | 24% reduction in 10 years  
  14% of commodities |
<table>
<thead>
<tr>
<th>Market Access</th>
<th>Ordinary Custom Duties</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Tariffs</td>
<td>Reduction commitments on duty levels as of 1986-88</td>
</tr>
<tr>
<td></td>
<td><strong>Tarification of non tariff barriers</strong></td>
</tr>
<tr>
<td></td>
<td>To be converted into ordinary bound custom duties</td>
</tr>
<tr>
<td></td>
<td>in tariff equivalent of the base period [the developing counties had the option to offer ‘ceiling bindings’]</td>
</tr>
<tr>
<td></td>
<td><strong>Tariff Reduction</strong></td>
</tr>
<tr>
<td></td>
<td>Duties resulting from (i) and (ii) to be reduced by</td>
</tr>
<tr>
<td></td>
<td>24% on average, with minimum of 10% on each line</td>
</tr>
<tr>
<td></td>
<td><strong>Special Safeguard Measures [SSGs]</strong></td>
</tr>
<tr>
<td></td>
<td>Not usually applicable to developing countries</td>
</tr>
<tr>
<td></td>
<td>3% of base period (86-88) consumption must increase to 5% in 2000</td>
</tr>
</tbody>
</table>

*Source: Implications of WTO Agreements for Indian Agriculture-I.I.M, Ahmedabad*
Annexure - II
Agreement on Indian Agriculture under WTO, 1994

| ART. 1 | Domestic support through a publicly funded Government programme not involving transfer from customers and the support shall not have the effect of providing price support to the producers. |
| ART. 2 | Expenditure in relation to programmers which provide services or benefits to agriculture exempt from being considered under AMS. |
| ART. 3 | Public stock holding for security purposes exempt from being considered under AMS. |
| ART. 4 | Domestic food aid exempted from being considered under AMS. |
| ART. 5 | Support provided through direct payment to producers being claimed for exemption should meet the criteria under Art. 1 and Art. 6 to 13. |
| ART. 6 | Decoupled income support exempt from being considered under AMS. |
| ART. 7 | Govt. financial participation in income insurance scheme and safety net programmes exempt from being considered under AMS. |
| ART. 8 | Govt. participation in crop insurance for relief from natural disasters is exempt from provision of AMS. |
| ART. 9 | Structural adjustment assistance provided through producer retirement programme exempt from being considered under AMS. |
| ART. 10 | Structural adjustment assistance provided through resource retirement programme exempt from being considered under AMS. |
| ART. 11 | Structural adjustment assistance provided through investment aid exempt from being considered under AMS. |
| ART. 12 | Payments under environmental programmes exempt from being considered under AMS. |
| ART. 13 | Payments under regional assistance programmes exempt from being considered under AMS. |

Source: Reforming Agriculture in the WTO Environment: Lessons from European Union Experiences - Samar K. Datta and Milindo Chakrabarti - Appendix 3.1
CHAPTER 6
STRENGTHENING THE COPING CAPACITY OF FARMERS UNDER AN UNCERTAIN TRADE ENVIRONMENT

6.1 The Context

6.1.1 During the past decade and a half, the Indian farmer has faced three episodes of uncertainty, in the context of the globalisation of the economy. The first came from the policies of liberalisation that were adopted in the early 1990s, which were accompanied by steep reduction in tariffs, on commodities including agricultural commodities.

6.1.2 The second episode of liberalisation was brought by India’s accession to the WTO. In this episode, India was required to remove its quantitative restrictions maintained for balance of payments purposes and this affected a considerable proportion of the agricultural sector. However, a section of domestic producers received some succour in the form of high levels of tariff bindings\(^1\). India’s high tariffs\(^2\) are now under the scanner with many of its trading partners insisting that these high tariffs must be lowered for promoting agricultural trade. The on-going Agriculture negotiations in the WTO that are being conducted under the rubric of the Doha Round have seen such demands being made by many developed countries that have substantial interest in the global market for agricultural commodities.

6.1.3 The third, and the most recent of the episodes of trade liberalisation, has come in the form of the Free Trade Agreements (FTAs). Although only a few of the FTAs involving India have come into effect, a large number of these are currently being negotiated. More critical for India’s domestic agricultural interests are the proposed FTAs with the ASEAN and the PTA with MERCOSUR members. These groups have

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\(^1\) At the end of the Uruguay Round negotiations, India opted for ceiling bindings, which allowed relatively high levels of tariffs to be imposed on at least the major agricultural commodities. Most primary agricultural commodities were bound at 100%, processed products at 150% and certain oilseeds at 300%.

\(^2\) India’s average bound tariff is 114.2%.
significant presence of agricultural exporters and whose major export interests include commodities in which India has sensitivities either from the perspective of food security or livelihoods, or both.

6.1.4 Trade liberalisation has also exposed the Indian farmers to the **risks associated with the widely fluctuating prices for agricultural commodities in the international markets**. During the past decade, international prices for the major agricultural commodities have gone down and have remained sticky at low levels. While the price fluctuations are natural, given the relatively inelastic demand for agricultural commodities, discriminatory policies followed by some of the larger players in the global markets for agricultural commodities, for instance the grant of high subsidies by the US and the EU, that have amplified the considerable uncertainties in the commodity markets arising from fluctuating prices.

6.1.5 The key issue arising in the context of the globalisation of the Indian economy relates to the **mechanisms that policy makers should adopt that would give a reasonable degree of comfort to the Indian farmers**. Policy makers would have to take measures to ameliorate uncertainties facing them, by taking two sets of initiatives. In the first instance, the policy response would have to be in the form of adequate levels of support to the farm sector so that cheap imports, or even a potential threat from cheap imports, do not create a situation where livelihoods are threatened. Secondly, comprehensive changes in agricultural policies must be put in place for reversing the declines in productivity and the consequent erosion of farmers’ incomes.

6.1.6 Recent developments have reinforced the point that Indian agriculture is on a knife-edge and that minor uncertainties in the agricultural markets can cause food insecurity and livelihoods concerns. India would have to argue consistently, as it has been doing in the WTO negotiations, that it would need to provide reasonably **high levels of protection to address the twin concerns of food security and support of livelihoods in the farm sector**. According to India, these concerns are part of the non-trade concerns that WTO Member countries have recognised as being of critical importance to developing countries.
6.1.7 One of the major areas of concern for Indian agriculture arises from the threat of cheap imports. Over the past decade, prices of major commodities have remained depressed in the international markets largely because of the weight of subsidies granted by the US and the EU. According to IMF statistics, between 1996-1999, and with a base of 1990-91, the price index has undergone a fall of –43.1%, –45.8%, –25.7% and –31.3% in respect of Cereals, Wheat, Rice and Vegetable oils and Protein meals respectively. Although the WTO Agreement on Agriculture (AoA) seems to have taken the initial steps towards reining in farm subsidies, the implementation of the Uruguay Round commitments have shown that very little progress has been made in this direction. Effective reduction of farm subsidies remains high on the agenda of the G-20 group of developing countries, which is led by India and Brazil.

6.1.8 Yet another effort was made by the developing countries in the 1970s and the 1980s for stabilising commodity prices. These countries could get the global community to agree to an arrangement that could ensure stabilisation of commodity prices. The establishment of the Common Fund under the aegis of the UNCTAD was a step in this direction. Although the UNCTAD initiative never took off the ground, the need for price stabilisation measures remains, nonetheless.

6.1.9 The second level of response, one that looks at the medium to the long run, should aim at reversing the productivity declines that the farmers have been facing in almost all major crops. This would require a package of measures that would include, *inter alia*, land reforms for addressing the problems arising from uneconomic land holdings, fragmentation of holdings, and easy access to technological inputs that promote sustainable agriculture, and better management techniques for utilising available resources more effectively. Only such a package can improve on-farm efficiency and can help bridge the productivity gap that prevents farmers in India from competing with the more efficient producers.

6.1.10 It needs to be clarified that price fluctuations in international market affect the Indian farmers in two ways. For commodities exported by India, the fall in international prices brings down the price realisation by the Indian farmers e.g. cotton. For
commodities imported by India, an increase in supply brings down domestic prices and also brings down the price realisation of the Indian farmers e.g. edible oils.

6.1.11 This Chapter analyses the implications of the process of globalisation on Indian agriculture by looking closely at four commodities, viz. pepper, coconut, cotton and oilseeds. The need to protect producers involved in the production of these commodities arises from the sizeable number of farm families and workers that are dependent on them. In other words, the issue of livelihoods security arises quite prominently in case of all the four commodities. The case studies bring out the issues involved and have relevance for other agricultural commodities too.

6.1.12 The analysis here would also explore the policy options that need to be looked at for safeguarding the interests of the farmers engaged in the production of these commodities in particular and other crops with global ramifications in general.

6.2 Pepper

6.2.1 Pepper is a smallholder crop and linked to rural development and livelihood security. The pepper growers are full time workers in agriculture depending solely on the crop for livelihoods. Producers of pepper are mainly small farmers with average land holding size about one hectare. More than 17 million people are dependent on pepper cultivation for livelihoods.

6.2.2 Kerala is the largest producer of pepper – in 2003-04 more than 96% of the country’s production was accounted for by this state. In 1991, nearly 1,70,000 hectares were under pepper cultivation in Kerala, which was just less than 6% of the State’s gross cropped area, and by 2003-04, this figure had increased to more than 7%. Exports accounted for nearly three-fourths of the total production of pepper in 1999-2000. However, in the more recent years, exports have fallen to just over a fourth of the total production.
6.2.3 Trends in Pepper Production in India

6.2.3.1 Pepper production in India seems to have gone a full circle during the decade and a half since 1990. After experiencing considerable fluctuations in the first half of the 1990s, pepper production increased to its highest level in 1999. Thus, pepper production had increased by almost 60% from the trough of 48,000 tonnes seen in 1991.

6.2.3.2 Fluctuations in the level of production of pepper in India were driven to a significant extent by movements in domestic prices. The effect of prices on production was more pronounced since the late 1990s. Another feature of pepper production was that the levels were influenced directly by changes in area under cultivation. Thus, in 1999, when production had increased by nearly 60% as compared to the level achieved in 1991, area under pepper cultivation went up by 40%. In other words, until about the year 2000, changes in pepper production could be explained largely by commensurate changes in the area under cultivation. In the more recent years, this link seems to have been broken, as an almost stagnant level of area under cultivation has been witnessing fall in production.

6.2.3.3 This tendency in the later years was a reflection of falling productivity of pepper cultivation in India. After remaining constant at around 300 kg per hectare, pepper yield came down to nearly 200 kg per hectare in 2004. All this while, when pepper yield in India was stagnant, its main competitors, like Vietnam and Indonesia, had improved their position in the global market through efficiency gains. As a result, productivity gap between India and the other leading pepper producers increased quite considerably in the more recent years. The following discussion provides the details.

6.2.4 The Global Market Trends

6.2.4.1 Four countries provide the bulk of pepper produced globally. These countries, viz. Vietnam, Indonesia, Brazil and India, had a combined share of nearly 75% of the global production in 2004. Vietnam emerged as the largest producer in 2004, with a total production of nearly 96,000 tonnes. It had outstripped Indonesia, which was the largest producer since 1998.
6.2.4.2 Production trends of the four leading producers since 1990 indicate that the production centres have changed quite significantly during this period. Brazil was the largest producer in the beginning of the 1990s, after which the country’s production suffered a steep decline. Indonesia emerged as the top producer for a couple of years, only to be replaced by India. However, since 1999, India’s pepper production declined quite rapidly – from a high of 76,000 tonnes produced in 1999, which was close to 26% of the global production, India was producing only two-third of this level in 2004. What also needs to be pointed out is that since 1999, global pepper production has consistently increased on the backs of robust production performance by all the leading producers barring India.

6.2.4.3 The emergence of Vietnam in the global market for pepper has been the most remarkable development. In the beginning of the 1980s, the country was producing less than 1,000 tonnes of pepper, and within a decade, its production had exceeded 11,000 tonnes. But even after registering a ten-fold increase in production, Vietnam had no more than a 5% share of world production in 1991. However, with production increasing even faster during the 1990s, Vietnam had increased its share in the global production to more than 23% in 2004.

6.2.4.4 Explaining the above-mentioned trends in production across countries are the differences in their yields. For instance, India suffered a relative decline in the market share for pepper since it was the least productive among the four leading producers. While all other countries increased their yields since the late 1990s, yields declined in India during the past few years after remaining nearly stagnant between 1990 and 2001. What emerged from these trends was that in 2004, pepper yields in Vietnam and Brazil were higher by 10 and 12 times higher respectively as compared to that recorded by India. Interestingly, both these countries went through periods in which they recorded even higher levels of efficiency. An added matter of concern for India should be that in 2004, pepper production in the country was nearly 5 times lower than the global average.

6.2.4.5 India’s relative decline among the leading pepper producers was manifest in its declining shares in global exports. In 1999, India was the second largest exporter of
pepper, and the volume of exports from India was not significantly below that of the leading exporter, viz. Indonesia. Among the other leading producers, Vietnam had already started challenging the global market leaders, but Brazil was a considerable distance behind.

6.2.4.6 This situation underwent a rapid change since the beginning of the current decade. A more than 25% decline in production in 2002 turned India to the international market as a major importer. India’s imports of pepper, in terms of volume, increased more than five-fold within a period of three years, i.e. from 1999 to 2002. Consequently, India emerged as the third largest importer of pepper in terms of quantity.

6.2.4.7 It may be argued that this surge in imports has acted as an added disincentive for the pepper farmers in the country, whose long term prospects have looked dismal in the face of the secular decline in productivity levels of the crop. Aside from the structural nature of the problem that they face, attention must also be given to whether the pressures from the global market, particularly in terms of the relative movement in domestic and international prices have encouraged imports, thus affecting domestic production. The latter possibility would justify the use of tariff protection, at least in the interim, so that the Government can take measures to improve efficiency levels of the pepper producers in India. The following discussion looks at the details in this regard.

6.2.5 Increase in Pepper Imports: Role of relative price movements

6.2.5.1 At the outset, movements in producer price seen in India and its major competitor countries would be analysed. As is evident, differences in producer prices reflect the relative production costs, and this provides a basis for assessing the policy instruments that the government would need to put in place in order to safeguard the interests of the Indian pepper producers.

6.2.5.2 FAO database provides comparable sets of producer prices for two of India’s major competitors in the global market for pepper, viz. Indonesia and Brazil. This data are available for the period 1991-2003 (Table 1).
### Table 1: Comparison of Producer prices in leading pepper producing countries

<table>
<thead>
<tr>
<th>Years</th>
<th>India</th>
<th>Indonesia</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1549.8</td>
<td>3382.0</td>
<td>755.0</td>
</tr>
<tr>
<td>1993</td>
<td>1412.3</td>
<td>3050.9</td>
<td>708.7</td>
</tr>
<tr>
<td>1995</td>
<td>1885.1</td>
<td>3254.3</td>
<td>1309.8</td>
</tr>
<tr>
<td>1997</td>
<td>3155.0</td>
<td>3411.2</td>
<td>3353.5</td>
</tr>
<tr>
<td>1999</td>
<td>3671.6</td>
<td>2476.2</td>
<td>3944.4</td>
</tr>
<tr>
<td>2000</td>
<td>2924.2</td>
<td>2803.9</td>
<td>2322.8</td>
</tr>
<tr>
<td>2001</td>
<td>1509.8</td>
<td>2383.2</td>
<td>1238.5</td>
</tr>
<tr>
<td>2002</td>
<td>1485.3</td>
<td>2810.1</td>
<td>895.3</td>
</tr>
<tr>
<td>2003</td>
<td>1414.1</td>
<td>3313.2</td>
<td>787.4</td>
</tr>
</tbody>
</table>

Source: FAOSTAT

6.2.5.3 Data for producer prices provided in Table 1 show interesting tendencies across countries. Producer prices have remained relatively low in India despite the fact that the productivity levels in the country are significantly lower than in the other countries. In case, the trends in producer prices seen in the above Table bring out the inherent limitations of the country’s pepper production system quite clearly. The smallholder dominated pepper production system in India was not able to benefit from scale advantages accompanying increases in production recorded in the second half of the 1990s. Thus, producer prices escalated with increased production and in 1999 when India recorded the highest level of pepper production, its producer price was almost a third higher than Indonesia, which was then the country’s main competitor.

6.2.5.4 Available data on producer prices indicate that in recent years India did not face any threat from Indonesia, the largest producer of pepper after Vietnam. Producer prices in Indonesia have been significantly higher as compared to those in India, particularly since 2001. More importantly, Indonesia seems to have lost ground in the global markets as its export volumes have seen sharp reduction.

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3 During this period, India experienced downward movement in producer prices that accompanied declining production volumes.
6.2.5.5 However, Brazil did pose a threat to India, since it was able to bring down its producer prices quite appreciably. The sharp decline in producer prices recorded by Brazil since 2000 was reflected in the country’s growing presence in the global markets. In 2004, Brazil was the second largest exporter, having upstaged Indonesia.

6.2.5.6 Relative movements in domestic and international prices captured in Table 2 also suggest that Indian producers do not face an apparent threat from imports, given that the latter have exceeded the former by an average of nearly 20% in recent years.

Table 2: Domestic and International Prices of Pepper

<table>
<thead>
<tr>
<th>Years</th>
<th>Domestic Prices</th>
<th>International Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-98</td>
<td>4665.7</td>
<td>5290.0</td>
</tr>
<tr>
<td>1999-2000</td>
<td>4961.6</td>
<td>5030.0</td>
</tr>
<tr>
<td>2001-02</td>
<td>1826.3</td>
<td>1970.0</td>
</tr>
<tr>
<td>2002-03</td>
<td>1673.7</td>
<td>1910.0</td>
</tr>
<tr>
<td>2003-04</td>
<td>1616.9</td>
<td>1700.0</td>
</tr>
<tr>
<td>2004-05</td>
<td>1553.5</td>
<td>1650.0</td>
</tr>
</tbody>
</table>

Source: Spices Board

6.2.5.7 Evidence presented above would suggest that the Indian pepper producers do not face any competitive threat from imports at present since domestic prices were considerably below international prices. Furthermore, imports have increased during the past few years not because of the worsening competitive strengths of the Indian producers but for meeting the slack in domestic demand arising from the shortfall in production.

6.2.5.8 A closer evaluation of available data, however, indicates that cheap imports are a potential threat to Indian producers. Data on unit values of import of pepper show that during the past few years two of India’s principal competitors, viz. Vietnam and Brazil, exported below international prices, while Indonesia exported pepper at prices that were below the corresponding domestic prices. Table 3 provides the details.
Table 3: Unit Import Values and Domestic/International Prices of Pepper

<table>
<thead>
<tr>
<th>Years</th>
<th>Unit Values of Imports</th>
<th>Domestic Prices (India)</th>
<th>International Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indonesia</td>
<td>Vietnam</td>
<td>Brazil</td>
</tr>
<tr>
<td>1999-2000</td>
<td>2790.2</td>
<td>2337.4</td>
<td>-</td>
</tr>
<tr>
<td>2000-2001</td>
<td>3104.7</td>
<td>2264.2</td>
<td>-</td>
</tr>
<tr>
<td>2001-2002</td>
<td>1537.0</td>
<td>1945.2</td>
<td>-</td>
</tr>
<tr>
<td>2002-2003</td>
<td>1637.8</td>
<td>1597.8</td>
<td>-</td>
</tr>
<tr>
<td>2003-2004</td>
<td>1495.9</td>
<td>1430.9</td>
<td>1466.7</td>
</tr>
<tr>
<td>2004-2005</td>
<td>1810.9</td>
<td>1283.1</td>
<td>1400.0</td>
</tr>
</tbody>
</table>

Source: DGCIS

6.2.5.9 The actual threat faced by the domestic producers from cheap imports, originating in Vietnam, in particular, can be gauged by observing the tariff-adjusted import parity prices. Import tariffs on pepper were bound at 100%, while the applied rate was 70%. Table 4 provides a comparison between domestic prices and the tariff-adjusted import parity prices; the latter having being based on Vietnam’s unit values of imports.

Table 4: Domestic Prices and tariff-adjusted import parity prices for pepper

<table>
<thead>
<tr>
<th>Years</th>
<th>Domestic Prices</th>
<th>Tariff adjusted import parity prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
<td>4961.6</td>
<td>3973.6</td>
</tr>
<tr>
<td>2000-2001</td>
<td>3813.2</td>
<td>3849.1</td>
</tr>
<tr>
<td>2001-2002</td>
<td>1826.3</td>
<td>3306.8</td>
</tr>
<tr>
<td>2002-2003</td>
<td>1673.7</td>
<td>2716.3</td>
</tr>
<tr>
<td>2003-2004</td>
<td>1616.9</td>
<td>2432.5</td>
</tr>
<tr>
<td>2004-2005</td>
<td>1553.5</td>
<td>2181.3</td>
</tr>
</tbody>
</table>

6.2.5.10 Table 4 shows that barring 1999-2000, tariff-adjusted import parity prices for pepper have been above India’s domestic prices. Since 2003, however, steep fall in international pepper prices have significantly reduced the difference between the two sets of prices.
6.2.5.11 From the above discussion it can be surmised that India’s pepper producers do face an import threat as the two major exporters, viz. Vietnam and Brazil, try to expand their presence in the Indian market. But it is the formalisation of the Indo-Sri Lanka Free Trade Agreement (ISLFTA) that poses the biggest threat to the domestic pepper producers. It has widely been reported that ISLFTA has provided an opportunity to pepper originating from Vietnam to use Sri Lanka as a conduit to gain access to the Indian markets. The evidence above supports this point of view. Pepper imports from Sri Lanka have increased substantially since 2002, i.e. after the ISLFTA has come into operation.

6.2.5.12 A two-pronged strategy can therefore be suggested to protect farmers engaged in pepper production. The short-term strategy would entail imposing appropriate levels of tariffs that effectively address the problem of cheap imports finding their way into India. In this regard, Vietnam poses the greatest threat since it has been found to be exporting pepper considerably below the international price. Accounting practices of the transition economies is not easy to decipher, and consequently comparable data on their cost of production are not available. It is therefore, imperative that adequate attention is given for protecting the interests of the pepper producers in India.

6.2.5.13 Alongside the short-term strategy, a medium to long-term strategy also needs to be adopted. This would entail addressing the problems of declining production and productivity that face the pepper producers in India. A well-coordinated strategy should be put in place in this regard. Besides providing means for the farmers to benefit from technological advancements, it is necessary to give due consideration to the institutional bottlenecks that prevent the farmers from maximising their returns on investment.

6.3 Coconut

6.3.1 The Domestic Scenario

6.3.1.1 Production of coconut in India has shown an upward trend over time. It increased from 5883 million nuts in the triennium ending 1982-83 to 12486 million nuts in 2002-03. However, annual growth rate of coconut production declined from about 7% during 1982-83 to 1992-93, to just 0.4% in the period 1992-93 to 2002-03. Drastic fall in
production in Andhra Pradesh, Tamil Nadu and Kerala, the three largest coconut-producing states, was largely responsible for the considerable slackening of coconut production.

6.3.1.2 The area under coconut cultivation expanded from 11 lakh hectares in TE 1982-83 to nearly 19 lakh hectares in TE 2002-03. But during these two decades, the rate of growth of area under coconut cultivation suffered a steep decline. While area expansion was 3% per annum during 1982-83 to 1992-93, it fell by one-half during 1992-93 to 2002-03. And, perhaps more importantly, since the beginning of this decade, area under coconut cultivation suffered an absolute decline.

6.3.1.3 Alongside production, coconut yield also declined during the present decade, after reaching its peak in 1998-99. As compared to peak level of 7821 nuts per hectare in 1998-99, coconut yield declined to 6422 nuts per hectare in 2002-03, a fall of nearly 19%. The drop in yields occurred as Andhra Pradesh and Tamil Nadu, the two high acreage states, recorded negative growth during this period. Contributing to the problem was the presence of large number of senile and uneconomic palms, small and fragmented holdings and lack of irrigation.

6.3.2 Global Trends in Coconut Production

6.3.2.1 India is the world’s third largest producer of coconuts, behind Indonesia and the Philippines. In 2004, Indonesia produced more than 16 million tonnes of coconut in 2004, which was the culmination of a steady increase recorded since 1999-2000. As regards the Philippines, the period between 2002 and 2004 was one in which the country was seeking to reverse the decline in production witnessed since the mid-1990s. India, on the other hand, experienced an increase in production during the first half of the 1990s, following which a steady decline in production was registered. Although its 2004 production of 9.5 million tonnes marked a recovery from one of the recent troughs reached in 2002, it remained well below the record production levels achieved in the early 1990s.
6.3.2.2 The three leading producers accounted for almost 75% of the global production of coconuts. Data available for the period 1990-2004 show that the three countries had near constant shares in global production throughout. While Indonesia, the world’s largest producer of coconuts, had a 30% share, the Philippines and India maintained their shares at 27% and 20% respectively.

6.3.2.3 Among the leading producers, Indonesia recorded the fastest growth in coconut production between 1990 and 2004, which was somewhat higher than the global average. In fact, all the three leading producers increased their production of coconuts in excess of the global average. But, for India, trend growth in output was positive only during the first four years of the 1990s, following which a marginal negative trend was observed.

6.3.2.4 Although coconut yields in India were comparable with the world average, its inability to maintain the impressive growth in yields registered during the first half of the 1990s is a cause for concern. This is where India differs from the other major coconut producers. While Indonesia managed to consistently increase coconut yields, the Philippines took rapid strides at improving the yields.

6.3.2.5 India’s future prospects do not look very promising as the major coconut producing states have been experiencing downturn in production and productivity in recent years. This spectre of declining productivity levels raise concerns about the ability of the Indian producers to meet price competition from their counterparts in countries like Indonesia, which have benefited from the secular increase in coconut yields. This issue would be analysed in the following section.

6.3.3 Price Competitiveness of the Indian Coconut Producers

6.3.3.1 Here, the analysis would be based on two sets of data. In the first place, FAO data on the producer prices of coconut would be used. This dataset is available from 1991 to 2003. The second set of data relates to prices of copra, for both domestic and benchmark international prices. The two datasets have been used independently to comment on the relative efficiency or otherwise of the Indian coconut producers.
6.3.3.2 Table 5 provides a cross-country comparison of coconut producer prices for the period 1991-2003.

Table 5: Coconut Producer prices: A cross-country comparison

<table>
<thead>
<tr>
<th>Years</th>
<th>India</th>
<th>Indonesia</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>214.1</td>
<td>81.5</td>
<td>65.9</td>
</tr>
<tr>
<td>1994</td>
<td>95.3</td>
<td>97.3</td>
<td>80.6</td>
</tr>
<tr>
<td>1997</td>
<td>109.8</td>
<td>112.0</td>
<td>67.5</td>
</tr>
<tr>
<td>1999</td>
<td>87.8</td>
<td>124.0</td>
<td>99.3</td>
</tr>
<tr>
<td>2000</td>
<td>87.0</td>
<td>82.4</td>
<td>44.8</td>
</tr>
<tr>
<td>2001</td>
<td>68.1</td>
<td>97.7</td>
<td>32.6</td>
</tr>
<tr>
<td>2002</td>
<td>60.9</td>
<td>80.6</td>
<td>54.7</td>
</tr>
<tr>
<td>2003</td>
<td>62.1</td>
<td>96.3</td>
<td>48.9</td>
</tr>
</tbody>
</table>

Source: FAOSTAT

6.3.3.3 Barring the few years in the early 1990s, India was price competitive vis-à-vis Indonesia for most years during 1990-2003. But vis-à-vis the Philippines, price competitiveness of Indian coconut producers eroded quite significantly since the year 2000, when the former started reaping benefits from sustained increases in yields. However, the differences between producer prices existing in India and the Philippines were not large enough to offset the import duties that coconut attracts at present. The bound tariff for coconuts is 100%, while the applied tariff is 70%. This level of applied tariff protection is insufficient for Indian farmers and increased imports seen in recent years have acted as a disincentive to them.

6.3.3.4 In case of copra, India’s benchmark prices for the product, viz. the minimum support prices remained consistently above the international prices. Copra attracts an import duty of 70%, and even at this level of protection, domestic producers find themselves unable to safeguard their interests. This becomes evident if domestic copra prices are compared with the tariff adjusted import parity prices (Table 6).
Table 6: Domestic prices and Tariff adjusted import parity prices of Copra

<table>
<thead>
<tr>
<th>Years</th>
<th>Domestic Prices (MSP)</th>
<th>Tariff adjusted import parity prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-96</td>
<td>747.4</td>
<td>827.9</td>
</tr>
<tr>
<td>1996-97</td>
<td>760.6</td>
<td>768.4</td>
</tr>
<tr>
<td>1997-98</td>
<td>780.3</td>
<td>676.6</td>
</tr>
<tr>
<td>1998-99</td>
<td>736.8</td>
<td>795.6</td>
</tr>
<tr>
<td>1999-2000</td>
<td>750.0</td>
<td>606.9</td>
</tr>
<tr>
<td>2000-01</td>
<td>722.4</td>
<td>353.6</td>
</tr>
<tr>
<td>2001-02</td>
<td>691.9</td>
<td>416.5</td>
</tr>
<tr>
<td>2002-03</td>
<td>686.0</td>
<td>487.9</td>
</tr>
<tr>
<td>2003-04</td>
<td>761.7</td>
<td>720.8</td>
</tr>
</tbody>
</table>

6.3.3.5 The differences between the MSP and the tariff adjusted import parity prices that have been seen particularly in the more recent years provide a strong justification for the imposition of tariffs that would be close to, if not equal to the WTO bound rates. Coconut tariffs are currently bound at 100%, but the applied tariffs for fresh and desiccated coconuts have been kept fixed at 70% for some years now. It is clear that the current applied rate does not provide adequate protection to domestic copra producers and that increase in imports that have been seen since the beginning of the current decade have acted as a disincentive for them.

6.3.3.6 The threat to domestic producers could increase manifold if the proposed FTA with the ASEAN that India has been negotiating takes effect. Adequate care must be taken to ensure that commitments to introduce a duty-free regime in coconuts are not taken as a part of this FTA. In the ensuing FTA negotiations, primacy must be given to protecting livelihoods of the coconut producers who are essentially operating at the margins. It may be unfair to compare the efficiency and productivity of farmers growing coconut in their homesteads and commercial plantations in other countries.
6.4 Cotton

6.4.1 Domestic Production Scenario

6.4.1.1 Cotton is among the more significant commercial crops produced in India. Between 1999 and 2001, cotton was produced on nearly 5 per cent of the country’s gross cropped area. This share is not-too-insignificant considering that food crops account for about two-thirds of the country’s gross cropped area.

6.4.1.2 Cotton production has witnessed a steady increase since the mid-1980s due to improvements in both area and yield. In the 1990s, production growth experienced a slowing down because of sharp decrease in yield gains. However, since 2000, rising yields and, more recently, an increase in area have revived production growth.

6.4.1.3 Cotton producers in India have made huge strides forward in cotton production, increasing their average yields from just over 0.2 tonnes per hectare in 1999-2000 to nearly 0.5 tonnes per hectare in 2004-05. Consequently, cotton output more than doubled from just less than 12 million bales in 1999-2000 to over 24 million bales in 2004-05. Most of this expansion was registered in 2004-05, a year that saw a 5 million bale surplus being generated (Table 7).

Table 7: Demand and Supply of Cotton in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Consumption</th>
<th>Demand-Supply Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>14.0</td>
<td>17.3</td>
<td>(-)3.3</td>
</tr>
<tr>
<td>2001-02</td>
<td>15.8</td>
<td>17.2</td>
<td>(-)1.4</td>
</tr>
<tr>
<td>2002-03</td>
<td>13.6</td>
<td>16.9</td>
<td>(-)3.3</td>
</tr>
<tr>
<td>2003-04</td>
<td>17.9</td>
<td>17.7</td>
<td>0.2</td>
</tr>
<tr>
<td>2004-05</td>
<td>24.3</td>
<td>19.4</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Source: USDA

6.4.1.4 The increase in cotton production in recent years brought a chronically deficit country to a situation where it is in a position to become a major exporter, thus threatening some of the large exporters like the US. But in a recent assessment of India’s potential in the global market for cotton, the USDA argued that India's expanding cotton production is unlikely to affect U.S. cotton producers, at least in the short term. But, if
India's cotton production continues to outpace its consumption needs for some more years, USDA expects Indian cotton to start displacing U.S. cotton in other markets.

6.4.1.5 A contrary view has also been presented by some commentators who opine that this impressive growth notwithstanding, it is uncertain if these gains will be sustained. Output continues to show large annual variations due primarily to weather-induced fluctuations. These commentators have further argued that India has to go a long way towards bridging the yield-gap, which exists vis-à-vis, the leading cotton producers. This aspect is dealt with in the following sections.

6.4.2 The Global Scenario

6.4.2.1 India is the third-largest cotton producer in the world. In the early 1990s, India was quite a distance behind China and the United States, the two leading cotton producers. However, following India’s strong performance since the year 2000, one that has not been matched by the leading duo, the gap between the top three producers has decreased quite significantly.

6.4.2.2 Area under cotton production in India is significantly larger than in any other country. Almost 25% of the world’s planted area under cotton is accounted for by India. At nearly 9 million hectares, cotton acreage in India is more than 70% higher than that in China. In recent years, there has been a slight decline in the area under cotton cultivation, possibly because of better land utilisation.

6.4.2.3 One of the prominent weaknesses of cotton production in India has been the relatively low average yield. Cotton yields in India were lower than those recorded by the top ten global producers, although in the past few years the gap has been decreasing. Moreover, progress in raising yields toward levels achieved by other major producers has been slow. Yield differences aside, the quality of cotton produced in India has often been found unsuitable by the domestic cotton mills. The quality of India’s cotton is often poor because an array of technical, economic, and institutional bottlenecks have affected the production systems. The extent to which these productivity and quality factors can be addressed will be critical in determining India’s competitiveness in global textile markets.
and whether rising cotton demand will be supplied by domestic producers or by global markets.

6.4.2.4 This raises the critical issue of relative competitiveness of cotton production in India. In many parts of the country, cotton farmers have argued in the past that the level of protection that the crop enjoys at present is threatening their livelihoods and that there is a need to calibrate the tariff rates. This issue would be dealt with in the following analysis, where a case for increased protection is examined, given the movement in relative prices.

6.4.3 Is there a case for raising tariff protection for cotton?

6.4.3.1 This issue would be addressed by analysing the relative movements in domestic and international prices of cotton. At the outset, it should be mentioned that the data on domestic prices for cotton are not very well organised. The exception in this regard is the availability of data on MSP.

6.4.3.2 Table 8 provides a comparative picture of domestic and international price trends observed in different categories of cotton.

**Table 8: Price Comparison of Cotton Varieties**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton F414/H-777 (MSP)</td>
<td>357.9</td>
<td>363.5</td>
<td>355.7</td>
<td>351.2</td>
<td>346.1</td>
<td>391.7</td>
<td>391.1</td>
</tr>
<tr>
<td>Cotton H-4 (MSP)</td>
<td>411.7</td>
<td>409.6</td>
<td>399.5</td>
<td>393.1</td>
<td>387.4</td>
<td>436.2</td>
<td>440.0</td>
</tr>
<tr>
<td>Medium Staple Cotton Wholesale Prices</td>
<td>560.7</td>
<td>442.2</td>
<td>484.2</td>
<td>386.4</td>
<td>465.1</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Cotton &quot;A&quot; Index*</td>
<td>1589.7</td>
<td>1165.1</td>
<td>1262.1</td>
<td>923.3</td>
<td>1230.4</td>
<td>1180.1</td>
<td>1217.0</td>
</tr>
</tbody>
</table>

6.4.3.3 The table above seems to suggest that the Indian market faces no perceptible threat from imports given that domestic prices are considerably below the international benchmark price. However, price movements observed in the National Commodity & Derivatives Exchange Limited (NCDEX), suggest that the “market price” of cotton in India is considerably higher than what the data presented above indicate. According to
NCDEX, Trading centres of Mumbai, Saurashtra region of Gujarat and Rajasthan serve as reference markets for prices of cotton traded across the country. NCDEX has reported that currently, raw cotton prices in upcountry markets across the country is ruling in the range of Rs. 41000 to 89000 per tonne for various varieties/grades (equivalent to US $ 890 to 1900). This scenario is a cause for concern for the cotton producers in India, since the average “market price” of US $ 1400 of all varieties of cotton is about 20% higher than the international prices as indicated in the Table above. This implies that the current applied rate of 10% for cotton look quite inadequate in providing protection to the domestic producers.

6.4.3.4 The issue of providing protection to Indian cotton producers needs to be considered in the light of the country’s cotton import scenario. As stated above, India was unable to meet it domestic consumption requirements until 2002-03, after which the country has started generating surpluses. However, even after 2002-03, imports have not reflected the changed demand-supply scenario in the domestic market. Although imports in the first nine months of the previous financial year have shown some signs of slackening, there is a need, to protect domestic cotton producers against import threats by providing appropriate levels of tariff protection.

6.4.3.5 This is in view of the fact that international prices of cotton have been extremely volatile during the decade. The benchmark cotton price in the international market, viz. Cotton 'A' Index, declined from nearly US $ 2200 per tonne in 1995 to under US $ 1200 per tonne in 1999. Although there was a minor reversal of this trend which saw international prices reach US $ 1400 per tonne, in the past couple of years, prices have again been on the downslide.

6.4.3.6 One of the major factors responsible for the volatility in cotton prices has been the subsidy granted by one of the largest producers of cotton, viz. the USA. The US was expected to reduce its subsidies on cotton as a part of the deal that would have incorporated the results of the negotiations in the Doha Round. An understanding reached at the end of the Hong Kong Ministerial Conference in December 2005 was that the US would reduce its subsidies in the interest of the cotton producing states in Africa, which
have suffered considerable losses in export earnings because of their inability to compete with the subsidised cotton originating in the US. However, with the Doha Round facing an impasse, the succour to the cotton producers in the developing countries that the US was expected to provide by lowering its subsidies on cotton, may not be in the offing.

6.4.3.7 In India, the issue of protecting cotton farmers raises an internal dichotomy, one that pits the interests of the farmers against those of the textile industry. While the industry has argued that the farmers have not been able to provide them their preferred long staple cotton, the farmers have argued that they can make the necessary adjustments to satisfy the requirements of the industry given the right kind of incentives. The most meaningful incentive that can be provided to the domestic producer is to protect his market from imports. The distress that the cotton farmer presently faces should be the opportune time to extend the incentive that he needs to protect his livelihood.

6.5 Oilseeds

6.5.1 According to an USDA study, India, the world’s seventh largest producer of oil crops (2001-03 average), is a major producer of soybeans, rapeseed, groundnut, cottonseed, and sunflower seed and their derived products. India is traditionally an importer of vegetable oils and an exporter of protein meals, but a negligible trader in oilseeds. Oil imports have been on the rise because of strengthening consumer demand and import liberalisation measures implemented in 1994. During 2001-03, India was the second largest edible oil importer in the world, behind the European Union (EU-25).

6.5.2 The country grows mainly nine oilseeds, viz. groundnut, rapeseed, sesame, safflower, linseed, niger seed, castor seed, soybean and sunflower. Groundnut, rapeseed/mustard account for about 60% of total production, although since the 1990s, soybean, sunflower and cottonseed have also grown in importance.

6.5.3 Production of oilseeds underwent expansion after efforts made by the oilseeds mission, which was established in the 1980s, bore fruit. Total production of oilseeds, which was only about 12 million tonnes in the later 1980s, went up to more than 20
million tonnes in 1992-93. This growth in production was largely due to higher yields, although in the 1990s, increase in the area under cultivation also played its part.

6.5.4 The growth momentum of oilseeds production seen in the early 1990s was not maintained. After reaching the lowest level in nearly a decade and a half, total production reached the highest levels ever in the two most recent years for which data are available.

6.5.5 As was indicated earlier, rapeseed and groundnut have historically contributed a lion’s share of India total oilseeds production. However, since the beginning of the 1990s, production of these two oilseeds went through considerable fluctuations with both rapeseed and groundnut production remaining depressed after 1997-98. On the other hand, soybean, sunflower seed and cottonseed production had increased. In fact, soybean had topped both rapeseed and groundnut to record the highest tonnage among all major oilseeds in 2005-06. Table 9 below provides the details.

**Table 9 : Production Levels of India’s Major Oilseeds**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonseed</td>
<td>3358.1</td>
<td>3641.6</td>
<td>4395.2</td>
<td>3700.0</td>
<td>3281.8</td>
<td>2964.0</td>
<td>4689.0</td>
<td>5130.0</td>
</tr>
<tr>
<td>Groundnut</td>
<td>8309.0</td>
<td>8322.0</td>
<td>7524.0</td>
<td>7090.0</td>
<td>6558.6</td>
<td>5953.5</td>
<td>6000.0</td>
<td>6702.1</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>4125.3</td>
<td>4800.0</td>
<td>5758.0</td>
<td>6657.9</td>
<td>5788.4</td>
<td>5082.6</td>
<td>3918.0</td>
<td>6200.0</td>
</tr>
<tr>
<td>Soybean</td>
<td>2601.5</td>
<td>4745.2</td>
<td>5096.0</td>
<td>6463.1</td>
<td>5275.8</td>
<td>4558.1</td>
<td>7900.0</td>
<td>7500.0</td>
</tr>
<tr>
<td>Sunflower seed</td>
<td>873.0</td>
<td>1350.0</td>
<td>1260.0</td>
<td>890.0</td>
<td>646.4</td>
<td>901.9</td>
<td>1086.0</td>
<td>1300.0</td>
</tr>
</tbody>
</table>

Source: FAOSTAT

6.5.6 The trends in oilseeds production portend to the problems that this sector faces. The inability of the major oilseeds sector to maintain its growth momentum seen in the late 1980s was manifest in the stymied domestic production of edible oils, as can be seen from Table 10 below.
Table 10: Edible Oils Production in India

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut</td>
<td>250</td>
<td>375</td>
<td>420</td>
<td>445</td>
<td>456</td>
<td>440</td>
<td>462</td>
<td>462</td>
</tr>
<tr>
<td>Cottonseed</td>
<td>405</td>
<td>620</td>
<td>560</td>
<td>562</td>
<td>550</td>
<td>488</td>
<td>845</td>
<td>840</td>
</tr>
<tr>
<td>Palm</td>
<td>0</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>35</td>
<td>35</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Groundnut</td>
<td>1740</td>
<td>1700</td>
<td>1754</td>
<td>1357</td>
<td>1901</td>
<td>1360</td>
<td>1748</td>
<td>1778</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>1570</td>
<td>1800</td>
<td>1650</td>
<td>1630</td>
<td>1510</td>
<td>1345</td>
<td>2068</td>
<td>2287</td>
</tr>
<tr>
<td>Soybean</td>
<td>425</td>
<td>712</td>
<td>859</td>
<td>792</td>
<td>833</td>
<td>615</td>
<td>900</td>
<td>971</td>
</tr>
<tr>
<td>Sunflower seed</td>
<td>285</td>
<td>455</td>
<td>370</td>
<td>425</td>
<td>470</td>
<td>332</td>
<td>397</td>
<td>458</td>
</tr>
</tbody>
</table>

Source: USDA

6.5.7 Thus, while in the beginning of the 1990s, domestic production was seen to be matching the growing oilseeds consumption in the country, in the past few years, consumption had far outstripped production.

6.5.8 Quite clearly, the major challenge for the Indian oilseeds sector is to meet the increasing demands of its consumers. This would be possible if the production system improves its efficiency and meets the standards set by the other major oilseed producing countries.

6.5.9 India’s Oilseeds Production in the Global Context

6.5.9.1 In the following discussion, India’s production performance in the oilseeds sector is analysed by taking four of the more important oilseeds into consideration. These are rapeseed, groundnut, soybeans and sunflower seed.

6.5.9.2 Three countries, viz. China, Canada and India, dominate the global rapeseed production. China has been the largest producer of rapeseed for more than a decade and a half, followed by India. However, after the mid-1990s, India has fallen considerably behind China in terms of absolute levels of production. While the former nearly double
its production between 2002 and 2005, India was struggling to reach its peak production levels that were attained in the late 1990s.

6.5.9.3 Differences in yields essentially explain the production performance of the three leading rapeseed producers. India was able to break away from its long-term trend of 0.7 tonnes per hectare by increasing the yield to one tonne per hectare in the beginning of the 1990s. Decline in the yields in the subsequent period and the increases registered by the other major rapeseed producers meant that by 2005, yield levels in India were just one-half of that recorded by China.

6.5.9.4 In case of groundnut, the domination of China was even more marked. Between 1990 and 2004, China was able to increase its production by nearly 125%. In sharp contrast, India, which was the world’s largest producer of groundnuts in 1990, experienced a 7% decline in production during the same period. Groundnut production in India can be divided into three phases. While the 1990-98 saw an increasing trend around minor fluctuations, the four years after 1999 was one in which production levels declined by more than 50%. A recovery took place during the 2003 and 2004, but this was not enough to compensate for the earlier decline in production.

6.5.9.5 A combination of declining yields and area under cultivation affected India’s groundnut production between 1990 and 2004. Indian producers could not average more than a tonne per hectare of groundnut production during this period. At this level, India’s groundnut yield was almost a third of that registered by China. During this period, area under groundnut cultivation in India registered a 19% decline, as against an increase of more than 60% registered by China.

6.5.9.6 Among all the major oilseeds that India produces, soybean registered sustained increase between 1990 and 2004. Soybean production increased more three-fold until 2003, before a minor downturn in 2004. India’s performance is however dwarfed by those of Brazil and Argentina, both of which have been able to increase their share in the global market. Together with the USA, Brazil and Argentina, account for
80% of the total global soybeans production. India, on the other hand, continues to be only a minor player in the global context, with a production share of only 4% (2004).

6.5.9.7 As in the case of rapeseed and groundnut discussed above, Indian soybean producers have suffered in relative terms because of depressed yields. Although soybean yields have shown improvement over time, these increases have not been able to match the appreciable increases that the three leading producers have been able to register. In 2004, India’s soybean yield of 1.1 tonne per hectare was less than half of those recorded by both Argentina and Brazil.

6.5.9.8 Trends in production and consumption of oilseeds and edible oils discussed above clearly indicate that India’s oilseeds sector did not respond to the country’s growing consumption needs in the 1990s. This non-response on the part of the producers seems somewhat anomalous given the fact that production was on an upsurge following the successful intervention made by the Oilseeds Mission in the second half of the 1980s. Changes in the trade policy, in particular the liberal tariff regime that was adopted after the mid-1990s, explains this anomaly to a considerable extent.

6.5.10 Edible Oil Import Regime and its Impact on Domestic Producers

6.5.10.1 Until the early 1990s, imports of edible oils were restricted, with import duty on palm oil fixed at 125%. This regime provided higher incentives for domestic production of oilseeds, which was manifest in the higher levels of output registered by almost all the major oilseeds. When imports of edible oils were liberalised in 1994, output of oilseeds witnessed a slowdown, which had an impact on production as well as exports of oil cakes. In March 1994, imports of palm oil were put under Open General Licence (OGL) attracting an import duty of 65%, while, at the same time, state agencies like STC and National Dairy Development Board were allowed to import palm oil at a lower duty of 20%. After February 1995, this initial phase liberalisation gave way to far more sweeping changes in the import regime: all edible oils except for coconut oil were put under OGL at an import duty of 30%. And in 1998, the import duty on palm oil was reduced to 15%, the lowest level yet. This liberal import regime in oilseeds was reversed
in 1998. Import duty was initially increased to 28%, and in 2001, the duties were increased to over 90%. The changes in the palm oil import duties since the beginning of the 1990s are captured in the Table 11 below:

Table 11 : Changes in the Import Duty applicable to Refined Palm Oil

<table>
<thead>
<tr>
<th>Period</th>
<th>Import duty (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>125.0</td>
</tr>
<tr>
<td>1992</td>
<td>65.0</td>
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<tr>
<td>1994</td>
<td>65.0</td>
</tr>
<tr>
<td>1995</td>
<td>35.0</td>
</tr>
<tr>
<td>1996-97</td>
<td>25.0</td>
</tr>
<tr>
<td>1998</td>
<td>15.0</td>
</tr>
<tr>
<td>1999</td>
<td>28.6</td>
</tr>
<tr>
<td>2000</td>
<td>71.6</td>
</tr>
<tr>
<td>2001</td>
<td>92.2</td>
</tr>
<tr>
<td>2003</td>
<td>70.0</td>
</tr>
<tr>
<td>2004</td>
<td>75.0</td>
</tr>
<tr>
<td>2005</td>
<td>90.0</td>
</tr>
</tbody>
</table>

Source: Centre for WTO studies database

6.5.10.2 The variations in the import duties on palm oil affected the domestic production to a significant extent. The period of low duties on palm oil coincided with the phase when the domestic production of major oilseeds suffered a decline. Two factors influenced this decrease in import duties. The first was the effect of the overall policy regime, which, since the early 1990s, had laid more emphasis on the liberalisation of the economy. The second, and the more important, was the response of the government to encourage imports while domestic consumption of edible oils was experiencing an upswing. But after the government reposed faith in the domestic producers by increasing import protection towards the end of the 1990s, the latter also responded to this regime by increasing level of production to highest-ever levels during 2004-06.

6.5.10.3 There have been detrimental effects of the stop-go policies adopted in respect of tariff protection to palm oil, which makes for the bulk of edible oil
imports in India, on domestic edible oil production. Increase in imports acted as a disincentive for the domestic producers, which resulted in the reversal of the strong expansion that the domestic oilseeds production had started to show from the late 1980s. This experience with the oilseeds sector sends a strong message that prudence needs to be exercised while deciding on the level of protection that should be provided to critical sectors like oilseeds. Over the past decade, the country had to suffer sizeable foreign exchange outgo on import of edible oils and oilseeds because of the tariff policies. In the early 1990s, domestic production was level pegging with consumption, but import duties on oilseeds were soon slashed only to trigger a steep fall in domestic production. Even the gains of the Technology Mission on Oilseed and Pulses in increasing area and yield were lost. **This was an object lesson on the need for ensuring synergies between technology and public policy, and lesson is relevant even today.**

6.5.10.4 This issue assumes added significance in light of the recommendations made by the Committee on Rationalisation of Customs and Excise Duties on Edible Oils and Oilseeds to lower import duties on all edible oils, except soybeans to 65 per cent, from the existing 75-80 per cent. The Committee based its recommendations on the tariff adjusted import-parity prices of the major edible oils, which, according to the Committee was 24 per cent higher than the domestic prices in case of rapeseed. The data used by the Committee to arrive at this conclusion was for a one-year period, viz. December 2004 to December 2005.

6.5.10.5 **The above-mentioned recommendation of the Committee needs careful reconsideration** on at least three counts. First, the period for which the comparison between domestic and international prices was made appears too short given that agriculture is prone to cyclical behaviour. Secondly, prices of edible oils in the international market have displayed considerable volatility in the past, which is also indicated by the Committee in its report. For instance, rapeseed prices in the global markets declined by nearly 13 per cent between December 2004 and December 2005.

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4 The Committee was set up by Department of Economic Affairs, Ministry of Finance, which was headed by Dr. Ashok Lahiri, Chief Economic Adviser to the Govt. of India. The final report was submitted in January 2006.
Lastly, domestic prices were somewhat depressed during the reference period as they were influenced by the record production of oilseeds in the country. There is substantial merit in the Note of Dissent from the Department of Agriculture and Cooperation, Govt. of India, in that continued support for oilseed sector is essential in the interest of the incomes of farmers cultivating marginal soils, and for generation of employment in rural areas, crop diversification, improved cropping intensity and restoration of soil health. All these elements are central to the efforts to reduce agrarian distress.

6.5.10.6 Government of Kerala had set up a Commission on WTO concerns on Agriculture under the Chairmanship of Prof. M. S. Swaminathan. Its report titled “Building a Sustainable Agricultural Trade Security System for Kerala”, and submitted in January 2003 has studied several commodities having global ramifications like Coconut, Black pepper, Cashew nut, plantation crops, Rubber, Tea, Coffee, Cardamom, Livestock products, Marine products and Fisheries. The recommendations made in the Report should be actively implemented.

6.6 Conclusions

6.6.1 At the outset, it must be appreciated that India has been well aware of the problems likely to be faced by the Indian farmers in the context of the globalization and the WTO commitments. The issues of access for India’s exports to the market of the developed countries, and the unfair competition faced by the Indian farmers due to the heavy subsidization of their agriculture sector by many developed countries have been central to India’s position in the negotiations under the Doha Round of the WTO.

6.6.2 Developing countries like India have focused on three main instrumentalities in any further market access commitments under the Doha Round. Firstly, consequent upon India opting for ceiling bindings in the Uruguay Round, the bound tariffs across most agricultural products are at 100% for primary products, 150% for processed products, and 300% for certain edible oils. With gradual liberalisation, the applied tariffs are generally well below bound rates, providing the Government the flexibility to calibrate the applied rate within the bound level depending upon the emerging situation. The G-20, of which India is a founder member, has proposed cuts on bound tariffs in the
Doha Round of a maximum of 36% on average for developing countries, provided that the developed countries undertake proportionately higher tariff cuts of at least 54%. Assuming G-20 cuts are agreed, at the end of the implementation period of the Doha Round in India’s case across over 80% of the agricultural tariff lines the final bound tariff would still be at or above the current applied rates. Secondly, it has already been agreed in the negotiations that developing countries shall have the flexibility to self-designate an appropriate number of agricultural tariff lines as **Special Products**. This self-designation shall be guided by indicators based on the fundamental criteria of **food security, livelihood security and rural development needs**. The tariff reductions on designated Special Products shall be more flexible than on the non-Special Products. Negotiations are underway to reach an agreement on the appropriate number of Special Products as well as the tariff reduction commitments. It would be critical for India’s farmers to ensure that as many of our agricultural commodities as possible related to rural development, food security and livelihood security are designated as special products noting that for a country like India as much as 70% of the population is linked to agriculture. Thirdly, in the negotiations under the Doha Round it has been agreed that developing countries shall have recourse to a **Special Safeguard Mechanism** which permits the application of a safeguard duty in situations of either an import volume surge or price decline of the imported product. This safeguard mechanism would be unlike the current provisions of safeguard duty or quantitative restriction under the WTO Agreement on Safeguards available to countries like India.

6.6.3 The large domestic support granted by US and EU under the three boxes to their farmers are compared with the low level of support in India, based on latest data available, as under:
Table 12: Domestic Support granted by the European Union, the United States and India

European Union

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Green Box</td>
<td>23.8</td>
<td>25.1</td>
<td>20.3</td>
<td>20.4</td>
<td>18.4</td>
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</tr>
<tr>
<td>Blue Box</td>
<td>26.5</td>
<td>24.4</td>
<td>22.9</td>
<td>21.8</td>
<td>18.2</td>
<td>19.9</td>
<td>22.4</td>
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<tr>
<td>Amber Box</td>
<td>64.5</td>
<td>58.8</td>
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<td>50.1</td>
<td>44.4</td>
<td>39.6</td>
<td>37.8</td>
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<tr>
<td>Total Subsidies</td>
<td>114.8</td>
<td>108.3</td>
<td>99.9</td>
<td>92.4</td>
<td>81.0</td>
<td>79.1</td>
<td>79.6</td>
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United States

<table>
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</tr>
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<td>0.0</td>
<td>0.0</td>
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<tr>
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<td>7.1</td>
<td>7.0</td>
<td>15.1</td>
<td>24.3</td>
<td>24.1</td>
<td>21.5</td>
</tr>
<tr>
<td>Total Subsidies</td>
<td>60.8</td>
<td>58.9</td>
<td>58.3</td>
<td>65.0</td>
<td>74.0</td>
<td>74.2</td>
<td>72.1</td>
</tr>
</tbody>
</table>

India

<table>
<thead>
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<th>Subsidies/Years</th>
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<th>1996/97</th>
<th>1997/98</th>
</tr>
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<td>Green Box</td>
<td>2.2</td>
<td>2.5</td>
<td>2.9</td>
</tr>
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<td>Article 6.2 Support</td>
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<td>4.9</td>
<td>5.2</td>
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<tr>
<td>Amber Box</td>
<td>-23.8</td>
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<td>2.3</td>
</tr>
<tr>
<td>Total Subsidies</td>
<td>-21.4</td>
<td>9.4</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Source: IIFT, New Delhi

6.6.4 Elimination of all forms of export subsidies, which are the most trade distorting, by developed countries has already been agreed by 2013 under the Doha Round. Developing countries like India will retain the right to provide marketing and transport subsidies on export shipments for a period of 5 years beyond the end date for all forms of export subsidies by developing countries. This date is still under negotiation. On trade distorting domestic support, it has been agreed that the three heaviest subsidizers, namely, the EU, the US, and Japan, shall reduce their overall trade-distorting subsidies by progressively higher cuts in order to achieve harmonization of permitted support levels. Moreover, Blue Box subsidies will be capped and will also be subject to disciplines to ensure that Blue Box support is less trade distorting than Amber Box support. Green Box criteria will also be reviewed with a view to ensure that Green Box payments have no, or at best minimal, trade-distorting effects.
6.6.5 Regarding FTAs, India’s agricultural sensitivities have been safeguarded under the proposed India-MERCOSUR PTA even though other partners to the PTA have substantial export interest in agricultural commodities. Perhaps, this could be a model for the other FTAs under negotiations in order to ensure safeguards for Indian farmers. It would be desirable to set up a road map for FTAs with adequate domestic transparency and proceed in a sustainable and measured manner. FTAs can bring substantial benefits to Indian farmers, if safeguards are built-in.

6.6.6 Briefly, therefore trade policy gives sufficient options to protect the interests of the Indian farmers and should not become a barrier to the interests of the Indian farmers. It is for the Indian farmers to improve their productivity and enhance quality literacy with assistance from the Government to benefit from liberalization.

6.6.7 Having said this, the cases of four of agricultural commodities presented above indicate the threat that the producers engaged in each of these commodities face from imports that have been encouraged by the liberalised trading regime. Trade liberalisation has affected the domestic producer thrice over. The first was the liberalisation adopted in the early 1990s; the second followed India’s accession to the WTO, and the third is the developing interest for FTAs. Although only a few FTAs have come into effect, their impact has already been felt.

6.6.8 Liberalisation has affected several commodities, the most prominent of which are oilseeds and cotton. Increased imports have affected the fortunes of India’s oilseeds producers and at a time when their future prospects looked quite promising. Subsequently, however, increasing tariffs rectified the damage caused to domestic producers, but this change in policy was brought about only after the domestic production was put back, in some cases, by more than a decade.

6.6.9 In case of cotton, the Government has been sympathetic to the demands of the domestic textiles industry, in the interest of exports of textiles, which has unfortunately worked to the detriment of the interests of the farmers. The cotton farmers have made persistent demands to increase import tariffs, but despite universal recognition of the
distress of the farmers due, in part, to persistent imports, tariffs have remained unchanged.

6.6.10 **India’s commitments to the WTO in agriculture allow a level of comfort for the country to impose higher levels of tariffs. However, in many agricultural commodities, the advantages of high tariff bindings have not been taken.** This includes coconut, a commodity in which the country has been faced with increasing imports since the applied tariffs are inadequate to provide effective protection to the domestic producers.

6.6.11 Among the FTAs that India is currently a part of, a mention must be made of the India-Sri Lanka FTA. This FTA has had an adverse impact on the Southern States, in particular Kerala. Several commodities, including pepper and coconut, that form the lifeline of Kerala’s economy, have been affected by the duty free access provided to imports from Sri Lanka.

6.6.12 From the evidence available, a case can be made for designing trade policies that are sensitive to the needs of the domestic producers. Besides the fact that a large country like India, can ill-afford to depend on external sources to meet its requirements in a sustained manner, imports are detrimental to the interests of a considerable section of farming households. In some of the commodities mentioned above, smallholder agriculture dominates the production system. The issue of livelihood security assumes even greater importance under such circumstances.

6.6.13 The evidence should also be carefully considered by the Government, which is currently engaged in negotiating a series of FTAs. It needs to be emphasised in this context that while there may be Foreign policy and Trade policy imperatives for engaging in the FTAs, **the adversities that the farmers in India have faced during the episodes of trade liberalisation should get due consideration while decisions on the extent of participation in the FTAs are taken.**

6.6.14 In this regard, appreciative mention must be made of the uncompromising stand that India has taken in the WTO negotiations by arguing that the interests of
farmers cannot be bartered away in trade deals. The following arguments must be kept in mind:
a) Considering the strong interlinkages among the three pillars of the Agreement on Agriculture, substantial and genuine reductions in trade distorting supports in developed countries must come into force before greater market access could be considered by India. This should involve elimination of Blue Box and reform of Green Box. b) Export credits and other support subsidies, being the most trade distorting, should be phased out at the earliest. c) Livelihood support through tariffs should be seen as the only option. Since market access in developed countries is not coming through and trade continues to be distorted and unfair. d) Diversity of India’s agriculture and its huge populations dependence on agriculture as a way of life, in spite of minimal returns should be seen as enough justification for a comprehensive coverage for special products. e) Consequent to the volatile international prices and trade distortions, a comprehensive coverage for special safeguard mechanism would be fully justified, and f) The commitments in the Doha round of WTO as well as the livelihood security of 70% of our population dependent on farming need to be safeguarded.

6.6.15 This should be the reference point for all future trade negotiations. The bottom line of our Trade policies on agriculture and even our Foreign policy should be the economic well being and livelihood security of our agricultural families. It would be wasteful and counterproductive to provide assistance to farmers for increasing their production and then pursuing Trade and Foreign Policies, which end up depressing their price realisation. Simultaneous application of the accelerator and the brake can never be regarded as a good driving habit and can only lead to generation of heat and no motion and lead to a waste of fuel. It is admitted that in a global economy, the Trade and Foreign policy compulsions cannot be wished away, but then good governance is all about a skilful and balanced use of options. The distress amongst the Indian farmers growing oilseeds, cotton, pepper and coconut shows that a correction and tilt in favour of farmers is perhaps overdue. Short-term palliatives and adhoc packages may not suffice for long.

6.6.16 Even while arguing for higher subsidy support to Indian farmers to meet the threats of unfair trade in the global market, it should be simultaneously appreciated that
India does have constraints in providing high levels of support to its farmers primarily because it would involve assisting 70% of its population involved in farming by the remaining 30%. In contrast, in US, 98% of the population subsidises 2% of its population engaged in farming. Besides, US/EU have the advantage of much higher GDP as well as economic clout.

6.6.17 The Government needs to recognise that the concerns of the farmers in the era of globalisation would have to be addressed in a systematic and sustained manner. This can be possible only through the establishment of a Farmer-centred institution that would function in a network mode with the States. Towards this end, the proposal made by the National Commission on Farmers in its Third Report, Chapter 1, for setting up of an Indian Trade Organisation (ITO), dedicated to safeguard the interest of farm and fisher families by providing a Livelihood Security Box to ensure fair trade, needs to be reiterated and stressed. The Livelihood Security Box should have provisions to impose quantitative restrictions on imports and/or increases in import tariffs, under conditions where imports of certain commodities will be detrimental to the work and income security of a large number of farming families.

6.6.18 The justification for such an approach, comes from the fact that there is no level playing field between the capital, subsidy and technology driven mass agriculture production of the developed countries with a very limited number of persons engaged in agriculture and the production by masses in India with seventy percent of its population connected to farming and characterised by weak support services, deficient infrastructure, heavy debts and resource and technology constraints. This argument can find favour with a very large number of developing countries with a similar spectrum of farmers in the WTO fora. The Indian Trade Organisation should serve as “a brain and information bank” for enabling the Government to take proactive and quick reflex decisions in a timely manner on potential surpluses and shortages of agricultural commodities. ITO should have an arm to be called National/State level land use Advisory Service which could serve as a friend, philosopher and guide, to small farmers, providing proactive advice on land use and crop planning, based on best available assessment of home and external trade opportunities.
6.6.19 Briefly therefore, the small and marginal farmers in India can be protected from price fluctuations in International markets by a judicious mix of several strategies: increasing productivity by following various suggestions contained in the Reports of the NCF for achieving economies and efficiencies of scale, establishment of an Indian Trade Organisation, enhancement of domestic demand, greater attention to price, quality, consistency, reliability of supply and to trade literacy, and farmer friendly Trade and Foreign policies.

6.6.20 Mahatma Gandhi had given a Talisman for testing conflicts between Policy options, by noting, "I will give you a talisman. Whenever you are in doubt, or when the self becomes too much with you, apply the following test. Recall the face of the poorest and the weakest man [woman] whom you may have seen, and ask yourself, if the step you contemplate is going to be of any use to him [her]. Will he [she] gain anything by it? Will it restore him [her] to a control over his [her] own life and destiny? “Given the complex compulsions of globalisation, the Indian farmers need the protection of this Talisman. Their job and livelihood opportunities must be protected and inspite of constraints, such options, both in the Trade and Foreign policies and in the domestic policies relating to input prices, Minimum Support Prices and Market Intervention Operations exist and must be tapped more vigorously.

6.7 Recommendations: Way Forward

6.7.1 It is being realised that Marrakesh Agreement has given substantial benefits to the developed countries by permitting them to cover their large farm subsidies. Prof. M.S. Swaminathan has opined, “**WTO has no visible agenda for the resource-poor farming families**”. Globalisation has proved to be inherently asymmetric in its impact. Countries most dependent on export of primary commodities have not been able to derive benefits from a “free trade” regime”. It has not been fair enough. Nevertheless, globalisation and competitiveness are facts of life and the Central Government, State Government and the farmers would have to act in tandem to ensure that WTO requirement and FTAs commitments do not drag Indian agriculture and Indian farmer families down but convert challenges into opportunities. Given India’s vast plant and animal bio-diversity and varied agro-climatic conditions, Indian farmers need not go into
a defensive mode, provided the following recommendations are kept in mind by all the three players mentioned.

6.7.2 Central Government

i) While negotiating under the WTO or FTAs, for promoting India’s interest in other segments of the economy or as a part of the foreign policy, Livelihood Impact Analysis on the Indian farmers must be undertaken. Simultaneously, the impact on employment opportunities for the Indian rural youth should also be carefully studied, considering that provision of employment opportunities is a major concern and such opportunities have been shrinking due to a variety of reasons.

ii) A set of Ground Rules must be laid down which should be sacrosanct in the interest of the Indian farmers in all trade negotiations, as spelt out in Para 6.13 above. No country could object, if India attempts to protect the interest of 70% of the population which is engaged in farming as a means of livelihood and pursuing a way of life, inspite of minimal returns, while many richer countries continue to provide huge support to miniscule sections of their population, engaged in commercial farming.

iii) Rules relating to country of origin for agricultural produce must be strictly and honestly enforced so that FTAs do not become a conduit for countries not entitled for its benefits. Claims of value addition should also be carefully scrutinised. Quality of imports must also be checked very carefully.

iv) India must become a part of the process by which Sanitary and Phytosanitary Standards (SPS) are decided in order to ensure that these are not utilized as non-tariff barriers against our export to developed countries.

v) India must evolve SPS standards for our domestic produce as well as imports.

vi) Since the various boxes in the 1994 Marrakesh Trade Agreement of the WTO have been utilized by developed countries to continue to provide substantial protection to their farmers to the detriment of the farmers in developing countries, an effort should be made to do away with these boxes, earlier than
planned, or at least impose constraints on their use if developed countries do not bring down their subsidy levels substantially by a cut off date. These should be replaced by a clear statement on support which is trade distorting and which is not.

vii) Besides the effort to disband the system of Boxes, due to non-performance, a strong case for a Livelihood Security Box should be made so that assistance to farmers in developing countries for their income/employment opportunities could be safeguarded. It should be possible to distinguish between life and livelihood saving support to small farmer families and support for commodities entering the global markets.

viii) Considering that an overwhelming proportion of India’s Agricultural production goes for internal consumption in view of our large population, there is a need to set up an Indian Trade Organisation (ITO) with a National Land Use Advisory Service, as a self-empowerment measure and its own boxes for domestic support. It should advise farmers on implications of domestic regulations, WTO rules and Regional Trade Agreements. It would function as an information bank, a forum for dialogue and strategy think tank. It would also be a link between global and domestic markets. ITO has been recommended in Chapter I of the Third Report of NCF.

ix) Investments/support for more than a billion small farmers with limited access to technology, inputs, rural infrastructure and post harvest facilities should never be seen to be a barrier to free trade and trade distorting, especially when such farmers have to compete in under tapped markets in developed countries which have highly subsidized capital, inputs and technology. This argument should be forcefully articulated.

x) A Price Stabilization Fund should be established for major commodities to support farmers, when international prices fall by a certain percentage.

xi) Commodity Boards, on the pattern of Tea, Coffee and Rubber Boards should be set up for other commodities where farmers are under threat due to
globalisation/competition from highly subsidised production in developed countries. Farmers should have representation on these Boards.

xii) Since productivity and competitiveness would be the key to survival in the liberalized global market, more resources need to be provided for research and extension. Simultaneously, the personnel would need to carry out time bound farmer oriented programmes with the responsibility of working out affordable recommendations. Their success should be measured in terms of gains in productivity.

xiii) Farmers should be made more competitive through greater use of Information and Communication Technology (ICT) in order to ensure digital inclusion. This would be necessary in order to ensure “more crops per unit of input” which would provide strength to Indian farmers in global trade. The concepts and modalities of setting up Village Knowledge Centres have been elaborated and recommended in Chapter VIII of the First Report of NCF.

xiv) The use of Plant and Animal genetic resources should be optimized for developing competitiveness and tapping niche markets globally.

6.7.3 State Government

i) States must ensure convergence of resource available under programmes like NREGP, Bharat Nirman and National Rural Health Mission as well as various programmes of Department of Women and Child Development to build up infrastructure for the Indian farmers, which would enable them to increase their productivity and competitiveness.

ii) They should carry out amendments to their Agriculture Produce Marketing Acts to ensure greater transparency and provide choice to farmers for marketing their produce. It would also facilitate the participation of larger companies, who could procure for the international markets after appropriate grading/processing, and using their marketing strengths for creating a win-win situation for the farmers too.
iii) Good governance should be ensured by facilitating timely delivery of inputs and knowledge so that the farmer could avoid unnecessary and avoidable costs and delays, which affect productivity.

iv) State Land Use Board should be revitalized so that they could actively guide the farmers to the demands of the international market by correlating data on soil, weather, market prices and market demand. The Board should have a technical and multi-disciplinary team with participation of the farmers and should provide recommendations, which would be ecologically sustainable and affordable.

v) There should be active coordination between the State extension machinery/ATMA and Krishi Vigyan Kendras so that proper synergies could be built up and farmers could take up knowledge-based agriculture.

vi) State should facilitate a Consortium of progressive and innovative farmers for encouraging other farmers to take up novel practices and projects for enhancing incomes in a sustainable manner. It would be desirable to involve farmers whose products have been successfully exported in this Consortium so that concepts of quality, trade and legal literacy could also be propagated.

6.7.4 Farmers

i) Increase in the productivity and competitiveness, especially of the small and marginal farmers, would be the cornerstones of the farmers’ efforts to gain from globalization. Given the fact that the bulk of the holdings are operated by small and marginal farmers and most of the cropped area is rainfed which is subject to vagaries of weather and facing barriers to technology upgradation, the task is difficult but certainly achievable through steps like the organisation of Small Farmers’ Estates.

ii) Various measures to increase competitiveness have been elaborated and recommended in Chapter III of the Fifth Report and other Reports of NCF and cover issues like Investments inputs, technology, knowledge revolution soil health and move towards high value agriculture, marketing, post harvest
operations and value addition etc. The farmers would have to pay attention to all these strategies not only to climb up the ladder of competitiveness but also to stay above others. It should be remembered that competitive advantage is a dynamic concept and many internal and external factors can upset balances.
CHAPTER 7

SHAPING THE ECONOMIC DESTINY OF FARMERS

7.1 Indian agriculture is characterized by the following distinctive features, as per the data collected under the 59th Round of NSSO (Report No. 497) as well as other studies:

- Over 60% of the population depends on crop and animal husbandry, inland and marine fisheries, forestry and agro-processing for their livelihood.

- Over 60% of the consumers are farm families and the prevailing widespread malnutrition can be eliminated only by improving their income and purchasing power.

- Farming is the largest private sector enterprise in the country; State-wise information shows that the lowest percentage of farm households, out of total rural households is 35% in Tamil Nadu. The highest at 91% is in Jammu and Kashmir.

- Out of 115 million holdings, 90 million are 1 hectare or less in size. Tiny holdings limit the capacity of farmers to take to the technological upgrading of farm enterprises. They also limit their coping capacity to withstand economic shocks caused by meteorological and/or marketing policies.

- Out of 178.25 million farmers, 136.85 million (76.7%) are foodgrain farmers. 13 million farmers produce cotton and sugarcane.

- Rural poverty and under-nutrition are higher than urban poverty and hunger.

- There is increasing feminisation of agriculture. Women constitute over 50% of the agricultural work force. Yet, women have no land rights and are push-outs of the credit system.
• Rural infrastructure is poor, particularly in the area of post harvest technology. There is a mismatch between production and post-harvest technologies in most farming systems.

• Capital formation in agriculture is going down and the credit-deposit ratio is adverse in rural branches.

• The principle of financial inclusion is yet to become a reality in rural India.

• Prime farm land is being diverted for non-farm purposes, due to the lack of an agricultural land conservation policy; consequently more food and other agricultural products will have to be produced under conditions of diminishing per capita availability of arable land and irrigation water.

• The rate of growth of employment in rural areas is poor, leading to the population supporting capacity of the ecosystems being exceeded in most parts of the country and to the unplanned migration of the rural poor to urban slums.

• The average monthly income per farmer household is Rs.2115 and does not cover the average per capita monthly consumption expenditure of Rs. 2770. Only households with landholding of 4 ha and above have a surplus of income over expenditure.

• The cost-risk-return structure of farming is getting adverse leading to a sense of despair in the rural areas. Consequently, the youth in villages are reluctant to take to farming as a career.

• The ecological foundations essential for sustainable agriculture like land, water, forests and biodiversity are in varying degrees of decay and adverse changes in climate appear a distinct possibility as a result of global warming.

• In the prevailing atmosphere of gloom and doom, there are many bright spots – farmers with access to adequate land, water, capital and technology are doing very well in areas like horticulture and animal husbandry and are demonstrating the strengths of Indian agriculture, arising from abundant sunshine and a rich diversity of agro-ecological and agro-climatic conditions.
The persistence of widespread under- and malnutrition in the country arises from policies which fail to recognize that the farming population including landless agricultural labour constitute the majority of consumers. Unfortunately, the term, “Consumer” seems to cover only the urban population in the minds of the policy makers. This is one of the reasons why we are off-track in achieving the UN Millennium Development Goal of reducing hunger by half by 2015. **Enhancing small farm productivity and profitability, as a single step, will make a major contribution to reducing hunger and poverty. This in turn will depend on our ability to assure remunerative prices for their produce.**

In industrialized countries, farmers constitute 2 to 4 percent of the population. The per capita income of farmers is high both because of the size of the farm operated and the extensive support extended by government. They are technology, capital and subsidy rich. Public policies concurrently promote conservation, cultivation, consumption and commerce. Extensive support is given to promote conservation farming. **The collapse of the Doha round of negotiations in agriculture is an indication that farming cannot survive in industrialized countries without substantial support from public funds to ensure its economic viability.**

What then is the future for India’s rural population numbering over 700 million? **We cannot be silent onlookers to a situation where 30% of India is shining and 70% is weeping.** If we want farmers and farming to survive, several essential steps should be taken immediately. In addition to the areas mentioned in the first four Reports of NCF and in the draft National Policy for Farmers, the following four areas needs urgent and integrated attention: technology, training, techno-infrastructure and trade. Technological, ecological and management upgradation of small farms is the need of the hour.

**Technology**

Technologies which can help to enhance land, water and labour productivity are urgently needed. They should lead to an evergreen revolution in small farms, i.e. increase in productivity in perpetuity without associated ecological harm. The smaller
the farm, the greater is the need for marketable surplus in order to generate cash income. The small farm can lend itself to higher productivity and profitability, provided the small farmer is enabled to overcome his/her handicaps arising from lack of capital and credit and access to appropriate technologies and inputs and remunerative markets. There is need for a small farm management revolution, which can result in conferring the power and economy of scale on small producers both in the production and post-harvest phases of farming; if this does not happen, mounting debts arising from adverse economics will continue to affect them. The strategy for a Small Farm Management Revolution will have to be developed by Panchayati Raj Institutions (PRIs) with technical help from Agricultural, Rural and Women’s Universities as well as IITs and IIMs, since much of the action will be location-specific. Cooperative farming, service cooperatives, stakeholder companies, formation of compact production and processing Estates by Self-Help Groups and farmer centric contract farming can all help to improve the economics of small holdings and thereby foster improved management. The pace of the implementation of the Wasteland Development Programme is slow. The recommendations of the Mohan Dharia Committee on Wasteland Development are yet to be adopted in a serious manner.

7.5.2 At the production end, there is need for integrating frontier technologies like biotechnology, information and communication technologies, space and nuclear technologies and renewable energy technologies such as solar, wind, biogas and biomass based energy systems with traditional ecological prudence. Bio-energy based on pyrolysis and gasification of biomass can be a decentralized source of energy. Bio-fuels also offer scope wherever ecological and economic conditions are favourable. Biomass is an under-utilized resource. Bio-Parks can be promoted in every block to convert the available biomass into a wide range of economic products, including energy and manure.

7.5.2 Conservation farming is the pathway to an evergreen revolution. The greatest problem with applying conservation agriculture concepts in dry land areas is the lack of adequate quantities of crop residues. The removal of crop residues for alternative uses accelerates the already fast decline of soil organic matter content in dry land areas.
Long term sustainability of dry land soils may be significantly enhanced by reduced tillage that leaves more crop residues on the soil surface.

7.5.3 Besides enhancing soil fertility and soil organic matter, the need for the economic and efficient use of irrigation water cannot be over emphasised. The average yield of cereals can be increased by 30 to 60% annually in dry farming areas by increasing crop water use by 25 to 35 mm. This can be readily achieved by conservation agriculture. High input costs, uncertain rainfall and poor income lead to widespread indebtedness. The younger generation will be reluctant to take up farming as long as income prospects are poor. Declining terms of trade between farm and non-farm sections is a matter of concern.

7.5.4 It is in this background, that we have to examine the opportunities opened up by new technologies. New agriculture technologies like genomics and information technology together with improved agronomic management should form the cornerstone of increasing agriculture productivity and profitability of small farms both in irrigated and rainfed areas as well as in problem soils and coastal areas. Recombinant DNA technology has already resulted in the breeding of crop varieties possessing tolerance to salinity and drought as well as to serious biotic stresses caused by the triple alliance of pests, pathogens and weeds. It is however essential to have a professionally and socially credible National Biotechnology Regulatory Authority, on the lines recommended by the Swaminathan Committee in 2004. The bottom line for any biotechnology regulatory policy should be the safety of the environment, the well being of farming families, the ecological and economic sustainability of farming systems, the health and nutrition security of consumers, safeguarding of home and external trade, and the biosecurity of the nation.

7.5.5 The Village Knowledge Centre (VKC) or Gyan Chaupal movement recommended by NCF in its first report (December 2004), will help to bridge the growing gap between scientific knowledge and its field application. It will also facilitate the removal of many intermediaries from the marketing chain.
7.5.6 The wholesale fruit and vegetable markets are likely to lose their importance under the growing influence of contract farming and direct supply relationships between producers and major market chains. Changes in intermediary relationship will occur as internet based marketing tools are adopted by both producers and suppliers. **Bharat Nirman has rightly given priority to knowledge connectivity, in addition to physical connectivity through roads.** As a single step, the *Gyan Chaupal* will bring about a transformation in the economic conditions and social relations in our villages. **Bridging the digital divide is a powerful method of bridging the gender divide, since rural women master the ICT technologies with ease.**

7.5.7 India is poised for a major ICT revolution in rural India. The broad strategy recommended by NCF is as follows:

- Establishment of a Village Resource Centre (VRC) in every block with the help of the Indian Space Research Organisation. These VRCs will be linked to satellites and will have telecommunication facilities.

- Every Panchayat headquarter will have a Gyan Chaupal or Village Knowledge Centre (VKC). This will have internet connectivity. Alternatively, the Gyan Chaupal can be established in the village school or any other public space where there will be social inclusion in access to the technology.

- The last mile and last person connectivity will be through FM / Community radio and / or mobile phones. **The internet – radio – mobile phone synergy is a very powerful tool for social inclusion in access to all the needed information, including warning of impending natural disasters.** Villagers give priority to health and marketing information. In addition, an Entitlements Database can empower them with information on all the Government schemes designed for their well being. Gender-specific information is equally important. Every farmer in the village should be issued with an Entitlements Pass Book.

7.5.8 NCF is happy that the Government of India has approved the setting up of 100,000 rural Common Services Centres (CSC) across the country at a total cost of
Rs.5742 crores. This will help to accelerate progress in achieving the goal of Every Village a Knowledge Centre. The Village Level Entrepreneur (VLE) envisaged under the programme should be supported by a capacity building programme. The Fellows of the Jamsetji Tata National Virtual Academy may be able to organize such capacity building and mentoring programmes. *The Rural Knowledge Revolution is now on the way to becoming a reality.*

7.5.9 We are thus on the threshold of both a biotechnology and information technology revolution. Biotechnology does not imply only GMOs. Non GMO applications are many, such as tissue culture for multiply elite germplasm, bio-fertilizers, bio-pesticides and bio-remediation of ground water as well as marker-assisted breeding. In the case of GMOs, safe and responsible use should be ensured. Organic farming procedures permit the use of varieties developed by marker-assisted breeding.

7.5.10 The third technological revolution relevant to agriculture is the ecotechnology movement. This involves the appropriate integration of frontier sciences with the ecological prudence of farming communities.

7.5.11 The ecotechnology revolution underpinning the ever-green revolution movement has many pathways as indicated below.

| Green Revolution: Commodity-centred increase in productivity | Ever-green Revolution: increasing productivity in perpetuity without associated ecological harm |
| Change in plant architecture, and harvest index | Organic Agriculture: cultivation without any use of chemical inputs like mineral fertilizers and chemical pesticides |
| Change in the physiological rhythm-insensitive to photoperiodism | Green Agriculture: cultivation with the help of integrated pest management, integrated nutrient supply and integrated natural resource management systems |
| | Ecoagriculture: based on conservation of soil, water and biodiversity and the application of traditional knowledge and ecological prudence |
| | EM Agriculture: system of farming using effective microorganisms (EM) |
| | White Agriculture: system of agriculture based on substantial use of microorganisms, particularly fungi |
| | One-straw Revolution: system of natural farming without ploughing, chemical fertilizers, weeding and chemical pesticides and herbicides |
For most small farmers, green agriculture will be the most feasible form of eco-agriculture. Crop-Livestock integrated systems of production will be ideal for organic farming. More research is needed on nitrogen fixing tree species and shrubs, as well as green manure plants. Our soils are hungry and thirsty and they need both nutrients and water.

In addition to BT, ICT and Ecotechnology, there are opportunities in space application, nuclear techniques and GIS and GPS based precision farming. What is important is the training of Farm Science Managers (atleast 1 woman and 1 man) in every village, so that there is a new dawn in Indian agriculture, which capitalizes on both traditional wisdom and frontier science and technology.

In their 2004 report on “Revamping and Refocusing Agricultural Research” the Swaminathan Committee stressed the need for greater investments in strategic research. Fortunately, the Finance Minister responded positively and provided Rs. 50 crores for this purpose in the Union Budget for 2005-06. This should be activated and used for purposes like the preparation of Bio-bricks through the science of synthetic biology. Also, like the Silicon Valley, Biovalleys could be organized in Western and Eastern Ghats and the Himalayas, to run training programmes combining conservation and sustainable use to enable the local population to convert biodiversity into bio-wealth.

We can then end the irony of the co-existence of prosperity of nature and poverty of people. Organic farming also requires support from strategic research in the areas of feeding for high yields and pest management. An area of technology of great importance to the survival of small scale agriculture is proactive advice on land use based on anticipated meteorological and marketing conditions. A Land Use Advisory Service, using the latest meteorological and computational tools is badly needed. We cannot abandon farm families with small holdings to their fate in a globalized economy without adequate support services based on the best in modern science. A Market Intelligence Service should be set up which can monitor crop trends in the country and advise farmers what to plant in the coming season, so as to prevent gluts and price crashes. This can be disseminated through the Village Knowledge Centre.
7.6 Training

7.6.1 How can such a technological, ecological and managerial upgrading of small farm agriculture be brought about? This is where training, re-training, re-tooling and redeployment of both farmers and farm graduates become important. Fortunately, we have 47 Agricultural and Animal Husbandry (including Fisheries) Universities. Nearly 20,000 farm graduates including about 7000 postgraduates become available each year. There is a vast chain of National Research Institutes and Centres, National Bureaus and All India Coordinated Projects under ICAR. There are also a growing number of R & D institutions in the private sector and a number of civil society organisations working on agricultural issues. The Indian National Agricultural Research System (NARS) is thus a formidable one.

7.6.2 NCF has already recommended the following steps:

- Promote farmer to farmer learning by establishing Farm Schools in the fields of outstanding farmer-achievers.
- Revitalize and upgrade Krishi Vigyan Kendras by adding a post-harvest technology wing.
- Organise 60,000 Lab to Land demonstrations in the areas of post-harvest processing, marketing and value addition to primary produce all over the country.
- Establish Gyan Chaupals in every village based on the integrated use of the internet, cable TV, community radio, cell phone and local language community newspapers. If Mission 2007: Every Village a Knowledge Centre is accomplished, the knowledge deficit currently prevailing in villages can be removed and the “know-how” – “do how” gap can be bridged.
- Establish Capacity Building Centres for those operating Gyan Chaupals.
- Train one woman and one male member of every Panchayat as Farm Science Managers
• Establish at the District level a SHG Training and Mentoring Centre, in order to build a local level cadre of SHG catalysts, capable of organizing Sustainable Livelihood Banks based on micro-credit.

• Establish in coastal areas Fish for All Training Centres to provide training in all aspects of fisheries ranging from capture/culture to consumption.

7.6.3 Training of farm and home science graduates also needs revamping. NCF has proposed that the major mission of our Agricultural, Veterinary, Fisheries, Rural and Women’s Universities should be to help every scholar to become an entrepreneur. They can then organize Service Co-operatives, Stakeholder companies, Agri-clinics, Agri-business centres, Bio-Parks, Food-Parks and other enterprises which can help to improve the efficiency and economics of farming. Home Science Colleges could be restructured as College of Human Sciences, where both men and women learn the science and art of nutrition, agro-processing and home economics. This is why NCF has included farm and home science graduates in the definition of farmers. They should be proud to belong to the dominant vocation of India, namely farming and farm-based enterprises. The cover of this last report of NCF has an extract from the Visitors’ Book of the National Dairy Research Institute, Bangalore, showing that the father of the Nation Mahatma Gandhi chose to describe himself a “Farmer”. Only youth can revive the glory of Indian farming.

7.6.4 Service cooperatives by farm and home science graduates can help to upgrade speedily the efficiency and economic viability of small farms, since they can facilitate highly productive decentralized production supported by key centralized services. Cooperatives should be organized on a stakeholder rather than on a shareholder principle.

7.6.5 A reorientation in the mindset of farm graduates can be brought about only by innovative changes in curricula and courses. In all applied areas, business and financial management should be added to the disciplinary training. For example, a course in Seed Technology can be restructured and designated as “Seed Technology and Business”. Similarly, nutrition courses could be reorganized as Food Safety and Nutrition Security programmes. Courses in Agronomy could be developed
into Agronomy and Agri-business Programmes. **If the business, financial and trade aspects are integrated with disciplinary training, such courses will give the farm/home science graduates the self-confidence essential for embarking upon a career of self-employment.** We recommend that attention be given to imparting a business orientation to all the applied courses in Agricultural Universities. A large number of graduates are now being trained in the field of biotechnology. However, many of them are not able to utilize their training after taking degrees due to lack of appropriate employment opportunities. Agricultural Biotechnology is an area where there are considerable opportunities for remunerative self-employment. It would therefore be appropriate that support is extended to the creation of a **National Association of Genome Entrepreneurs** who could be supported with Venture Capital Fund in order to enable them to convert the rich knowledge available in Government institutions in the field of functional genomics into commercially viable products. They could also undertake work for other countries in the area of preparation of genome maps of the crops of interest to those countries. The National Centre for Plant Genome Research set up by the Department of Biotechnology at New Delhi could organize short term course on Functional Genomics and Business Development. **Mainstreaming entrepreneurship and business skills in all applied courses, rather than keeping Business Management Course as a separate entity is essential, if small farm agriculture is to become economically sustainable and educated youth are to be attracted to take to a career in agriculture.**

**7.6.6 Another urgent need is the establishment of a chain of Regional Institutes for Food Safety and Security.** They can be established in appropriate Agricultural, Veterinary or Fisheries Universities. To begin with seven such Centres may be established during the 11th Plan period. Home Science Graduates can be employed in such Regional Institutes to launch a movement for food safety including awareness of codex alimentarius standards. They should also spread quality literacy among farmers through Gyan Chaupals.

**7.6.7 Training of all engaged in agricultural administration in the basic principles and economics of farming is essential.** In the United States, practising farmers often
occupy leading positions in Agricultural Departments for specific periods. It would be useful to begin posting active and accomplished farm/fisher women and men as Directors in State Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, etc on a 5 year tenure. Unless there is an upgradation in the practical knowledge of those responsible for developing agricultural programmes and policies, there is no hope for Indian agriculture in a globalised economy.

7.6.8 The other urgent task is to sensitize the policy maker on the ground realities of farm economics. We suggest that the Sixth Pay Commission may be requested to familiarize itself with the “net take home income” of farm men and women who constitute the genuine majority of our population. A comparative study of the positions of the salaried class and of the self-employed farmers working in sun and rain to feed the small elite salaried class, is in the broader interest of the Nation, particularly in the context of a commitment to inclusive growth. Understanding the economics of farming will help the Sixth Pay Commission to appreciate the social context in which the salaries and privileges of a small section of the population need to be fixed.

7.7 Techno-infrastructure

7.7.1 Bharat Nirman should help to improve the infrastructure essential for a technological upgrading of farm operations. Post-harvest infrastructure, particularly for perishable commodities, is extremely weak. This is why the Swaminathan Committee recommended in 1981 the establishment of a National Horticulture Development Board, solely devoted to the cause of improving post-harvest infrastructure, processing and marketing. Unless this is attended to on an urgent basis, farmers will not be able to get adequate return for their labour. Fortunately, the National Horticulture Mission is likely to fill this felt need. Similarly facilities for food safety, water quality, sanitary and phytosanitary measures and biosecurity need to be improved. The Small Farmers’ Agri-business Consortium (SFAC) started by Prime Minister Dr Manmohan Singh, in 1992, when he was Union Finance Minister, is yet to serve the purpose of enabling small farmers to take to market driven agri-business. It is high time that SFAC is restructured,
revitalized and financially strengthened as indicated by the Union Finance Minister in his budget speech in 2004.

7.7.2 Credit at the right time and in adequate amount is a basic requirement of small farm families. In keeping with its commitment to inclusive growth, the Government of India is promoting Financial Inclusion (FI) in respect of access to credit. The RBI Policy Statement for 2006-07 has asked SLBC in all States / UTs to identify atleast one district in their area for achieving 100% financial inclusion, by providing a “no frills” account and a General Purpose Credit Card (GCC). Some of the other considerations which need to be kept in view are the following:

- Expand and strengthen the Bank-MFI-SHG route with support services for capacity building and training
- Launch a massive campaign of financial literacy in the local language
- Open Farmers’ Counselling Centres at taluka level. Bank of India is already doing this at the district level in Wardha
- Take an integrated credit requirement approach and combine investment, production and consumption requirements
- Examine and replicate innovative schemes already in operation like the Kalinga Kisan Gold and Silver Card Schemes launched by the Orissa State Cooperative Bank and the financing of tenant farmers cultivating land on “oral lease basis” in Andhra Pradesh through Rythu Mitra scheme, to address the genuine credit needs of farmers
- Devise innovative insurance schemes, both credit card linked and otherwise to cover crop, animal life, human life, healthcare
- Link with Government departments at the district level to ensure integrated delivery of schemes to the people.

7.7.3 Facilities for soil testing, particularly estimation of micro-nutrient status also need considerable strengthening. Unless more investment is made in strengthening
the support services needed by farmers for the scientific upgradation of farming, the average productivity will continue to remain low and youth will not be attracted to farming. Simple but safe storage bins need to be popularized on a large scale, along with low cost refrigeration facilities for perishable commodities. As recommended in the earlier Reports of NCF, a Livestock Feed and Fodder Corporation, a Land Use Advisory Service, an Indian Trade Organisation, Living Heritage Gene Banks to conserve unique local breeds of farm animals, internationally recognized certification agencies for organic farm products, an Agricultural Price Stabilisation Fund, integrated insurance products like Parivar Bima Policy and other essential support services are needed to help increase the productivity and profitability of small farm agriculture. The National Fisheries Development Board and the National Rainfed Area Authority recommended by NCF have fortunately come into existence. It is essential that such bodies should serve as professional powerhouses in their respective fields and help to upgrade the technological, ecological and management aspects of culture and capture fisheries on the one hand, and rainwater harvesting, conservation, sustainable use, aquifer recharge, more crop and income per drop of water and other issues relating to achieving the goal of Jal Swaraj in rainfed agriculture, on the other.

7.8 Trade

7.8.1 Producer oriented market holds the key to remunerative and sustainable farming. Quality and trade literacy should receive high priority in Gyan Chaupals. Facilities for Farmers’ Markets need to be expanded rapidly. In commodities essential for maintaining the Public Distribution System, the procurement price should be the market price at the time of purchase. Those providing essential commodities for the PDS should be recognized through the provision of Smart Cards, which will entitle them to certain benefits while purchasing essential farm inputs, including agricultural implements and machinery.

7.8.2 The wheat import plan announced by the Government of India during 2006 is in response to the need for maintaining adequate food stocks both for the purpose of food security and for feeding the public distribution system. Following the Wheat Revolution
in 1968, Smt Indira Gandhi decided to build a sufficient buffer stock of foodgrains under Government control in order to ensure that the basic staples are available at reasonable prices even under conditions of unfavourable monsoon. **She was also deeply conscious of the linkage between food security and national sovereignty in foreign policy and hence had decided that the Government should remain at the commanding height of the food security system.** Maintaining adequate food reserves is an absolute must from the point of view of avoiding both panic purchase and man-made famines, particularly at times when there are indications of aberrant monsoon behaviour. A few years ago, the Government of India had over 60 million tonnes of foodgrain reserves and substantial quantities were exported to reduce the cost of maintaining stocks of that order. There was criticism at that time that while we are exporting foodgrains, millions of children, women and men go to bed partially hungry in our country. The situation was described in the media as “grain mountains and hungry millions”. Even now we have the largest number of malnourished children in the world. Only the grain mountains have disappeared.

7.8.3 Wheat imports have now become essential to build and maintain a buffer stock and maintain prices at a reasonable level. Normally much of the surplus grain is bought by Government Agencies like the Food Corporation of India and State Corporations at the support price announced by Government. During 2006, private parties including large corporations have also entered the grain market and have been able to procure a part of the surplus grains at a slightly higher price than that offered by Government. The farmers are certainly happy when they are able to get higher prices. However this situation has led to a shortfall in procurement target necessitating wheat imports.

7.8.4 Maintaining food security for our over 110 crores of people is a fundamental obligation of Government. Fortunately, we have sufficient foreign exchange reserves and hence imports can be resorted to where there is no other alternative to replenish the buffer stock and operate the PDS. What is important is to draw appropriate lessons from this year’s experience and undertake the development of a long term policy for home grown food based food security, where both the public and private sectors perform well defined and mutually reinforcing roles. Such a strategy should be designed to promote the
availability of the staple grains and food commodities needed for nutrition security at the right time and place as well as at an affordable price. The private sector should develop its own code of conduct and should not indulge in actions where for short term financial gains, the health and nutritional security of millions of children, women and men are sacrificed. There is need for a transparent and well defined code of conduct in the areas related to the purchase and trade of basic staples. Speculative trading should be prevented. The nation as a whole must take pride in an effective food security system.

7.8.5 There have also been adverse comments on the removal of 10% tariff imposed on the import of pulses. In our country the situation with reference to producers and consumers is different from those of the industrialised nations. Nearly 65% of the consumers in India are also producers, many of them operating farms of 1 ha. and below in size. Rural malnutrition is more widespread than urban malnutrition. Small farm families depend for their livelihood on income from the sale of whatever surplus quantities of foodgrains, vegetables, fruits and milk they may have for the market. Pulses and oilseeds are predominant crops of rainfed and dry farming areas. Productivity is low since efforts in spreading new technologies and seeds are poor or inadequate, although there is a huge stockpile of underutilized technologies including new varieties. If we continue the practice of importing large quantities of pulses and oil seeds, without determined action to produce them within the country, dry farming areas will continue to languish in poverty and malnutrition. The linkages between low small farm productivity and the persistence of poverty and malnutrition is very strong. Therefore, the sooner we revise our import policies in relation to pulses and oil seeds and divert our attention to helping the millions of farmers toiling in rainfed areas to produce more of these essential commodities by assuring them of a support price, the greater will be the possibility of reducing substantially hunger and poverty in the country. Whenever there is a good crop of pulses or oilseeds like the one in mustard this year, farmers suffer due to lack of assured and remunerative marketing opportunities. The interests of the producer-consumer needs greater protection than those of the interests of trader-importers. Prime Minister Rajiv Gandhi started the Oilseeds and Pulses Missions to give holistic attention to all links in the production-consumption chain. The Missions
also had a striking impact in their early years. Subsequent policy changes and leadership vacuum have unfortunately led to the stagnation in the productivity of these life enriching crops.

7.8.6 The twin goals of ensuring justice to farmers in terms of a remunerative price for their produce, and to consumers in terms of a fair and affordable price for staples (65% of consumers are also farmers) can be achieved through the following integrated strategy:

- MSP should be regarded as the bottom line for procurement both by Government and private traders. Purchase by Government should be MSP plus cost escalation since the announcement of MSP. This will be reflected in the prevailing market price. Government should procure the staple grains needed for PDS at the same price private traders are willing to pay to farmers. Thus the procurement price will be higher than the MSP and will reflect market conditions. The aim of Government purchase is to feed the PDS, while the goal of the private trade will obviously be for making a large profit when the prices go up a few months after harvest. Thus, Government purchases foodgrains for public good, while private traders purchase for commercial profit. By purchasing at prevailing market rate, Government ensures that both farm families and urban consumers get a fair deal. At the same time, opportunities for the private trade to buy and store large quantities of staple grains and sell them when the prices go up substantially can be curtailed. In other words, if the market price of wheat is Rs. 800 per quintal soon after harvest, Government should give farmers that price for the quantities needed for PDS and buffer stocks. Trade will offer a little higher price than Government, in order to sell the produce when the price goes up, say to Rs. 1500 per quintal after a few months.

- The food security basket should be widened to include the crops of the dry farming areas like bajra, jowar, ragi, minor millets and pulses. PDS should include these nutritious cereals and pulses purchased at a reasonable MSP.
This will be a win-win situation both for the dryland farmer and the consumer. 

**We will witness neither a second green revolution, nor much progress in dryland farming, unless farmers get assured and remunerative prices for their produce.** A nutritional literacy programme also needs to be launched through Gyan Chaupals in conjunction with PDS.

- Food security with home grown foodgrains can alone eradicate widespread rural poverty and malnutrition, since farming is the backbone of the livelihood security system in rural India. This will enable **Government to remain at the commanding height of the national food security system.** Building a food security system and containing price rise with imported foodgrains may sometimes be a short term necessity, but will be a long term disaster to our farmers and farming. **A well-defined, pro-farmer and pro-resource poor consumer Food Security Policy is an urgent necessity.**

- Both universal PDS and enforcing MSP throughout the country for the selected crops are essential for imparting dynamism to agriculture.

7.8.7 **The Commission on Agricultural Costs and Prices (CACP) should be an autonomous statutory organization with its primary mandate being the recommendation of remunerative prices for the principal agricultural commodities of both dry-farming and irrigated areas.** The Minimum Support Price (MSP) should be atleast 50% more than the weighted average cost of production. The “net take home income” of farmers should be comparable to those of civil servants. **CACP should become an important policy instrument for safeguarding the survival of farmers and farming.** Suggestions for crop diversification should be preceded by assured market linkages. **The membership of CACP should include a few practicing farm men and women.** The terms of reference and status of CACP need review and appropriate revision.

7.8.8 Credit and insurance are twin basic needs of farmers. Farmers’ Associations feel that either NABARD should be renamed as **National Bank for Farmers** in order to enable it to focus attention on farmers rather than only on farming or else a new Bank for Farmers may be set up. Obviously, there is need to look at this issue carefully.
To sum up, imports or exports of foodgrains may be necessary from time to time, but the **bottom line of our import-export policies must be the livelihood security of both the farm and non-farm populations of rural India who constitute 70% of our population.** Time has come for Government to set up a multistakeholder **National Food Security and Sovereignty Board** chaired by the Prime Minister with its membership including the Minister for Agriculture and Food and other concerned Ministers of GoI as well as a few Chief Ministers of food surplus and deficit States, leaders of all national political parties, a few experts including specialists in the gender dimension of agriculture and food security, and mass media representatives. We are confronted with the need to safeguard the food security requirements of both resource poor farmers and resource poor consumers. The bulk of such resource poor farmers are small or marginal farmers and landless agricultural labour in unirrigated areas. It is these linkages which need to be understood and attended to. The proposed National Food Security and Sovereignty Board can attend to these complex linkages in a holistic manner and develop and implement a transparent national food security policy in the interests of all regions of the country and all sections of our population.

**7.9 Shaping our Agricultural Future – A three pronged Strategy:**

**7.9.1** India will remain during most of the 21st century a predominantly agricultural country, particularly with reference to livelihood opportunities. Therefore there is need for both vision and appropriate action in the area of shaping our agricultural destiny. Our major agricultural strengths are our large population of hard working farm women and men, our varied climatic and soil resources, abundant sunshine throughout the year, reasonable rainfall and water resources, a long coast line and rich agro-biodiversity. Converting them into jobs and income is the challenge.

**7.9.2** In our view, we should look upon agriculture not just as a food producing machine for the urban population, but as the major source of skilled and remunerative employment and global outsourcing hub.
7.9.3 Just as IT industries have specialized in handling outsourcing assignments efficiently, we must enable our farm graduates and farmers to take up outsourcing jobs, in areas where we have a comparative advantage. Some examples are hybrid seed production, tissue culture propagated plants, organic farm products, biological software for sustainable agriculture like biopesticides, biofertilizers, pheremones as well as herbal products, fruits, flowers and vegetables, vaccines and sero-diagnostics and veterinary pharmaceuticals based on medicinal plants. There is also scope for becoming a global outsourcing hub in the areas of plant and animal genomics and ICT for rural poor. Farm, Veterinary, Fisheries and Home Science Graduates should be trained to become genome and digital entrepreneurs. To start with, a few of our Agricultural, Animal Sciences and Fisheries Universities could set up **Bureaus for Outsourcing Business in Agriculture** to facilitate contacts between farmers’ organizations as well as agri-business centers operated by farm and home science graduates and external agri-business enterprises. Outsourcing should not only be from other countries to urban India, but also from urban to rural India, so that educated youth continue to live in villages.

7.9.4 We need a new vision for agriculture. That vision should aim to spread happiness among farm and rural families. **Bio-happiness through the conversion of our bio-resources into wealth meaningful to our rural families should be the goal of our national policy for farmers.** The hidden and unrecognized opportunities for creating more skilled jobs and income in the farm and non-farm sectors need to be tapped through appropriate public policies and programmes. Technology Missions should be revamped and revitalized on the lines envisaged by Bharat Ratna Rajiv Gandhi when he first proposed them as organizational and management tools to help the nation leapfrog in the production of essential commodities like oilseeds and pulses.

7.9.5 A structurally progressive economy should reduce the share of people dependent on a sector as the share of that sector falls in the GDP. As the share of agriculture in the GDP falls, the share of people dependent on agriculture is also expected to fall in the same proportion. However in the Indian Economy though the share of agriculture in the GDP is falling steadily, there is no corresponding decline in the share of population dependent on agriculture. Because of population growth, the absolute number
of people depending on agriculture is increasing, even if there is a decline in percentage terms. This is why NCF has recommended a major integrated Rural Non-farm Livelihood Initiative, so that both on-farm and non-farm livelihoods become skilled and profitable.

7.9.6 The Technology strategy for an evergreen revolution should have the following three components:

**Defending the Gains**

7.9.6.1 Punjab farmers provide 60% of wheat and 40% of rice to the PDS and national buffer stocks. The net productivity has increased in the Punjab in rice and wheat from 1.2 t/ha and 1.1 t/ha to 4.3 t/ha and 3.9 t/ha respectively from 1960-61 to 2004-05. However, in recent years there is stagnation in productivity improvement due to a variety of causes of which the following are important:

- Declining farm size and income
- Depleting natural resources base, as for example a steep fall in ground water table and impaired water quality.
- Increasing input costs, particularly diesel and adverse economics of farming
- Deficiency of micro-nutrients in the soil and deteriorating soil health
- Inadequate post harvest technology
- Uncertain market prospects except for wheat and rice though MSP is announced for the following 25 agricultural commodities:
  - Cereals – paddy, rice, wheat, jowar, bajra, maize, ragi, barley
  - Pulses – gram, tur, moong, urad, masur
  - Oilseeds – groundnut, soyabean (yellow/black), rapeseed and mustard, toria, sunflower seed, safflower, nigerseed
  - Sugarcane, cotton, jute, tobacco
- High indebtedness of farmers – the total debt of Punjab farmers for instance is estimated to be about Rs. 24,000 crores.

7.9.6.2 Similar conditions prevail in Haryana and Western UP. Thus, the heartland of the green revolution is in grave trouble. These areas need conservation farming which will help farm families to conserve and improve soil health, water quantity and
quality and biodiversity. Some of the eco-technologies developed by the Punjab Agricultural University are: bed sowing of wheat saving 20 to 25% water, leaf colour chart saving 15% N application in rice, tensiometer based irrigation scheduling, zero tillage technology for wheat, and IPM in cotton saving 40% pesticides. Thus, there is vast scope both to promote Green Agriculture and to reduce the cost of production through enhanced factor productivity. A course on Sustainability Science should be introduced in all Agricultural Universities. India will not be able to maintain a stable food security system, if the “fertile crescent” (i.e. Punjab, Haryana and Western UP) region is not saved through adequate support for conservation farming. Defending the gains already made in this region is an urgent task.

7.9.6.3 An example of the need for support for Conservation Farming is provided by the situation in rice cultivation in the Punjab. At present, nearly 26 lakhs hectares are under rice in the Punjab. Much of the irrigation water used is ground water. The water table in the Central districts of the State producing rice and having 70% of the tubewells is receding at an alarming rate of 2 to 2.5 feet annually. At present about 30% of the tubewells have become submersible and it is estimated that during the next 10 years practically all the centrifugal pumps will become nonfunctional and will have to be converted into submersible pumps. It would therefore be advisable to restrict rice cultivation to 2 million hectares in the Punjab with a yield target of 5 tonnes per hectare. The remaining area can come under maize, pulses and oil seeds which are all at the moment in short supply. Conservation Farming in the Punjab as well as in other intensive agriculture areas will involve a scientific programme of restructuring farming systems. Such a restructuring is an urgent need in the interests of the long term livelihood security of Punjab farmers and food security of the nation. The same is true in parts of Haryana, Western Uttar Pradesh as well as in many of the early IADP districts in the country. NCF suggests that an initial allocation of Rs.1,000 crores may be made for farming systems restructuring based on the principles of ecology, economics, social and gender equity and employment generation in the areas of importance to national food security.
Eternal vigilance is the price of stable agriculture. NCF had recommended in its Third Report the establishment of a science-based National Biosecurity System. The sooner the NCF recommendation is implemented, the safer will be the country from the point of freedom from invasive alien species, which could cause potential harm to crop and animal husbandry, fisheries and forestry. Our wheat crop for example, now faces threats from new strains of rusts like the 78S84 (similar to Yr 27 virulence) race of yellow rust Ug 99 strain of stem rust could also cause trouble. The steps taken to defend the gains already made should therefore include pest surveillance and management and gene deployment for checkmating the spread of pathogens. This is equally important in the case of poultry and animal enterprises.

In every State, the agricultural “bright spots” and “hot spots” will have to be mapped. The State should develop a strategy for enlarging the extrapolation domain of bright spots. Similarly, every State should develop a Good Weather Code to maximize the benefits of adequate moisture availability, a Drought Code to minimize the adverse impact of drought, and a Flood Code both to prevent excessive distress and damage, and to promote a post-flood production plan. In the desert areas of Rajasthan, the Good Weather Code should include provision for raising nurseries of appropriate plants, so that in years of excessive rainfall, an extensive tree planting and sand dune stabilization drive can be launched. This will help to strengthen the ecological infrastructure of the desert, and gradually convert the desert into an oasis. The Drought Code should include the adoption of crop life saving technologies and contingency plans to change the cropping pattern according to moisture availability. “Be prepared” – both to take advantage of a good monsoon and to reduce the impact of adverse seasons – should be our national motto in agriculture.

**Action 2006-07: Contingency Plans and Compensatory Production Programmes**

The first advance estimate of production of foodgrains for kharif 2006-07 has been pegged at 105.2 million tonnes against a target of 115.2 million t indicating an overall shortfall of ten million t. Rice production is likely to be 75.7 million t against a target of 80.7 million t. Such variations may occur more frequently in the future, if
there are adverse changes in precipitation and temperature as a result of global warming and climate change. It will therefore be prudent for the National Rainfed Area Authority to develop computer simulation models on the likely impact of different weather patterns on the major crops. Data from the All India Coordinated trials of ICAR provide opportunities for developing such simulation models. For example, an increase in the average temperature by 1°C during rabi may lead to a reduction in the duration of the wheat crop by 1 week in Northwest India, including the Punjab. This may reduce wheat yield by 400 to 500 kg per ha.

7.9.6.7 The simulation models can help in the preparation of contingency plans to face different weather possibilities. They can also help in making advance preparations for compensatory production programmes during rabi to offset the loss in kharif. Such an opportunity is available only to tropical and sub-tropical countries where crops can be grown throughout the year.

7.9.6.8 The highest wheat production so far was 76.7 million tonnes in the year 1999-2000. Since then, production and productivity have been declining. How do we turn the tide and how can we step up the production of wheat and rice during rabi 2006-07, to compensate for the loss of 10 million t in kharif? First, it must be emphasized that seed reserves are important for crop security, just as grains reserves are important for food security.

7.9.6.9 Second, in wheat there is a vast untapped production reservoir available in UP, Madhya Pradesh, Bihar and Rajasthan. The ICAR Wheat Directorate in Karnal has calculated that we can produce an additional quantity of about 24 million t of wheat immediately by bridging the gap between potential and actual yields, with technologies and varieties now on the shelf (Table 1).
Table 1: Achievable Targets by Bridging Yield Gaps through available Technologies under irrigated conditions (based on National Demonstrations)

<table>
<thead>
<tr>
<th>State</th>
<th>Current Area 2003-04 (,000 ha)</th>
<th>Current yield gap t/ha</th>
<th>Additional production possible (000 t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP</td>
<td>8418.0</td>
<td>1.346</td>
<td>11330.5</td>
</tr>
<tr>
<td>MP</td>
<td>2831.8</td>
<td>2.071</td>
<td>5864.7</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>2103.1</td>
<td>1.646</td>
<td>3461.7</td>
</tr>
<tr>
<td>Bihar</td>
<td>1483.0</td>
<td>1.196</td>
<td>1773.6</td>
</tr>
<tr>
<td>Haryana</td>
<td>2303.0</td>
<td>0.581</td>
<td>1338.0</td>
</tr>
<tr>
<td>Gujarat</td>
<td>660.7</td>
<td>0.714</td>
<td>471.7</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>581.1</td>
<td>0.656</td>
<td>380.0</td>
</tr>
<tr>
<td>Karnataka</td>
<td>97.0</td>
<td>0.998</td>
<td>96.8</td>
</tr>
<tr>
<td>Punjab</td>
<td>3444.0</td>
<td>0.241</td>
<td>82.9</td>
</tr>
</tbody>
</table>

7.9.6.10 It will be prudent to launch a well designed farmer-centric compensatory production programme in Bihar, Rajasthan, MP and UP, with priority attention to soil health enhancement and varietal choice.

7.9.6.11 Similarly, there is vast scope for increasing rice production in West Bengal, Assam, Orissa, Andhra Pradesh, Tamil Nadu, Karnataka and even Kerala during the rabi season. The yield of boro rice is high in Assam and West Bengal. Over 27 high yielding rice hybrids are now available to suit different agro-climatic and growing conditions, as well as grain quality requirements. They are from both the public and private sectors. Pusa RH-10 is a superfine, aromatic grain hybrid suitable for cultivation in North-West India. KRH2 is a high yielding and widely adapted hybrid, while DRRH 2 is an early hybrid with a good yield potential. **States with an unutilized yield reserve in their Agricultural Production Bank should be encouraged immediately to initiate action with the guidance of experienced farmers and scientists to utilize the yield reserve wisely to improve production and productivity.** The precise agronomic package will have to be developed on a location specific basis with the help of Agricultural Universities.
7.9.6.12 In the case of wheat, the following nine steps will help to improve wheat production during the 2006-07 rabi season:

- As a result of floods during August / September of 2006, Gujarat, South Rajasthan, Madhya Pradesh and Maharashtra, which account for nearly 7.0 million hectares of land sown to wheat, will need wheat varieties that will mature in 120 days. Farmers would like to sow more wheat due to current ruling prices and availability of good soil moisture. **Preparedness for timely supply of seeds is necessary, along with other inputs.**

- Adequate and timely availability of credit is essential, particularly due to the financial loss suffered during kharif.

- Wheat should be sown before 15 November in NW Plain Zone to get maximum yield and to escape from potential heat stress in March.

- Use of seed drill to capture soil moisture, adopt proper seeding depth and complete sowing in time should be recommended. **Resource conserving tillage agronomy should be subsidized to save water and improve yield.**

- Avoid sowing wheat during late October in the Punjab as such early sown wheat often suffers if temperatures during December are above normal.

- Balanced use of fertilizers including Zinc should be promoted and overuse of urea should be curtailed.

- Pre emergence weed control or a post emergence chemical weed control should be recommended over the Indo-Gangetic plain

- Varietal diversity should be ensured all over the wheat growing region and farmers should grow three of four different varieties to avoid genetic vulnerability to diseases.

- Wherever limited irrigation facility is available, atleast one irrigation around crown root stage / early tillering should be recommended followed by need based weeding and fertilization.
7.9.6.13  **Rabi** and **boro** rice production can be enhanced considerably by giving attention to balanced fertilization, particularly to the supply of the needed micronutrients like zinc, Boron and sulphur. Together with plant protection the enhancement of soil health will help to improve productivity atleast by an additional tonne per hectare. There are nearly 5 million ha under **rabi** and boro rice in the country and improved varieties are available for all the States where rice is cultivated between November and May. Striking progress in improving the yield of rainfed maize, soybean, sorghum, green gram, blackgram, pigeon pea, chickpea, finger millet (ragi), pearl millet (bajra), castor etc., can be achieved through balanced fertilization (NPK and the needed micronutrients). Seeds of improved varieties should be maintained in Village Seed Banks in rainfed areas, so that alternative cropping strategies can be introduced depending upon monsoon behaviour. Improved cultivars alone can enhance productivity by 10 to 50%. Varietal choice should be based on the likely moisture availability. The short duration chickpea variety **Shwetha** (ICCV2) has revolutionized chickpea production in Andhra Pradesh. The productivity increased from 470 kg per ha in 1993 to 1084 kg per ha in 2004. Area also increased seven fold. There are nearly 12 million ha of rice fallows in MP, Orissa, Jharkhand, Chattisgarh and West Bengal. In such rice fallow areas, chickpea can be grown by using residual soil moisture. Simple seed priming technologies like soaking seeds in water and micronutrient solution for 6 hours and drying in shade will help in establishing a good chickpea crop in rice fallows. In Madhya Pradesh 2 million ha remain fallow during the **kharif** season. Using broad bed and furrow, balanced nutrient management and short duration soybean cultivars like Samrat, farmers in the Vidisha district were able to take a crop of chickpea or wheat during **rabi** and thereby double their income. Many such simple steps in soil-water-crop management can lead to major advances in both crop output and farmers’ income. This is the pathway to making farming economically viable.

7.9.6.14  The timely and adequate supply of credit, seeds and electricity, together with addressing the micronutrient deficiencies in the soil will help to offset the loss in production during **kharif**. **Those States which had heeded to the NCF appeal made in**
December 2005 that 2006-07 may be observed as the Year of the Farmer and Agricultural Renewal will be in a much better position to improve rabi production. The 5 pronged strategy recommended then consisted of soil health enhancement, water harvesting and management, credit and insurance, technology and inputs and remunerative marketing.

7.9.6.15 Adaptation to climate change is an urgent task. The Climate Management Unit of the National Rainfed Area Authority should develop computer simulation models of weather behaviour coupled with the public policy and agronomic responses needed to meet diverse possibilities.

Extending the Gains

7.9.6.16 Eastern India (eastern UP, Bihar, Chattisgarh, Orissa, West Bengal, Assam and NE States) have a large untapped production reservoir even with the technologies now available. In these areas, poor water management, rather than water availability, is the major constraint. The Indo-gangetic plains offer scope for becoming the major bread basket of India through an appropriate mix of technology, services and public policies. In many of these areas, the aquifer should be enriched during the S W Monsoon period, and extensive ground water use should be promoted during the October – April period. Given the right strategy, the Ganges Water Machine could become the main anchor for our food security system. Bihar in particular is a sleeping giant in the field of agriculture. The work of IARI in the Dharbhangas district and Sone Command area has shown that the wheat yield can be increased substantially with good seeds and improved agronomic practices. The major bottleneck is however the absence of a Grain Purchasing Machinery which will provide the MSP to farmers.

7.9.6.17 Action to extend the gains of higher productivity and profitability should cover all rainfed areas. This should be a priority task of the National Rainfed Area Authority. The recommendations of the Swaminathan Committee on “More income per drop of water (2006)” should be converted into action plans on a location and farming systems basis.
Making New Gains

7.9.6.18 The immediate prospect for making new gains lies in the areas of post-harvest technology, agro-processing and value addition to primary produce. NCF has made several recommendations in this area in its first four reports. In the longer term, there is need for new yield and quality breakthroughs in major crops through genomics and gene pyramiding. For example, Super Wheats capable of yielding about 8 t/ha are now in the breeders’ assembly line. Such wheats have a complex pedigree and illustrate the importance of genetic resources conservation and exchange.

7.9.6.19 Super Wheats are semi-dwarf with robust stem, broad leaves, large spikes with more number of grains per panicle and more grain weight. The Super Wheat architecture in the breeders’ assembly line, both at CIMMYT and AICWIP, is derived from a blend of Tetrastichon (Yugoslavia), Agrotriticum (Canada), Tetraploid Polonicum (Poland) Gigas (Israel), Morocco wheat (Morocco) and semi-dwarf wheats currently grown in India.

7.9.6.20 We can produce 100 Million t of wheat by 2015, by the following two steps:

- Average yield of 4 t/ha from 25 million ha
- Harnessing the large untapped yield reservoir in eastern, central and western India

7.9.6.21 Every State should develop a detailed agricultural strategy for their major farming zones and systems based on the 3 pronged approach outlined above.

7.9.6.22 Irrigation Water is going to be a serious constraint since as pointed out earlier, ground water is being over exploited. Therefore NCF supports the recommendation of the Swaminathan Committee set up by the Ministry of Water Resources that the Agricultural Year 2007-08 (June 1, 2007 to May 31, 2008) may be observed as “Year of More Crop and Income Per Drop of Water”

7.9.6.23 During this year starting with a kharif of 2007, 5000 Farmer Participatory Action Research Programmes may be initiated throughout the country with the help of appropriate Agricultural Universities, ICAR Research Institutes, ICRISAT and WALMIs.
50 such institutions may be entrusted with the responsibility of organizing jointly with farm families 100 Action Research Programmes each for demonstrating that it is now possible to increase yield and income per drop of water through generating synergy among water, variety, agronomic practices, particularly relating to macro and micronutrients in the soil, and implements. Each programme will cover a minimum of one hectare and will be implemented in a participatory mode, with the farm family having a sense of ownership of the programme.

7.9.6.24 The emphasis will be on rainfed areas where catalytic technological and management interventions will be introduced to make a striking impact. The programme will be so designed that a small Government Project leads to a mass movement in the area of water conservation and use efficiency, as happened in the case of National Demonstrations in Wheat during 1964-65. The economic benefit to the farmer as a result of this programme should be measured. Each Action Research Programme will need about Rs.50,000. Thus the total cost of 5000 Farmer Participatory Action Research Programmes will come to Rs. 25 crores. A well-planned Water Literacy Drive together with the revitalization of traditional systems of water conservation will also be undertaken as a part of this programme. Also, Action Research Projects in irrigated areas will aim at phasing out flood irrigation by the end of the 11th Plan.

7.9.6.25 We urge that such a Farmer Participatory Action Research Programme may be initiated during 2006-07 in arid, semi-arid, hill, coastal and irrigated areas. The necessary financial provisions may be made in the Union Budge for 2007-08.

7.10 Integrated Asset Reform

7.10.1 There is need to complete the unfinished agenda in land reforms. Kerala, West Bengal and now Tamil Nadu have set good examples on the distribution of both ceiling surplus land and appropriate Government land to the landless poor. Tamil Nadu’s recent step in providing 2 acres of land to the landless labour families is commendable. This should be emulated by all States. **We should revive the spirit of Acharya Vinobha Bhave.** In addition, there is need for aquarian reform for the equitable and
efficient utilization of all community and government water bodies. Aquarian reform is also needed in respect of marine fisheries and coastal aquaculture. This should be high on the agenda of the National Fisheries Development Board. Because of population pressure, both land and aquarian reforms alone may not be adequate to provide productive assets. Land and aquarian reforms could form part of an integrated asset reform system designed to provide some productive asset to everyone in the village. Livestock rearing, training in market driven skills or any other form of income security could all form part of an Integrated Asset Reform Policy. Livestock provide good opportunities for strengthening both income and nutrition security. A Livestock Development Council would help to promote integrated attention to all aspects of Livestock Care and Sustainable use. Every Veterinary and Animal Sciences University should establish a Vidya Dairy on the model of the one at Anand, and a Vidya Abattoir to promote the efficient use of the entire animal biomass like skin, bones and blood.

7.11 From Suicide Relief to Suicide Prevention

7.11.1 In the agrarian distress hotspots, there is need for a paradigm shift from “Suicide Relief” to “Life-saving Support”. While immediate relief measures are important, prevention should be the goal. This is the pathway to providing every farm and landless labour family with an opportunity for a productive and healthy life.

7.11.2 The occurrence of farmers’ suicides in several States of the country (particularly Andhra Pradesh, Maharashtra, Karnataka, Kerala and the Punjab), since the year 2000 marks a sad chapter in India’s agricultural history. The extreme step of taking one’s life marks the loss of hope in the prospect for leading a productive and satisfying life. The Farmer suicide tragedy has several dimensions – economic distress and despair, breakdown of social and State support systems and psychological nightmare. The response to this situation has also to be multi-dimensional, with priority going to mitigating economic distress. The various steps taken by Central and State Governments, Prime Minister’s visit to Vidarbha and the different relief packages announced so far have helped to stir hope in the minds of farm families. Nevertheless, farmers’ suicides are continuing.
7.11.3 There is a concern that suicides could lead to socio-cultural changes in our society. For instance, recent research from Oxford University, UK, suggests that imitative suicides occur when suicidal behaviour is portrayed as a natural or understandable response to problems such as financial crisis. Self-poisoning with pesticides account for about a third of all suicides worldwide; hence, the monitoring of pesticide use in the suicide hotspot areas will be useful. The measures to be taken to deal with this situation have been described in the earlier NCF reports. They broadly fall under the following 5 categories:

i. **Saving the Living:** Immediate attention to the livelihood needs of widows and education and employment needs of children should be the first priority. Pain and sorrow can be reduced by the care and concern manifested in the form of concrete action.

ii. **Ending the “debt death”:** Extinguishing bush fires is not enough, but steps are needed to eradicate the causes underlying frequent and continuing bush fires in the form of farmers’ suicides. Immediate action has to be in the form of loan and interest waiver, so that the family again becomes credit worthy. Obviously the loan waiver has to be done with care and after discussion with the affected families and local panchayats.

The debt deaths underline the need for urgent reform of farm credit. China gives loans to farmers at zero percent interest. Obviously, the Government and not the Banks meet the transaction cost. NCF had recommended 4% interest rate based on both government subvention and pruning of all avoidable expenditure by Banks. We are glad that the Centre and State Governments have now arranged to provide credit to farmers at 6 to 7% interest. Further, the credit cycle in drought prone areas should be 4 to 5 years. Also, it should be holistic catering to the needs of farm families for health care, domestic needs and agriculture.

In order to insulate both Banks and farmers from losses, the agricultural insurance system should be revamped and made effective and affordable. Insurance system should cover crop losses arising from both meteorological and marketing factors.
iii. **Strengthening Livelihood and Income Security:** Loans which have led to suicides have often been taken for adopting high cost technology in the expectation that higher returns will be forthcoming. The resource poor farmer has little coping capacity to withstand the shock of crop failure. Similarly, loans have been taken to dig tube wells, which have failed. Technologies should be life-giving and not life-taking. There is need for proper and timely advice on land use planning and choice of technologies. Scientific organic farming will reduce the debt load, because of the substitution of home grown inputs for market purchased ones. Agricultural Universities and Departments have a grave responsibility in this area. Steps to provide crop life saving irrigation need to be stepped up considerably. Remote sensing technology should be used for helping farmers to select sites for digging borewells.

There is also need for providing multiple livelihood opportunities like the rearing of livestock such as dairy cattle, poultry, sheep, goats etc, as well as non-farm occupations in areas such as biomass utilization and post-harvest technology. There has to be an integrated on-farm and non-farm livelihood strategy. Income security largely depends upon output prices and the market. The prices received by farmers for their produce should be at least 50% more than the cost incurred. Low and uncertain returns are among the important causes for farmers’ despair. **As a single step, assured and remunerative prices for farmers’ commodities will help to end the “debt deaths”**. Market reform should be designed to ensure better and more stable income for farm commodities. Central and State Governments and Financial Institutions could establish a **Price Stabilisation Fund** to end distress sales when the crops are good, and where no arrangements exist for providing MSP.

iv. **Life Saving Social Support and Security:** The Gram Sabhas should discuss frequently the economics of farming and methods of avoiding debt deaths. The village communities should strengthen their social support systems, and revive traditional values in terms of support to those suffering from extreme deprivation and distress. Although the joint family system of social support is fast vanishing, the Gram Sabha and Panchayat can develop a **collective security system** designed to prevent suicides.
The Agricultural Universities should form **Hope Generation Teams** to visit and stay for some time in the affected villages and help the farmers in adopting low risk and stable income technologies. At the same time, the Government of India in association with State Governments should develop and introduce a **Social Security System** for farm families, on the lines recommended by the National Commission for Enterprises in the Unorganized Sector. **The other help needed from the Government of India is the undertaking of a livelihood impact analysis of imports and tariff policies.** Policies which are likely to endanger livelihoods should be avoided.

v. **Reinforcing the Psychological Strength:** Youth for Life Corps: There is need for psychosocial measures which will spread the “we shall overcome” spirit. Gyan chaupals can become counseling and hope instilling Centres. A cadre of young women and men who are well versed with counseling procedures, who can help to bring some hope and cheer in the families plunged in darkness and despair, may be formed on the NSS model. **A Youth for Life Corps** should be immediately set up in suicide hotspots by a Consortium of Universities and Social Science Institutions.

7.11.4 An integrated action plan with the above components will help to end suicides related to the agrarian crisis.

7.12 Environmental Sustainability and higher and assured income are the twin urgent needs of Indian agriculture. Our progress in agriculture should be measured not merely by growth rates in production, but also by the growth rate in the real income of farmers. If we are to produce another 100 million tonnes of foodgrains by 2020, we will need the enthusiastic participation of atleast 100 million farmers. They will not produce more if the present uneconomic nature of farming persists. **Ecology and Economics are the twin determinants of the pace of agricultural progress.** While technology is the prime mover of change, technology will succeed in changing our agricultural destiny only if it is environmentally benign and economically viable.

7.13 It would be useful if a comprehensive **Rural-Urban Parity Index** is prepared at the State and district levels in order to help in the continuous refinement of the Bharat
Nirman Programme. If the evolution of rural societies is planned carefully, there will be symbiotic linkages between the village and the town, each enriching the other in both economics and employment opportunities. **Work, water and energy are the key needs of rural India.** The VIth Five Year Plan (1980-85) gave overriding priority to these sectors, together with attention to technology, natural resources conservation, women’s empowerment and enhancement, and remunerative marketing (for the first time, the VIth Plan introduced special Chapters on Environment and Development, Women and Development and a New Deal for the Self-employed). **This strategy resulted in agricultural growth rate (5.7%) exceeding for the first time, the overall GDP growth rate (5.5%)** during the plan period. Thus, given right priorities and strategies, we can accelerate progress both in agricultural growth and agrarian prosperity. It may be useful to revisit the VIth Plan strategies while preparing the XIth Plan.

7.14 Redesignating the Ministry of Agriculture as **Ministry of Agriculture and Farmers’ Welfare** will lead to positive results only if this is accompanied by a structural reorganization. **Leading farmers should be inducted at the senior level in the Ministry for specific tasks and specific periods.** This will help to change the “beneficiary” mindset in agricultural planning to one of regarding farmers as innovators, policy planners and life-givers. Agriculture will then become our nation’s pride and “Jai Kisan” will acquire true meaning and significance.

7.15 **Pan-Government of India Initiatives**

7.15.1 We suggest a **Pan-Government of India Initiative in the areas of food, water and work security and land care during the XIth Plan Period.** A beginning can be made jointly by the Ministries of Agriculture and Rural Development in improving work and income security as well as land care in rural areas through a **Pan Agriculture-Rural Development Programme in the area of skilled and market oriented non-farm employment.** If this does not happen, Jawaharlal Nehru’s statement that “We are a poor people inhabiting a rich country” will continue to remain valid.

7.15.2 We are aware that the culture of a Pan-Government of India coordinated action plan is more easily proposed that accomplished. Necessity is the mother of
invention and we hope that the prevailing widespread agrarian distress, under nutrition and deprivation will lead to the generation of the necessary political will and action, “Where there is a will, there is a way”.

7.15.3 Finally, we urge the Central and State Governments to consider seriously the question of including Agriculture under the Concurrent List in Schedule VII, Article 246 of the Constitution. Important policy decisions like those relating to prices, credit and trade are taken by the Government of India. Also, several pieces of legislation including the Protection of Plant Varieties and Farmers Rights Act, the Biodiversity Act, the Food Bill, etc., are administered by the Government of India. Substantial funds are provided by GoI for rural infrastructure development including irrigation, village roads and markets. By placing agriculture on the Concurrent List, serving farmers and saving farming becomes a joint responsibility of the Centre and States, i.e. a truly national endeavour in raising the morale, prestige and economic well being of our farm women and men.
# Annexure-A

## DETAILS OF TECHNICAL CONSULTATIONS

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# OTHER MEETINGS FOR FEEDBACK ON DRAFT NATIONAL POLICY FOR FARMERS

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## Annexure-D

### TERMS OF REFERENCE COVERAGE IN THE FIVE REPORTS OF THE NATIONAL COMMISSION ON FARMERS

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<td>2.</td>
<td>Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.</td>
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3. Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

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4. Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

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5. Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

A) Comprehensive policy reforms designed to enhance investment in agri-research
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6. Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

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<td>D) Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed</td>
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<td>E) Recommend methods of promoting horizontal integration of vertically structured programmes</td>
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<td>F) Credit-linked insurance schemes which can protect resource poor farm families from unbearable risks</td>
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<td>G) Suggest methods of strengthening and streamlining the National Horticulture Development Board.</td>
<td>First Report</td>
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<td>7. Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.</td>
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<tr>
<td>A) Measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities</td>
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<td>B) Application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery.</td>
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<td>C) Methods of providing adequate protection to farmers from imports when international prices fall sharply.</td>
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<td>8. Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.</td>
<td>First Report Third Report Chapter IV Chapter II, Para 2.11.B.14 - B.20 Annexure 8c</td>
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<td>9. Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.</td>
<td>Third Report Fourth Report Annexure 8a Chapter 3.3</td>
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<td>10. Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.</td>
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ACKNOWLEDGMENTS

The National Commission on Farmers expresses its gratitude to the Hon’ble Union Minister for Agriculture, Food, Public Distribution and Consumer Affairs, Shri Sharad Pawar, for having taken keen interest in the work of the Commission and for providing overall guidance to its activities. Thanks are also due to the Planning Commission and Ministers for Finance, Rural Development and Panchayati Raj and for their valuable suggestions.

The National Commission on Farmers would like to sincerely thank the Chief Ministers of various States and their Ministers for their valuable suggestions. Sincere thanks are also due to the senior Officers of the State Governments for the courtesies shown to the NCF teams and for organizing the interaction with farmers and other stakeholders in the States.

NCF is grateful to Shrimati Sonia Gandhi, former Chairperson and other members of the National Advisory Council, for the opportunity given for presenting the Recommendations of the NCF to NAC.

The Commission would also, in particular, like to thank Shrimati Radha Singh, Secretary, Department of Agriculture & Cooperation, Govt. of India, for assisting the Commission at all stages and making it possible for the Commission to complete its work well within the time allotted to it. The support coming from her senior Officers including Joint Secretary (Policy) in the Department of Agriculture & Cooperation is also gratefully acknowledged. Thanks are due to the various Ministries of the Govt. of India and the National Commission for Women for valuable suggestions.

The entire National Agriculture Research System has actively contributed to the deliberations of the Commission and enriched the quality of its work. Vice Chancellors of the Universities for Agriculture, Animal Husbandry and Fisheries deserve all praise for their support. Private sector R&D institutions have also provided excellent inputs which
are appreciated. The National Commission on Farmers is indebted to a large number of farmers, farmers’ organizations, leaders of political parties, NGOs and individuals for their advice and suggestions, both verbally and in writing. The Commission expresses its sincere thanks to the National Academy of Agricultural Sciences (NAAS) for providing logistical support.

NCF also appreciates the valuable technical inputs from various Experts/Consultants in the formulation of its Report and thanks them for their efforts.

NCF acknowledges the valuable technical contributions by Shri S.S. Prasad, and Shri G.C. Pati, former and present Joint Secretary, Ms Mamta Shankar, Director, Ms R.V. Bhavani, OSD to Chairman and Research Officers: Dr. (Ms.) Laxmi Joshi, Dr. Deepak Rathi, Dr. Pavan Kumar Singh, Dr. Ramesh Singh and the sincere work of Research Assistant, Dr. Prabhu Dayal Chaudhary and the secretarial staff of the Commission in the preparation of the Fifth and Final Report.
“To those who are hungry, God is bread” – Mahatma Gandhi, 1946

“Everything else can wait, but not agriculture”- Jawaharlal Nehru, 1947

Our work during the last two years has been guided by the above words of the architect of our independence on the one hand, and by the prime mover of planned development designed to promote faster economic growth coupled with social and gender equity, on the other. The approach to the XIth Plan is “faster and more inclusive growth”. Obviously this aim should cover 70% of our population, who live in villages and whose major occupation is crop and animal husbandry, fisheries, agro-forestry and agro-processing. The four reports submitted by us since December 2004, all contain concrete suggestions on how this goal can be achieved.

This fifth and final report deals with some of the key issues confronting our farmers and farming such as the economic survival of farmers with small holdings in a globalised economy, shaping the economic destiny of farmers, strengthening the ecological foundations essential for sustainable agriculture, attracting and retaining youth in farming, and restoring the glory of Indian farmers and farming. It presents an action plan for making hunger history. The Revised Draft National Policy for Farmers is submitted separately, based on widespread consultations throughout the country as well as extensive advice received from Central and State Government Departments, farmers, farmers’ organizations, tribal families, women’s organizations, academia, civil society organizations, political parties, panchayat institutions, mass media representatives and individuals.
We are indebted to Shri Sharad Pawar, Union Minister for Agriculture, Food, Public Distribution and Consumer Affairs, for his continuous guidance and encouragement and for being the major source of inspiration in our work.

We have chosen for the cover of this Final Report an extract from the Visitors Book of the National Dairy Research Institute, Bangalore, showing the Father of the Nation identifying himself as a “Farmer”. It is this pride in farming, both as a way of life and means to livelihood that we should revive. This is the pathway to “Purna Swaraj” and this report shows the way.

M S Swaminathan
(Chair)

R B Singh
(Member)

Y C Nanda
(Member)

Atul Sinha
(Member-Secretary)

Atul Kumar Anjan
(Member-Part time)

Jagadish Pradhan
(Member-Part time)

R L Pitale
(Member-Part time)

Chanda Nimbkar
(Member-Part time)
**National Commission on Farmers**

Serving Farmers and Saving Farming

Towards Faster and More Inclusive Growth of Farmers’ Welfare

Fifth Report

VOLUME II

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STATE LEVEL CONSULTATION OF ANDHRA PRADESH FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT HYDERABAD ON 6th JULY, 2006

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Hyderabad on 6th July, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, NCF, Dr. R.B. Singh, Member and Ms. Mamta Shankar, Director, NCF. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. Inaugural Session

At the outset, the Principal Secretary, Agriculture and Horticulture welcomed the NCF team and participants. Commissioner Agriculture made the following points:-

i) Over emphasis on credit without increase in plan budget will not help. Plan expenditure must go up.

ii) Farmers’ voice should be heard on a continuous basis.

iii) Farmers had to pay very large price for transgenic seeds. Knowledge was a public good. Interest of farmers must be protected while pricing the transgenic seeds. New Seeds Act was required with built in flexibility in procedures. ICAR should encourage research in public domain for transgenic seeds. Terminator genes should not be allowed.

iv) The State was facing adverse agro-climatic situation with 70% of its area under rain fed farming and 24% of water obtained from ground water resources. There was a need for increasing productivity in dry lands. Farmers had to be protected and Agro meteorology, with location specific forecasting was very important for
contingency planning for inputs like seeds and fertilizer, at the time of sowing. Remote sensing should be improved; it will provide a wealth of data. There was a need to work out cost benefit ratio for rain fed farming and make it credit worthy.

v) There was a need to focus on obtaining returns commensurate with cost of cultivation and finding markets. Integrated farming should be financed.

vi) In the AP pilot insurance scheme, village was a unit in 5 districts for a single crop and it had helped. This was proposed to be extended in the entire state.

vii) There should be a Price Regulatory Authority for input prices.

viii) There must be subsidy for micronutrients and increase in subsidy for Potassic and Phosphatic fertilizer since these were important inputs.

ix) Large numbers of labs were needed for testing of pesticides.

x) Farm mechanization research was needed.

xi) Validated scientific practice was needed for organic farming.

xii) There was too much confusion in Agri Export Zones Scheme which was mostly operating on papers.

xiii) Education of farmers was a must. At least 30% of the extension workers should be women. Internet, TV etc. must be used for extension.

xiv) After the implementation of the NREGP the cost of labour has gone up in the concerned districts.

3. General Observations and Suggestions

i) There should be a paradigm shift in policy and not patch work through small interventions.

ii) Farmers’ Commission should not be wound up. It should watch the implementation and do evaluation and monitoring to ensure the implementation of Recommendations. Without these activities many good Reports had remained on papers. Jayati Ghosh Commission, Justice Ramachandra Reddy Committee had also made recommendations but no action had been taken.

iii) A farmer should be the co-chair of the NCF and it should have a woman member too.
iv) In 1968, the green revolution was launched with a farmer oriented approach. At present, we were more under the influence of the MNCs and middlemen.

v) The Policy did not spell out lessons drawn from ‘ecological disasters’ and ‘technology fatigues’ during the last 40 years of Green Revolution and steps had to be taken to prevent them. The Policy on the other hand, tries to continue the same framework of more inputs, monocropping, industrial control on inputs and marketing etc.

vi) The Policy tacitly accepted liberalization and privatization adopted in agriculture without analyzing its effects on farmers and it missed on the ways to strengthen farmer centric research system and farmer-centric extension system. Policy should have sustainable vision.

vii) The Policy should aim towards more farmer and knowledge centric planning than input and industry centric planning. Policy should reverse the present trends of corporatizing agriculture.

viii) The process should be handed over to farmers and their organization to discuss and input into the Policy to make it farmer led and more broad based and to address the issue of sustainability and equity.

ix) Draft Policy talked about the need to recognize root causes for farmers’ suicides but it did not talk about fixing liability for mistakes committed. Policies should not be created without accountability.

x) Small farmer/marginal farmer/agricultural labour had to be kept in focus while making recommendations. There was no ground monitoring system. In each state, this should revolve around small farmer needs.

xi) It was a hope generating policy. NCF wording was too soft. It was a feel good document.

xii) NCF had not gone deep into root causes of agrarian crisis. IMF Structural Adjustment Plan included policies like reduction in government expenditure and curtailment of rural credit, winding up of extension, wage restraint on workers etc. These policies worked in the developed countries but had led to adverse impact on Agriculture in several developing countries. They had advised diversification into non-cereal crops leading to food shortages and imports and
thereby leading to external dependence for survival. This had not been nailed down in NCF Reports.

xiii) The Parliament had passed the Fiscal Responsibility Act. Now, World Bank was asking the States to do the same.

xiv) Since 68% of population was in Agriculture, atleast 68% of Budget is to be allocated for agriculture.

xv) Reinvestment surplus was not being generated from farming.

xvi) Scale of farming was too small for mechanization.

xvii) TVE system of China should be followed for rural prosperity.

xviii) No rural youth less than 20 years wanted to remain in farming.

xix) Policies had a pro consumer rather than a pro farmer orientation.

xx) Students should be taught environment and agriculture too, at school stage.

xxi) NREGP should be operated only in off-season.

xxii) Agricultural Workers Bill has been pending in Parliament for too long and should be passed soon.

xxiii) Policy has not said anything for security of landless labourers. Policy should expressly recommend enactment of Comprehensive Agriculture Workers Welfare Act to take care of social security and welfare needs of agricultural workers.

xxiv) NCF should recommend that government should strengthen tenant farmer organizations.

xxv) Data on suicide by women farmers, gender based asset mapping, and women registered under NREGP are necessary.

4. Land

i) Large lands have been given away at throw away price for corporate farming. This would be undesirable.

ii) Land Reforms should be completed and at least 1 acre with assured water supply should be allotted to the landless. There should be asset security.

iii) Conversion of land for real estate was taking place at an unprecedented scale.

iv) Government was not developing rural areas.
v) No investments had been made for land development.
vi) Large Public Investment should be made to make land productive.
vii) Land should be allotted to landless and not given to big firms for growing bio fuels.
viii) Since small holdings had been proved to be more productive, the recommendation in the Draft Policy in favour of land consolidation should be removed.

5. **Livestock**

i) Pastoralists have to make sacrifice for large dams. Agro Biodiversity is also threatened by large dams. Tanks are better in rainfed areas.

ii) Adequate livelihood security of displaced pastoralists should be ensured.

iii) In situ conservation of local breeds should be promoted. Policy of promoting cross breeds is antithetical to the promotion of the local breeds.

iv) Grazing lands should not be used for bio diesel plantation.

v) We do not need off shore genetic centre for screening germplasm. Onshore Centres should be preferable.

vi) Strong public disease management system will better serve the needs of resource poor farmers as compared to agri clinics.

vii) Every farmer should have milch animals to support his income from crops.

viii) Government should provide animals on subsidy to farmers which would also facilitate organic farming.

ix) A milk producer is not getting Rs 18 for one litre of milk whereas bottled water is sold at Rs. 12 per litre.

x) Organic farming is not possible unless dairy development is encouraged.

xi) Livestock rearing should be linked to agriculture in general, not just for ‘organic farming’ since is the only sustainable way forward. Existing livestock Departments should be strengthened, instead of relying on agri-clinics.
6. **Technology, Research Inputs and Extension**

i) Lacunae of green revolution should be removed before going into the second green revolution.

ii) No new technology was needed. Only appropriate policies and funds should be ensured for rural areas.

iii) Scientists should be accountable for wrong advice given to farmers.

iv) Use of term ‘bio security’ was confusing. It should include ‘bio safety’ as understood now in the context of GM crops for protection of health and trade security of the nation. The formulations in the Policy in this regard were inadequate.

v) There was no distinct advantage from GM crops.

vi) There should be a debate on whether we need transgenics which were very costly.

vii) Technology, inputs including seeds incentives etc. should be provided in time.

viii) Bio fertilizers were very costly and needed subsidy.

ix) Our research policy should be Small Farmer/Marginal Farmer oriented.

x) Better audio visual aids for organic farmers were needed.

xi) Organic farming saves land and water and a special package was needed for its promotion.

xii) Organic farming should be provided by formulating a package of practices.

xiii) At least 30% subsidy for organic inputs was required besides seeds which were subsidized.

xiv) There should be social control on research.

xv) Public domain research was a must.

xvi) Seed Act 2004 was in favour of the corporate sector. No protection to farmers from spurious seeds or high prices was provided.

xvii) SHGs should grow their own seeds. They needed a lot of capacity building.

xviii) Land to lab transfer of technologies was also required. Universities should learn from success stories in rural areas.

xix) There should be research on impact of Bt cotton crop residues – we should have precautionary principle in place.
xx) There should be price control on seeds.
xxi) Farmers face difficulties in approaching Consumer Courts and producing evidence when they had complaints against seed quality.
xxii) More stress should be given to technology acceptable to farmer.
xxiii) Research should clearly indicate the income it will give to the farmer.
xxiv) Many suicide cases were due to lack of access to correct knowledge and correct inputs.
xxv) Policy should allow full freedom to farmer to decide his technology.
xxvi) Seed issues were not dealt with adequately- Government should have a central role for this vital input.
xxvii) Extension services needed to be strengthened in the State and soil testing had to be conducted in almost every land holding.
xxviii) Certified seeds should be supplied to the farmers in time.
xxix) Private research claims should be verified and advised to farmer.
xxx) We should promote organic farming as is done in Uttaranchal. Every farmer should have livestock, horticulture along with agriculture.
xxxi) There was a need for shifting to organic farming in chemical fertilizer intensive areas.
xxxii) Vermi-compost should be prepared on a large scale and subsidy should be given to the farmers for its use to popularize it.
xxxiii) Central Government should take into consideration the cost of all inputs while deciding and fixing prices of commodities/produce.
xxxiv) Seeds, which were resistant to unfavourable seasonal conditions should be developed.
xxxv) Groundnut resistant to pests should be developed.
xxxvi) Research has to be conducted on wilt pest.
xxxvii) Horticulture crops have to be developed.
xxxviii) Before another green revolution is attempted, the existing government staff should be reshuffled.
xxxix) Inputs such as seeds and fertilizers should be provided in time.
Hybrid paddy could be grown with the use of chemical fertilizer if necessary with the help of banks.

7. **Credit and Insurance**

i) Section on credit and insurance does not talk about the need for reducing credit for agriculture through appropriate technology and other means. Agriculture technology has become a profit-earning tool for private enterprise at the expense of farmers. Need for such inputs should be questioned.

ii) Since Government is not providing sufficient assistance to farmers for rainfed crops, agriculture has become a gamble for the farmer and he gets trapped in debt.

iii) Farmers have no other choice but to approach private money lender since banks are not providing adequate finance for Agriculture.

iv) Farmer has to go to the moneylender for his other needs too, and later commits suicide since the returns from agriculture are minimal. Drought also exacerbates the problem.

v) Rescheduling of loan, as worked out in the relevant RBI circular, is ineffective because of large interest burdens. On rescheduling of loans a farmer borrowing Rs. 10,000/- is required to pay more than Rs. 27,000. Only 35-40% loans are rescheduled and compound interest is charged by banks.

vi) Mere rescheduling of loans was not sufficient. Whenever required, a critical analysis of reasons and the methodology had to be developed, so that the farmer could come out of the debt trap.

vii) People who had suffered drought for 5 years should have their loans written off. Private debts do not get rescheduled or written off. These debts should be waived.

viii) Rs.3000 crores of non-performing assets have been written off for industrial borrowers but a similar facility is not being provided to poor farmers.

ix) Every farmer/ labourer should be adopted by a financial institution.

x) Under Usurious Loans Act, banks cannot charge more than 9%. Banks are however charging excessive interest.
xi) Banks are not achieving 19% agriculture lending target under Priority Sector lending.

xii) It was time to introduce the concept of a production budget.

xiii) Our Embassies should identify export potential and the information should be passed on to the farmers along with quality requirements.

xiv) Farmer expenditure had increased geometrically but income have been growing arithmetically, only.

xv) Farmer has to pay stamp duty which should be reduced. Mortgage should be created on a declaration given by the farmer.

xvi) Government should waive stamp duty for farmers.

xvii) Credit requirement should be worked out for family and should be given to them as term loan for 5 years so that one crop failure and default of short-term installment loan does not derail him.

xviii) We need assured credit flow even for tenant farmers at 3 per cent interest.

xix) “Raithu Mitra” scheme to help tenant farmers is unique for AP based on self declaration.

xx) Farmers should be provided credit at 4 per cent simple interest by all banks i.e. nationalized, cooperative and regional rural banks.

xxi) Insurance premium should be borne by the Government.

xxii) Every farmer should get compensation in use of natural calamity/crop failure. Farmer should be the unit of crop insurance.

xxiii) The norms governing relief from natural calamity should be relaxed as and when required, particularly when crops are affected by repeated adverse weather conditions. Farmers should be provided with subsidy for payment of insurance premium. Comprehensive insurance should be provided to the farmer.

xxiv) A “Farmer Welfare Fund” may be created for the welfare of farmers and provide social security to all categories of farmers i.e. horticulturists etc.

xxv) National Agriculture Insurance Scheme is not responsive to the losses of the farmers.

xxvi) Even though government is collecting cess for land, it is not providing any financial help.
xxvii) It is necessary that farmer is provided social security since he is providing food security to the nation.

xxviii) It is necessary to provide insurance for failed bore wells. Government should create awareness about bore wells and insurance together.

xxix) Insurance claims should be paid immediately. The evaluation procedures are too long.

xxx) Crop insurance should be more friendly to the farmer.

8. Marketing, Distribution and trade

i) All suicides have taken place in the cotton belt. Cotton area went up due to higher international prices until 1977 after which there was a 55% decline in cotton prices. Policies of Government of India were framed in the interest of the textile industry. Liberalization of cotton imports led to depressed prices and ruining of farmers.

ii) DOHA Round will be damaging to the Indian farmer.

iii) We should have “variable custom duties structure” - but it was not implemented.

iv) Agricultural subsidy was reduced in 1991 and should be increased up to 10% as permitted by WTO.

v) Farmers who have provided food to the country have no food security for themselves.

vi) Mission statement should also include promotion of national food security in view of an unequal trade policy.

vii) Imports of edible oil were made without checking the domestic production. Imports should be decreased to protect the interest of farmers.

viii) ITO should be set up.

ix) Policy talked of opportunities available for external agricultural trade without specifying these opportunities.

x) Farmers were not getting benefit of support price since they had already sold their produce to middlemen for buying inputs.

xi) Govt. should announce “Remunerative Price” and not “Minimum Price” and Govt. should buy at least 50% of produce.
xii) Recommendation for contract farming should be withdrawn. The experience of contract farming in Kuppam in AP had not been good. Government should be the third party in contract farming – Govt. must arbitrate. Unless bona fides of contracting firms were established, Govt. should have a third party role.

xiii) Farmers were not getting premium price for organic produce.

xiv) The details of Price Stabilization Fund like its size and conditions under which Govt. will decide to intervene and the institutional mechanism for implementation were not spelt out. Input prices also needed to be regulated. Besides, farmer should get a fair share of the consumer prices after covering his cost of production.

xv) Millet etc. should be included in PDS. PDS should be strengthened. Farmers should be protected as consumers. Food quality and food assurance had to be ensured.

xvi) No one in mandi bothered about farmers. The staff should assess likely arrivals and make suitable arrangement.

xvii) NDDB model was suitable for domestic markets.

xviii) Cooperative service system could be very helpful instead of contract farming.

xix) Millets etc should be brought under MSP.

xx) Middlemen should be avoided in the marketing system and farmers should be provided with MSP support for their crops.

xxi) Farmers should be ensured with reasonable price for their produce through promotion of exports and by constructing cold storage/godowns.

xxii) Government should provide MSP support along with market intelligence.

xxiii) There were serious concerns in farmers’ bodies on several changes proposed in APMC Act. Hence it could not be called farmer-friendly.

9. **Dry Land Farming**

i) All manure is going into irrigated areas and no soil enrichment of dry land is taking place.

ii) Big dams are necessary – There is no alternative for achieving higher production – We should not allow our river water to go to the sea.
iii) Mixed crops are very useful in dry land areas.
iv) Although soil fertility is very important, Soil testing is negligible.
v) Policy should specifically talk about a Separate Policy for rainfed areas and farmers there.
vi) The Policy should pay special attention to rainfed farming and support system required for these regions. It should promote eco-technologies and not genetic engineering as alternative paradigm.

10. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF ASSAM AND NORTH-EASTERN STATES FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT GUWAHATI ON 8th SEPTEMBER 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Guwahati on 8th September 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member and Ms. R.V. Bhavani, Director (Tech.). Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) There should be a separate section on the Northeast.

ii) The definition of farmers should include those engaged in Piggery. Pigs in Assam are not reared by scavengers as mentioned in 3.5.14.0. Duck farming is also important in Assam.

iii) Assam should be included among the goat producing States of India.

iv) There should be State and district level awards for outstanding farmers.

v) Farmers should get representation on policy making bodies.

vi) The closed season allowance for fishers should be at least Rs.2000/- p.m. and should also apply to farmers during drought period.

vii) Forest policy must be coordinated with agriculture policy.

viii) All districts in the Northeast should come under NREGP.

ix) Interests of farmers should be the prime consideration in promoting crops; Oil
palm has no prospect in Assam but was suggested for promotion whereas rapeseed and mustard which are popular among poor farmers are not encouraged.

x) Roadside and homestead planting of fruit trees must be promoted to promote nutrition.

xi) Each district should have an Agricultural Park based on cluster village approach, with facilities for processing and market linkages.

3. **Land**

i) Wasteland should be allotted to small and marginal farmers and women farmers.

ii) Jhum cultivation needs support.

iii) 20 ha land is needed for sanction of micro irrigation projects – not feasible in hilly States.

iv) Embankments should be removed to ensure that all agricultural land becomes levelled.

v) Penalty should be levied on encroachment of cultivable land.

vi) For a farmer, losing his land is like losing a family member. Loss of farmland due to severe flood and erosion should be eligible for compensation.

4. **Water**

i) Hill areas need mobile HP motor that can be moved from one place to another.

ii) There are many incomplete projects in the region.

iii) The waters of the Brahmaputra should be properly harnessed with dams at various levels to address the problems of flood and drought.

iv) Many farmers are affected by arsenic/fluoride poisoning of water.

v) ‘Beels’ (water bodies) should be renovated for water harvesting and promotion of fish culture.

vi) National Rainfed Area Authority must include programmes for high rainfall areas also.

vii) Construction of tank should be in the farmer’s field under community management for irrigation water and fishery.
viii) Watershed management should address siltation not only in the river bed but also in the natural water body.

5. Livestock

i) Fodder Banks should be setup to reduce high cost of animal feed.

ii) Dairy marketing needs attention; NDDB should be requested to setup a State office in Assam.

iii) Disease control measures have to be properly implemented. Vaccines are in shortage.

iv) Non-availability of suitable germplasm is a problem.

v) A mission mode approach is needed for livestock development.

vi) There is no compensation for an animal’s death.

vii) FCI should procure animal feed ingredients at places of production and allocate to feed compounding units/farmers.

viii) Locally available feed ingredients should be incorporated where possible.

ix) Artificial insemination with selective breeding should be undertaken for upgradation of indigenous germplasm.

x) Organizational mechanism has to be developed for research support to livestock sector.

xi) Burning of cowdung should be prohibited and it should be used as manure in gobar gas plant.

xii) There should be ‘Pashu Vigyan Kendra’, on the lines of ‘Krishi Vigyan Kendra’, wherever livestock is the predominant activity.

xiii) There should be animal Quarantine Certification Station in the NE, especially because of the international porous borders.

xiv) Farm School for dairy farmers is also a necessity.

xv) Cattle transport to the NE is banned by the railways. But their induction is important for cattle breeding to improve productivity.

xvi) Restrictions on grazing and camping in wildlife sanctuaries is necessary as control of diseases of wild animals and birds is difficult. Modify 4.8.4 accordingly.
xvii) Breed conservation – modify – “users group may decide to keep only **accredited breeding males** (instead of certain) and those could be used on payment basis.[ Para 3.5.8.0 in Draft National Policy for Farmers]

xviii) Parent farms of high quality livestock and poultry seeds should be established

xix) Guidelines under the Indian Veterinary Council Act should be the basis for training for para-veterinarians.

xx) A Regional Lab and Gene Bank under the National Bureau of Animal Genetic Resources should be setup in NE India, to facilitate characterization and conservation of the indigenous germplasm in this part of the country, e.g. swamp buffalo, Nageswari duck, Pati duck, Miri poultry, Assam local goat and pig, etc.

6. **Research Technology & Training**

i) Opportunities for farmers to visit farms in other states and countries to learn better techniques, will motivate them.

ii) Greenhouses do not have facility for monitoring temperature.

iii) Horticulture should have support of drip irrigation facility.

iv) Technical advice for handling pest/insect attack is not forthcoming; e.g. bacterial wilt attack on ginger; insect attack on mushroom during peak summer.

v) Location specific cropping systems research is needed.

vi) Tripura needs an Agricultural University/College for effective extension.

vii) Schemes should be formulated according to local climate and farmers’ needs instead of centrally recommended uniform scheme.

viii) Change in mindset is needed. Technical extension has to be handled by technical people in participatory manner.

ix) An inventory of extant indigenous technologies should be built.

x) Community Information Centres can play an important role in cross learning from local experiences and other parts of India.

xi) Research institutes should focus on developing low cost implements, harnessing effective indigenous technologies
xii) Horticulture and Agro-processing research and training institute is a must in the region.

xiii) KVK may be developed to offer residential training courses by adopting the approach of ‘Earn while you Learn’.

xiv) Sons and daughters of farmers need reservation for admission in Agricultural colleges.

xv) 75% of ICAR research should be on farmers’ fields.

7. **Credit & Insurance**

i) Joint patta will not resolve problems of landless for credit. They should get funding support for training.

ii) Rate of interest on Kisan Credit Cards is very high.

iii) All farmers should be covered under crop insurance not just those who have taken loans.

iv) Rate of interest should be 3% in the NE due to greater hardships faced in the region.

v) The Cooperative credit structure should be revived.

vi) Bank credit is not forthcoming even on proposals passed by the Horticulture Department.

vii) There should be insurance support for crops and animals affected by natural calamities.

viii) Cooperative banks need support from government to comply with requirements under section 11. They do not get any refinance from NABARD.

ix) The functioning of the banking system should be reviewed and rectified.

x) Farmers need health insurance; A Policy on the lines of ‘Employees State Insurance Scheme’, has to be adopted.

8. **Market & Price**

i) Orchid production should be commercialized.

ii) Farmers don’t get the right price for vegetables.
iii) There should be a ‘Terminal Market’ at Guwahati to promote direct farmer sale.
iv) There should be a separate Regional Master Plan for market development in the NER integrating them with the market in SE Asia.
v) Lack of cold storage facilities and well-equipped carriage vans hampers border trade with Tibet/China, which can yield good returns.
vi) Sikkim should be declared Organic State and export market developed.
vii) New crops are being introduced under the Technology Mission, but the markets are not being identified and developed.
viii) There should be community cooperatives at Panchayat level to prevent distress sale.
ix) FCI is not buying any produce from the NE.
x) MSP has no meaning to farmers in Assam, as their cost of production is high.
xi) Contract farming of poultry and feed ingredients maybe promoted, especially maize and sweet potato.
xii) Producer companies on the lines of NDDB’s SAFAL should be promoted.
xiii) Price of tea is determined by the international market. Small tea growers need a price stabilization fund to protect them from fluctuations.
xiv) Commercial floriculture under Public Private Partnership [PPP] model can be promoted among urban growers organized into groups, like the women farmers’ groups in Mizoram.

9. **Fisheries**

i) Many fish are coming from outside Assam. Inbreeding hampers production of indigenous species and should be addressed. ICAR should undertake an impact study on effect of introduction of exotic species from Bangladesh and Myanmar, like Thailand Magur, Big Head etc.

ii) Pisciculture should be promoted through long lease of the water bodies.

iii) NFDB should have two wings – Fresh Water and Salt Water. The Centre for Fresh Water should be located in Assam.

iv) Forest fishery, which covers an area of 5017 ha, offers ideal sites for in situ
conservation of fish germplasm. This can be done through farmers’ participatory approach by the Fishery Department, if standing Forest Acts are suitably amended.

v) Identified natural bodies under forest area should be declared ‘fish sanctuary’, for in-situ conservation of fish germplasm of the region.

10. Agriculture

i) This is a branch of sericulture with lot of potential. No killing of the silkworm is entailed. So it can be widely encouraged.

ii) At present there is no policy for plantation for this purpose and women have to go to the forest to collect leaves for feeding.

iii) Women SHGs can be promoted to rear cocoon and reel silk. At present there is no reeling unit.

iv) The manufacturers have a problem of capital to purchase yarn. There should be yarn banks.

v) Farmers end up selling at low rates to buyers from outside the region.

11. Labour & Inputs

i) Cost of labour is very high and unviable to employ. (Rs.100/- for women & Rs. 150/- for male).

ii) Quality seed supply is a constraint.

iii) Gaon Panchayat Somobai Samiti used to supply all agricultural inputs earlier. These maybe revived and linked with the VKC movement.

iv) Farm inputs should be supplied at subsidized rate; seed, fertilizer, plant protection chemicals.

v) Seed banks should be promoted for maintaining right variety and quality of seeds and ensure availability during calamities.

12. Dissemination

i) Central Govt. Websites should be in local language.

ii) Information kiosks should be promoted.
iii) There should be a conscious policy to shift population to non-farm activities.

iv) Farmers in the region need special consideration like in the Vidharbha.

13. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF BIHAR FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT PATNA ON 12th JULY, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Patna on 12th July, 2006. The NCF was represented by Shri Y.C. Nanda, Member, Dr. R.B. Singh, Member and Dr. Ramesh Singh, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) It was good to note that the draft policy was in favour of small and marginal farmers as about 80% of the farmers of Bihar fell in the above categories.

ii) Non farm activities in rural areas are almost extinct with the result that there were very little employment opportunities outside agriculture. This is one of the important reasons for migration of rural people to urban areas.

iii) Timely availability of fertilizers, seeds and irrigation water were the major problems.

iv) In some areas, rearing of goats has become a profitable occupation for rural people.

v) Bihar should get the status of most favoured State regarding institutional support and infrastructure development.

vi) There is a lack of transparency in sale of seeds by Government/cooperative agencies.

vii) At present, most of the farming related work is handled by comparatively elderly people or those young men and women who are unable to migrate from their villages.
viii) It was reported that about 50% work of agriculture was done by the women; they should be given special treatment by formation of women group. This would lead to capacity building, skill development and general upliftment of women in the rural areas.

3. **Soil Health Care**

i) Soil testing facilities are poor. There is need for assessing the micro-nutrient deficiencies of soil. All farmers should be issued soil health cards.

4. **Irrigation**

i) Farmers are spending major part of their resources on irrigation.

ii) Community based common irrigation sources should be developed.

iii) Rejuvenation and maintenance of existing water bodies was important and should be given high priority.

5. **Research, Technology & Extension**

i) Agricultural scientists should visit the farmers’ fields more frequently.

ii) In Bihar, the crops like maize and rice had potential for increasing income of the farmers.

iii) KVKs should support Litchi and Mango growers to make Bihar the Litchi and the Mango State of India.

iv) Rejuvenation of old orchards should be given higher priority over plantation of new horticulture farms.

v) KVKs should provide custom hiring of harvesters to the farmers for harvest of crops to ensure timeliness in sowing of next crop.

vi) Farmers should be trained in nursery management.

vii) Government should have a plan for distribution of tree plants to farmers at nominal prices so that they take interest in planting trees.

viii) There is a need for different cropping pattern to suit irrigated and dry areas of the State.

ix) Traditional crops were important to provide livelihood security to the rural poor.
x) Agriculture should not be treated only as a State subject.

xi) Gyan Choupals should be established at least in every Panchayat at the earliest. These should serve as single window information source and should impart literacy regarding credit, insurance, trade and quality.

6. **Credit and Insurance**

i) Banks ignore farmers in general and the small and marginal farmers in particular for providing credit. Their focus is on financing bigger farmers who have better repaying capacity and collaterals to offer against their loans.

ii) Professional moneylenders provide loans to farmers at a very high interest rate i.e., around 4% per month.

iii) A high percentage of loans for installation of tubewells are misutilised for consumption purposes.

iv) NABARD should do direct financing

v) Outreach and quality of credit must be improved. Inefficiencies of the delivery system should not be loaded on the farmers. The State Government should also support the banks in delivery/recovery of credit from farmers.

vi) Farmers do not have recurrent monthly income. Larger farmers also face temporary cash shortages, therefore, the banks should also provide consumption loans subject to the repaying capacity of the farmers.

vii) There is need for upscaling the professional knowledge and managerial skills of the staff of the cooperative banks.

viii) Pledge loans should be provided by banks to prevent “distress sale” by the farmers.

ix) It is well known that agriculture is high risk activity and the crop insurance is the only solution to save the farmers from distress. At present, the matters regarding assessment of loss and settlement of claims under the crop insurance scheme are not satisfactory.

x) The assessment of damage to crop is based on average yield in the Mandal and not on the basis of the yield in the farmers’ field who had taken the crop insurance cover. Further, the crop insurance as in operation now, mainly protects
the bank and not the farmer. The insurance system needs reform and insurance policies which cater to multiple needs of farmers (production, health, accident etc) need to be developed. Farmer friendly cattle insurance is also important.

7. **Market and Investment**

i) Need for formation of farmers’ groups in large number for input delivery and marketing of produce.

ii) Marketing of agricultural produce should be done by the farmers’ groups on the pattern of NDDB.

iii) Increase in farmers’ income is most important and for that assured market is essential.

iv) Storage facilities should be provided to farmers at concessional rates so that the farmers could keep their produce till prices improve.

v) Diesel subsidy upto 50% should be given to the farmers to reduce the input cost of cultivation.

8. **Observations made by Dr. H. P. Singh, Vice Chancellor, Bihar Agricultural University, Pusa**

Dr. H.P. Singh, Vice Chancellor, Bihar Agricultural University, Pusa, who was appointed by the Government as the nodal point for the Consultation, highlighted the following recent agricultural trends in Bihar:

i) Integrated farming should be promoted as per the need of specific locations – a mechanism for minimizing the risk from natural disasters occurring frequently in the State.

ii) On the principle of “Build, Operate and Transfer” (BOT), the Government should provide post harvest and value addition facilities to rural entrepreneurs for prevention of post harvest losses as well as for providing employment opportunities in rural areas.

iii) While promoting integrated farming, among crops, sugarcane, maize, rice, oilseeds and pulses should get high priority. Among livestock, buffaloes should be given greater attention than in the past. With the success of SUDHA Dairy –
based on the NDDB Model – the livestock sector has high growth potential and income generation by the farmers. Honey production is also being attached with SUDHA Model.

iv) On the pattern of Nalanda, the Pusa Complex, Samastipur, should be declared as a National Heritage site and a National Museum for farmers and others should be established involving the activities of the University as well as of the IARI’s Regional Research Station at Pusa – established more than 100 years ago as the first scientific agricultural research centre in the country. The Museum should also exhibit the rich genetic resources and indigenous knowledge of Bihar.

v) The State has already established the Bihar Farmers’ Commission, chaired by Shri Ramadhar (Retired IAS) and a former FAO officer.

9. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF CHHATISGARH FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT RAIPUR ON 8th AUGUST, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Raipur on 8th August, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member and Dr. Prabhu Dayal Choudhary, Research Assistant. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

1.2 Agriculture Production Commissioner, Govt. of Chhatisgarh, welcomed the participants and explained the importance of farmers’ welfare and development for Chhatisgarh. The State has about 50% area under forest and 72% of farmers belong to small and marginal category. Only 27% of land is irrigated. Most of the land is under single cropping. Paddy is grown in about 30 lakh ha. of area which is mostly single cropped area. State Government’s priority to cover at least one third of this area under double cropping in rabi was highlighted.

1.3 Hon’ble Minister of Agriculture, Govt. of Chhatisgarh in his remarks highlighted the following factors essential for improving economic condition of farmers:

i) Availability of electricity for agriculture.

ii) Bank Credit with interest @ 7% to the farmers.

iii) More farmers are adopting organic farming in view of rise in input cost. Hence steps are being taken to facilitate organic farming by having a certifying agency at State level apart from other measures.
iv) Schemes for increasing irrigated areas through new projects, drip and sprinkler irrigation projects were emphasized and the farmers of the State were adopting these in a big way.

2. **General Observations and Suggestions**

i) Dignity of the farmers was a major issue according to some farmers. Agriculture should be commercialized so that young persons are attracted to it.

ii) Electricity tariff for using implements for animal husbandry and fisheries was higher than the rate applicable for agriculture in Chhatisgarh. Electricity Regulatory Commission had stipulated a higher tariff for “high-tech agriculture” compared to agriculture. This will discourage horticulture, pisciculture and other forms of agriculture that can yield higher farm income.

iii) Social audit of programmes and schemes being implemented by Govt at Gram Panchayat or village level should be taken up. The schemes were generally not benefitting farmers.

iv) Fake farmers grabbing land for “Farm house” should be taken to task by Income Tax Department since they were showing large income for agriculture without cultivating any land.

v) Small/ marginal farmers were facing difficulties since they could not engage agriculture workers and their income was less than landless agriculture workers due to high wages.

vi) Impact of sponge iron plants on neighboring farms was adverse. The units were not operating ESP to control pollution. Pollution norms be strictly enforced since it is adversely affecting environment.

vii) The benefit of 25% subsidy from State Government was not benefiting farmers since the concerned items were priced higher by about 15-20%.

viii) Local crops and coarse grains produced by farmers should be given priority for procurement under MSP operation and PDS and local aromatic rice should be procured at a higher price under MSP.

ix) There was need to associate Panchayats in agriculture and to encourage agro and food processing industries for improving income of farmers.
3. Land
i) Diversion of agricultural land in areas where urbanization was taking place should be discouraged.

ii) The ceiling surplus land was being acquired by Govt. without any compensation. The farmer should be compensated. When industries were not subject to any land ceiling, why should it be applicable to farmers?

iii) Because of theft and mischief by the villagers, land was sometime being kept fallow by farmers.

iv) Govt. land, which was used as passage/road to the farmers was being encroached. Hence it is not possible to adopt mechanized spraying and other operations which were necessary for high-tech farming.

v) Consolidation of landholding through mutual transfer among farmers may be encouraged as a policy. For this purpose, the stamp duty at concessional rate should be levied by State Govt.

vi) Survey of soil condition all over State be taken up to monitor soil health and to determine proper and balanced application of fertilizer.

4. Water
i) The women & tribal farmers emphasized inadequate irrigation facility which should be increased through small projects like cross-check dams on nullas.

ii) Water distribution as per practices under CADA should be ensured in irrigated land.

iii) The rainwater harvesting techniques and percolation tanks constructed by the farmers have improved water availability for farming. But it needs investment and is difficult for small farmers.

iv) Irrigation ponds and bunds should be protected from encroachment by mischievous elements and these should be maintained with help of local administration.

v) Water Management system in watershed areas involving Farmers’ Committee be encouraged.
vi) Minimum distance between two tubewells should not be insisted upon since it prevents poor farmers from having access to water.

vii) Chhatisgarh in spite of heavy rainfall and number of rivers has highly inadequate irrigation facilities. Bigger irrigation projects be constructed on rivers.

viii) Advice for sowing ‘suryamukhi’ was given by Agriculture Deptt. but in the last two months, the irrigation water was stopped by Irrigation Deptt. There should be coordination between extension agencies and Irrigation Deptts.

ix) In absence of proper water management system, no diversification from paddy is possible. Chhatisgarh Govt has enacted law for formation of water users’ committees, which would regulate and ensure proper water management system. It is being implemented in a phased manner.

5. Technology / Extension/Research

i) The livestock policy to improve indigenous milch animals was adopted by the State Government. Farmers can choose type of frozen semen as per their need. Local ‘Sahiwal’ cow can yield 15-16 litres of milk and it can be upgraded to 25 litres with frozen semen from improved Sahiwal bulls.

ii) Only about 15% of agriculture extension staff were capable of giving quality advice and extension service to farmers. They need refresher training. Conscious farmers may work for extension of technology in rural areas.

iii) Technology backup for recycling of agriculture waste, as fodder is inadequate and the same was not available to farmers.

iv) Potato seed is not available and was costlier in Raipur since production facility was not available in the State.

v) School teacher may teach agriculture practices to students. This was not being done. The school curriculum may be modified to include agriculture.

vi) Subsidy on improved implements, irrigation works, to the extent of 50% be made available to the farmers for adopting hi-tech agriculture.

vii) Farmers should be taken into confidence by Government while implementing projects/ schemes.
viii) Agro forestry in suitable areas may be taken up for benefit of farmers particularly in highland areas to optimize farm income. In some villages bamboo plantation had been taken up by the farmers profitably.

ix) A small land holding of 4.7 acres was used for fish seed production, horticulture and animal husbandry by a farmer to get good income with minimum investment.

x) No ICAR institution was available in Chhatisgarh, hampering research activities in the State.

xi) The quality and quantity of technology developed and extent of its adoption should be examined. The inadequacies should be studied.

6. Quality seed and Inputs

i) Facility of natural breeding for milch animals be given in the villages for improving the quality of indigenous cattle.

ii) Livestock was adversely affected due to inadequate pasture land.

iii) Use of organic fertilizer and waste products should be encouraged by Government for use by farmers.

iv) Availability of quality milk animals/ poultry at a reasonable rate with Government assistance was necessary for livestock development.

v) Timely availability of seed inputs and coordination between agriculture scientists and Agriculture Department was necessary for improving productivity.

vi) Cost of pesticides and agro chemicals varies from company to company and the farmers were sometimes misled/ cheated. Uniform price of pesticide should be adopted. There was a need for regulating the price and quality of pesticide/ agro-chemicals.

vii) Punishment for selling spurious fertilizers and pesticides should be more stringent. The culprits were charged under 420 IPC and they were mostly getting away with lighter punishment.

viii) Subsidy in fertilizer was given mostly to the manufacturers. For organic fertilizers, no subsidy was available.
7. Credit & Insurance

i) Central Government’s help to State to extend credit to farmers @ 7% p.a through cooperatives was required. This had not been possible so far in view of the three tiers in the cooperative system with margins to be provided at each level.

ii) A number of farmers complained that adequate credit was not available from banks even after mortgaging costly land.

iii) Complicated procedures laid down by the Banks for availing credit were difficult for the farmers to comply.

iv) Procedure for assessing crop loss for crop insurance was not transparent. The system was faulty and not beneficial to farmers.

v) Premium for crop insurance had been increased substantially beyond farmers capacity to pay. For “Arhar,” 19% premium fixed was not viable for the farmers. As a result the coverage of farmers under crop insurance was not satisfactory.

vi) For crop insurance, village should be the unit instead of “tehsil”.

vii) No relaxation was being extended by bank for restructuring of loan of farmers when it becomes a non performing asset due to natural calamities. Waiver of loan/reduction of interest was not necessary. But timely action to restructure loan when required and adequate credit would largely mitigate the problems faced by farmers.

viii) Emergency consumption loan may be considered for farmers against paddy stock to avoid distress sale when there was slump in the market.

ix) Interest holiday to farmers like “tax holiday” being extended to the industries should be considered by Government.

x) OTS facility be extended by NABARD for agricultural loan taken by farmers from Banks/Cooperatives.

xi) For better access to credit, women farmers be organized as SHG so that the Banks will be encouraged to give loan to the SHGs since recovery of SHG loan is about 98%.
xii) Effective interest rate for agriculture loan from cooperatives in Chhatisgarh is 11% instead of 9% since farmer has to give 15% of loan as share capital without any return, effectively increasing interest rate.

xiii) Warehousing facility was mostly available near urban areas but not in rural areas. Loan against warehouse receipt should be available to the farmers.

xiv) Information to farmers about different insurance schemes is not adequate.

8. **Marketing**

i) Most of the farmers had no access to market and depended on middlemen/dalals who decide the price deriving substantial profit and preventing farmers from getting remunerative price.

ii) Training programmes conducted by Government on agriculture/cropping did not highlight the problems of marketing. Extension machinery did not have an understanding of markets for explaining to the farmers.

iii) No processing facilities were available due to inadequate infrastructure and the benefit of processing of agro products was going mostly to the traders and not to the farmers.

iv) Organic farming/produce cannot be sold in cities due to inadequate facilities like a certifying agency in the State. Chhatisgarh Government is discussing with APEDA to have a certifying agency set up at Raipur.

v) MSP for paddy was increased only by Rs. 10/- per quintal last year which is negligible compared to increase in the cost of input. The basis for deciding MSP is not transparent.

vi) Prices received by farmer were not remunerative. Even a graduate farmer with 12 acres of irrigated land farming for 20 years has left it this year due to increased cost compared to the prices of produce.

vii) “Mandis”/markets for agriculture should be well equipped and connected with other markets to maximize returns to farmers.

viii) Three tier cooperative marketing structure as in case of marketing of milk (NDDB pattern) may be implemented associating the farmers.
9. **Suggestions made by the State Government**

The State Government stressed that in view of rain-fed rice cultivation, there was water stress at different growth stages in rice and water logging in the initial vegetative stages of every crop. Rain water harvesting and recycling and crop diversification in fragile rice growing environment was, therefore, necessary. *Biasi* system of rice cultivation in Chhatisgarh has been prevalent since a very long time and in view of the agro climatic conditions, it cannot be replaced easily. It has inherent defects – high seed rate, greater water loss through percolation leading to drought at terminal stage etc. *Biasi* operations cannot be done without standing water of at least 5 cm depth. The general definition for drought did not apply to rain-fed rice under the *biasi* system and hence Chhatisgarh does not get full benefit of drought relief. Farmers have low risk bearing capacity in view of mono cropping in the light of agro climatic conditions. A separate credit policy was, therefore, needed for the State. Large scale migration needed to be checked through better employment opportunities after the rainy season, increase in double crop area and other activities like bee keeping, sericulture, mushroom cultivation etc. Chhatisgarh is already giving importance to farm ponds and roof water harvesting and enjoys an advantage since each rice field also works as recharge pond. Chhatisgarh State Biodiversity Board would be working on detailed guidelines for protecting the rights of farmers in their various roles. It was pointed out that in Chhatisgarh, rice was grown under broadcasting *biasi* system whereas most of the dynamic crop simulation are made for transplanted rice with high inputs. It was necessary to develop dynamic crop simulation programmes for directly seeded *biasi* system.

Government of Chhatisgarh further indicated that they had planned to take up measures like crop diversification, increasing cropping intensity, organic farming, agro-forestry, strengthening of soil testing laboratories, fodder and cash crops and promoting agro-based industries for development of agriculture. Traditional and nutritive crops of Chhatisgarh like kulthi, kudo-kutki, kesri daal etc should be procured under PDS especially since “Pratik” variety of Kesri daal had only 0.6% toxicity. It also suggested that scope of fishermen welfare insurance be extended and subsidy component be increased. Another suggestion was that research in agriculture needs reorientation for
small farmers and should utilize traditional agricultural knowledge available with the farmers. Policy be reoriented to establish linkages between common property resources, livelihood support system and traditional institutional arrangements. Policy should also encourage rainwater harvesting. Employment opportunities should be improved through vocational training.

10. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF GUJARAT FOR FEED BACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT AHMEDABAD ON 15th JUNE, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Ahmedabad on 15th June, 2006. The NCF was represented by Shri Y.C. Nanda, Member, Dr. R.B. Singh, Member and Dr. Deepak Rathi, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) A large percentage of the rural households are landless and also assetless. As they also did not have any vocational skill/education, they were therefore not likely to benefit much from the growth of the economy. There may not be any trickle down effect for them unless they had some productive assets or marketable skills. Jobless growth was really joyless growth.

ii) The need was for a rural non-farm livelihood initiative with KVIC and a restructured SFAC as its core to work on a consortium basis as a counterpart to NREGP in the skilled employment sector. It may bring all rural non-farm employment programmes together.

iii) An effective and efficient delivery system was an important pre-requisite for improving our agriculture. Delivery system constraints need attention. Entire component of the delivery system [non-plan] needs to be supported. The staff needed retraining/greater mobility and more knowledge, as knowledge was likely to play an important role in future.

iv) Most of the recommendations of the NCF were laudable but the question was as to who would fund those.
v) Budget for agriculture needs to be increased particularly at the State level as agriculture is a State subject.

vi) Definition of the farmer as proposed in the draft policy covers different groups, which require segregated planning including different new policy packages.

vii) Scale is important in agriculture and inefficiency should not be rewarded. However, marginal and small farmers needed to be protected and supported.

viii) The farmers need education/training in every aspect of farming including marketing to face the challenges of modern diversified commercial farming.

ix) There is need to involve more educated youth in farming. Rural non farm activities needed to be enhanced.

x) Day to day weather report should be made available to farming community on a regular basis.

xi) Poor electricity supply is a serious contraint.

xii) There is a need to promote VKCs.

xiii) The State is fortunate to have no farmer suicide.

xiv) The time of telecast of programmes on agriculture should be shifted from 6.00 pm to 7.00 pm for the benefit of the farmers. Serials should be prepared on agricultural activities. Need for a 24 hour Kisan Channel.

xv) Private persons should also get the benefit of Indo-US Knowledge Initiative for their capacity building in relevant field.

xvi) Due to the National Commission on Farmers, the farmers have some voice in the country now.

xvii) There is a need for separate budget for agriculture like Railways for giving more emphasis and proper orientation to agriculture under the changing scenario.

xviii) On one hand we have food security related issues and on the other development of the competitive market with free choice; the farmer will go for the crop that will generate more income for him. How are the food security issues to be addressed? There are also chances of cheaper imports of agri-commodities in the present WTO era. The farmers would need support to face these challenges.
Government looks at farming with social angle and there is need to think in the entrepreneurial way. There are eight Agri-Export Zones in the State, which could be exploited for the benefit of the farmers.

Agriculture should be treated as a Central subject or placed in Concurrent List with the changing scenario and implementation of the WTO.

High tech agriculture and horticulture may be treated as industry.

3. Land

i) There was a need to relook at the ‘land ceilings’. Some cultivators felt only 70-80 acre land size was viable.

ii) Land Use Board need restructuring and should be renamed as Farm Use Board and placed under Agriculture Department rather than the Revenue Department as at present.

iii) Land laws need modification.

iv) Consolidation of land holdings was required. The concept that land size should not be allowed to be reduced below a minimum size needs to be examined and introduced in the land laws.

v) Allocate wastelands to small/marginal farmers and their groups instead of corporates.

4. Livestock

i) Some of our best breeds of livestock are being protected under IPR in foreign countries; we should protect our gene heritage. Knowledge and technology growth is very much required; the Agricultural Universities should be funded liberally for research and technology development for the farmers.

ii) Non descript animals are increasing; their characterisation should be made.

iii) Poultry comes under agriculture (activities allied to agriculture) but treated as an industry.

iv) Milk production is stabilised now: The need is to increase it further.
v) Gujarat is rich in animal genetic resources which needs to be protected and disease infestation should be checked. Very little is being done in this direction in an organised manner.

vi) Need to provide doorstep artificial insemination services for the cattle.

vii) Women do most of the work regarding cattle rearing in Gujarat.

viii) Extension system is very weak in the animal husbandry sector.

ix) There is need to give more emphasis to Agriculture Extension and Training in the 11th Plan.

x) Stray cattle often destroy the crops. But certain religious considerations come to the forefront in dealing with, uneconomic cattle and wild animals.

5. Research and Technology

i) There is need to look at organic farming in a holistic manner; organic farming requires more knowledge input than the normal farming system.

ii) Research and technology dissemination may look at the issues connected with the need for increased productivity, efficient input use, quality management, marketing, value addition and processing, diversification in the direction of export oriented crops, waste management, energy management, natural resource management, promotional role of APMC, agri processing and commodity parks, disaster management and improved support systems.

6. Inputs

i) Spurious input supply should be checked and right input at right time and place be made available to the needy farmer. The transport expenses should be kept at the minimum. There is a need to look at farmers in a disaggregated manner in different regions to work out a good delivery system. The prices of pesticides need to be controlled.

ii) Agriculture inspection services need to be established. Use of pesticide should be regulated.

iii) Quality of inputs and its timely supply and prices could be reduced by routing these through linkages with banks, suppliers and farmers.
iv) Need to form one resource centre in a cluster of 40-50 villages.

v) No need of service tax on seed as farmer is also a grower of the seed.

7. **Credit and Insurance**

i) Gujarat inspite of having good growth in agriculture was facing the problem of outreach of the financial system. Only 10 per cent of the farmers were getting credit from commercial banks, 17 per cent from cooperatives and nearly 42 per cent from informal sources. After 40 years of nationalisation of banks and 20 years of credit-targeting, poor outreach was extremely worrisome.

ii) World Bank and NCAER study [2003] showed that in UP and AP, the percentage of farmers to the rural households who could get credit were only 24 and 19 per cent respectively. Loan approval required on an average 33 week time in commercial banks. 27 per cent of the farmers reported paying bribe. The bribe amount ranged between 10 to 20 per cent of the loan amount.

iii) Outreach and quality of credit should be improved with appropriate interest rate. Inefficiencies of the delivery system should not be loaded on the farmers and Government may provide subvention if the interest rates were to be kept lower than the economic rates.

iv) Farmers also need credit to meet emergency expenses as also for consumption expenses as their incomes are seasonal. The banks could consider devising suitable schemes to meet these credit needs within the overall repaying capacity of the farmers.

v) Banks need to develop new schemes to meet credit needs of the farmers for switching over to higher productivity levels, new economic activities, value addition and new technologies.

vi) The crop insurance premium for cotton crop was very high.

vii) Agriculture is high-risk activity; proper crop insurance scheme is needed. The crop insurance in the present form is not farmer friendly and the government is also incurring large liability every year. Inspite of the above, the farmers are not satisfied. This needs revision. The farmers also need insurance for covering
market risks, which have increased considerably in shifting from subsistence farming to commercial farming.

viii) Medical expenses are increasing. An affordable and effective system of rural health insurance is needed. The primary health service should be improved.

ix) Farmers want quick cash after the harvest. In absence of adequate storage arrangements and problems in negotiability of warehouse receipts, pledge finance has not developed. Banks need to innovate and consider providing finance against produce stored at farmer’s house.

x) There was a need for an Agriculture Risk Fund to take care of the risk materialising in agriculture lendings by banks.

xi) The scale of finance for different crops should be realistic and revised regularly.

8. Cooperatives

i) The cooperatives appear to be the most effective way to reach the marginal and small farmers. However, there is a need for reforms in the cooperatives. These should be professionally managed with clear demarcation of duties and responsibilities between the officials and the Board of Directors. Audit and accounts need improvement

ii) Recommendations of the Vaidyanathan committee for revitalisation/recapitalisation of credit cooperatives should be implemented quickly.

9. Marketing

i) How to produce, when to produce and where to sell should be answered and integrated with market for the benefit of the farmers.

ii) Need to give more attention to remunerative prices for the farmers for their produce. APMCs and State Marketing Boards should understand their new developmental role. There was a huge scope of improvement in existing working style of the APMCs.

iii) Hamal and coolie do not deal with farmers respectfully; rather they insult them. Farmers selling their produce in APMC feel that the traders and management
connive and often cheat them. There is need for a greater say of farmers in managing the APMCs and a say particularly in the auction system. The farmer’s interest should be uppermost in the working of the APMCs. Ungraded produce fetches low price. The need is to introduce grading at the farm gate itself.

iv) Increase in farmers’ income is most important and for that making him secure in the marketing field is essential. Insurance to cover market risk does not really exist. Vulnerability on this account will continue to be there unless some mitigation mechanism is put in place.

v) At present farmers do not get sufficient return from grading but they are doing this only because of their reputation for supplying quality material in the market.

vi) With entry of big corporates in agriculture and related areas, it would be essential to ensure that the interests of the farming community are protected.

vii) There is a time lag between picking to export of cotton produced by the farmers. During this period they feel shortage of money at one end due to expenses incurred in ginning, grading and getting international certificate regarding quality of the cotton and on the other they don’t have money as they are not selling cotton; therefore to promote export of cotton, funding for the period mentioned above should be provided to such farmers for meeting day-to-day expenses.

viii) Storage facilities should be provided to the farmers at cheaper rates so that they can keep their produce in the godown and avoid sale during the glut period.

ix) Informal contract farming is taking place in the State. It is necessary that a suitable farmer-centric code of conduct is decided at the earliest. The present arrangements are rather fragile.

x) The Government should provide subsidy to farmers for processing, transportation and value chain management.

xi) According to the changing scenario in the marketing of farm products there is need to implement the Model APMC Act in all the States. Demand driven export oriented mega markets must be established to increase the income of the farmers.
xii) There was a need to promote the National Agro Product Futures Exchange by APMC etc with membership of all APMCs.

xiii) Need to develop farmers’ markets so that farmers could market his produce directly to the consumers.

xiv) The traders take benefit from MSP by procuring production of the small/marginal farmers at low price and then sell it at MSP. Value addition at farm gate level is required.

10. **Women in Agriculture**

i) Special treatment should be given to the women involved in agriculture activities. There is a need to form more women self help groups.

ii) Women capacity building and skill development is urgently required.

iii) Women do not get land titles and also find it difficult to access services including credit from banks.

11. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF HARYANA FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT CHANDIGARH ON 25\textsuperscript{th} AUGUST, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Chandigarh on 25\textsuperscript{th} August, 2006. The NCF was represented by Dr. R.B. Singh, Member, Shri G.C. Pati, Joint Secretary and Dr. Deepak Rathi, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

1.2. Mrs. Asha Sharma, Principal Secretary, Agriculture, welcoming the participants explained how farmers of Punjab and Haryana had taken leadership in making the country self-sufficient in food grain during green revolution. But now farmers of Haryana are adversely affected due to stress on natural resources on account of green revolution. Government of Haryana has adopted the strategy of diversification of agriculture to tackle the problem.

1.3 On request of the Principal Secretary (Agriculture), Shri Surajewala, a former senior Minister of Haryana and presently a Member of the Legislative Assembly of Haryana and President of the Bhartiya Kisan Sabha (Haryana), a person with several decades of association with farmers and himself a farmer, gave the following account and status of farming and farmers of the State:

i) A good number of farmers, including landless farm workers (a detailed list was provided), several in the age group of 20-45 years, have committed suicide in the last few years, a phenomena unknown 15 years ago. This was primarily due
to the increased indebtedness because of the low or negative income of the farmer.

ii) The overall Human Development Index in Haryana has gone down and people are even losing their culture and identity. The level of education, especially the technical education, was one of the poorest in the country.

iii) Some of the best livestock genetic resources of the country such as Murrah buffaloes are being lost rapidly due to poor policy of livestock marketing. The three major ICAR Livestock Research Institutes, namely, (i) National Dairy Research Institute, Karnal; (ii) Bureau of Animal Genetic Resources, Karnal and (iii) Buffalo Research Institute, Hisar, should ensure the conservation of the rich livestock biodiversity of Haryana.

iv) The present price policy has been defective and it was requested that a Regional Agricultural Prices Commission, comprising a good number of farmers, should be established to look into the input and output balance in the North West region, which is different from those in other regions.

v) Haryana being a major exporter of Basmati Rice, the Basmati procurement prices should be delinked with other Government-supported prices as export of Basmati Rice is the main foreign exchange earner amongst the agricultural commodities of the country. The price suggested by the CACP is generally unfavourable for farmers; hence the methodology of price calculations should be improved. There is good scope for promoting export of organic Basmati.

vi) Unthoughtful promotion of new crops has resulted in almost complete elimination of some of the very important crops such as, Chickpea (Gram) and Guar.

vii) The prevalent rice - wheat cropping system has resulted in serious fall in water table, thus has adversely affected the water quality as well as the cost of water pumping.

viii) The flow of credit to the poor farmers is highly unsatisfactory and majority of the farmers take loans from private moneylenders at the interest rate of about 35-40 per cent. The problem is further aggravated due to spurious seeds, fertilizers and pesticides.
ix) Most of the agricultural credits in the States are unemployed yet reluctant to take to farming resulting in social problems.

x) The loaning by the formal institutions in Haryana is relatively at high rate of interest of 12-14 per cent whereas the Central Government has declared agricultural loaning 7 per cent against 4 per cent interest rate recommended by the NCF. The subsidy should be given direct to the farmer.

xi) The agricultural research has been sluggish as high yielding varieties of oilseeds and pulses been released in recent years.

xii) The Government Departments work in isolation; hence there is poor extension services and technology transfer. Further, public-private partnership is also poor.

2. Land

i) Land record should have the name of woman farmer since she was totally involved in agriculture.

ii) Survey of status of land, its use and facilities should be conducted and computerized.

iii) A farmer should be considered a small farmer for land holding up to 4 ha against the existing limit of 2 ha.

iv) Land Reforms should allow lease of land by marginal farmers to other farmers to improve viability of farming. Land consolidation should also be undertaken. Fragmentation of holdings goes on unabated and 10 to 15% of the farmers have disposed off their tiny land pieces and of the farmers have become landless labourers.

v) Adequate soil testing laboratories should be made available in the State.

vi) Diversion of prime agricultural land for industrial purpose was mentioned as a critical issue. Waste land be developed by industry, part of it given to farmers, rest be used by them.

vii) About 15% of farmers in Haryana were reportedly landless and unviable.

viii) Land in some cases was lying fallow and uncultivable. Land development be taken up with govt. funding and may be recovered from farmers without interest.
Problem of land consolidation be sorted out since land holding was more fragmented.

Productivity has reduced even after using higher quantum of fertilizers due to degradation of soil. Organic manure should be provided so that ‘organic farming’ can be taken up in a big way.

Law should provide vertical development like multistoreyed buildings to minimize division of prime agricultural land in urban areas.

In order to discourage excessive use of urea & DAP which adversely affects soil fertility, the subsidy on urea/DAP fertilizer should be withdrawn or reduced.

3. Water

Depletion and deterioration of quality of ground water level in Haryana was stated to be a critical factor that would influence farmers adversely. Subsidy of 40 to 50% for drip and sprinkler irrigation project as well as for other implements should be given to farmers.

Water shortage, particularly for drinking water was mainly due to expansion of urban areas which should be prevented and villages be developed.

Groundwater level varied from 20’ to 150’ in the State. Cost of irrigation is higher where level is 150’. MSP should take into consideration this higher cost.

Industrial waste from industries should not be drained out the River; since it may cause harm to organic farmer.

For utilization of drip irrigation properly, skill was not available in Haryana. 50% of fertilizer can be saved with drip/sprinkler irrigation if properly used. Need for training and skill development in this aspect was highlighted.

Out of loan for tube well about 40% was wasted as commission or excess expenditure. Hence subsidy was not benefiting farmers.

Rain water harvesting from roof of Government building should be taken up first to popularize it.

Drip irrigation in plain and hill regions should be promoted to conserve water.

Water be treated as national asset. Scientists should evolve new seed to utilize saline water and inferior water.
x) Along with rice Haryana was also selling its water and natural resources to other State in shape of food grains.

4. Livestock and Fishery

i) Livestock was highlighted as an important asset for women farmers and landless labourers as it supplemented the household income of family preventing extreme steps like suicide.

ii) Apart from food & fodder, health care facility for livestock was stated to be a critical problem area.

iii) Problem of stray cattle should be tackled. Stray bulls should be castrated.

iv) India has one-third of World’s cattle population with per animal yield being lowest in the world. Per capita milk consumption was also lowest.

v) Livestock and fishery had to be adopted along with cropping in order to improve income of the farmers.

vi) Birth and death of indigenous and other livestock and animals should be registered to facilitate conservation of indigenous breed.

vii) Farmers with livestock should be covered under milk route for higher income and security.

viii) Social security for farmers should be at the same rate as per class IV government employees.

ix) Numbers of farmers have fish pond along with agriculture farming. Integrated farming has more benefits with less risk.

5. Technology

i) Law must be in place to punish the companies supplying fake or spurious inputs to the farming community.

ii) There is a need to establish technological parks where new technologies for value addition could be disseminated to the farmers was highlighted.

iii) Biodegradable mulching is required instead of plastic mulching to protect the environment and flora and fauna of the soil microclimate, as well as for increasing carbon content of the soil.
iv) Budget under research head should be increased so that new technologies would be developed for the benefit of the farmers.

v) Technologies like zero tillage for conservation agriculture must be generated and replicated.

vi) Vegetables should be given due importance in the National Horticulture Mission.

6. HRD and Education

i) Need for education in rural areas was stressed since it will create off farm employment opportunities for farmers for improving livelihood security.

ii) A large number of Agriculture graduates were unemployed. They may be given dealership for fertilizers/pesticides.

iii) Kisan Call Centre “1551” number should be accessible from the mobile phones also.

iv) Government should fund visit of farmers to other states and to other centres to train in new technology.

v) Technical guidance in proper use of fertilizer, land etc to farmer through Farm Schools should be provided.

vi) Training in vegetable/ fruit nurseries and other allied agriculture and agro processing should be imparted to the youths through KVKs.

7. Credit and Insurance

i) Private moneylenders dominate over institutional sources in terms of share of credit disbursement and they charge the interest up to 30 to 40 per cent per annum. A Law should be in place to regularize the moneylenders and to cap the rate of interest, may be around 12 per cent.

ii) Insurance should not be done on village basis but on unit area basis because many a times there were losses in a set of fields but some other farmers may harvest good crop.
8. **Market**

i) Original quality of ‘Basmati’ was restored after introduction of organic farming. “Organic Basmati” was profitable with no disease, for which sustainable certification facility should be available within easy reach of the farmer.

ii) Setting up of Farmers Clubs was reported to be beneficial.

iii) While finalizing MSP, cost of implements, irrigation etc should be taken into account. It should be linked to wholesale price index.

iv) Increase of MSP would result in increase in consumer prices and may not be politically acceptable. Hence subsidy in the cost of implements, credit, electricity etc. should be given. Credit at nominal cost should be allowed to farmers. Alternatively higher MSP should be allowed.

v) Monopoly trends in procurement of agricultural produce due to permitting large corporate houses to take up procurement should not be allowed since after 2/3 years, the industry may exploit both the farmer and the consumers.

vi) For ‘Contract farming’ Government should be the third party to contract and a sound dispute resolution mechanism be specified.

vii) Agro-processing units be promoted, particularly for medicinal and aromatic plants since it would attract youths to farming.

viii) MSP should be changed to Minimum Remunerative Price (i.e. MRP) and be linked to price index to give assured income to farmer and no subsidy would be necessary for agriculture. MSP should be different for different regions.

ix) In ground water stress area, heavy water consuming crops like paddy should be banned. Summer paddy should also be banned.

x) Crop insurance scheme should incentivise and reward crop diversification efforts in different areas.

xi) No trader should be allowed to purchase in “mandi” at a price less than approved MSP.

xii) Facilities for grading packaging, sorting necessary for diversification should be in place.

xiii) Instead of giving subsidy to farmers market should be developed with skill development training in value addition in farmers’ backyard.
xiv) Elimination of middlemen in marketing of agricultural produce (arthiyas) should be ensured.

xv) Food cooperative stores/shops for sale of SHG Horticulture and other Products should be set up by State Government in each Block.

xvi) Higher MSP for basmati rice should be notified by Govt. of India.

xvii) Veterinary medicines should be sold at MRP.

9. **Suggestions made by the State Government**

After the Consultation, the Member, NCF had discussion with Hon’ble Minister for Agriculture, Haryana in presence of officers of State Government where following views/suggestions were given:-

i) In view of amendment of succession law giving property right to women, the land held by women should be considered separately for ceiling as per Land Reform Act.

ii) Processing and storage facilities should be set up for fresh water prawn which has excellent potential particularly in salinity affected land in the State. About 3.50 lakh ha of water-logged land in the State should also be converted to fishery.

iii) A regulatory framework for controlling and testing the bio products in the market to prevent sale of spurious products should be in place.

iv) Movement of farmers from primary to secondary/tertiary sector should be facilitated for improving their income.

v) Food security should not be a burden on farmers. Areas which can be taken up for food grain production be identified by Government of India.

vi) There is need for preservation of indigenous genes and seeds for developing genetically modified seeds by ICAR institutions for benefit of the farmers.

vii) In livestock production maintenance of phytosanitary standards for international markets should be ensured. Livestock insurance should take care of reproduction losses.
viii) NFDB and National Agriculture Authority should have a representative from every State and a few farmers engaged in inland aquaculture.

ix) Water should be declared a national resource. Efficient use and conservation of water should be the focus of research and technology.

x) Sprinkler and drip irrigation system should be encouraged.

xi) Government of India should assist State Govts. in setting up of State level Institute of Plant Genetic Resources and for developing DNA Fingerprinting of selected crops.

xii) New wheat variety should be developed to withstand higher temperature in February.

xiii) A law to ensure MSP at full economic cost of production and profit should be enacted by Parliament.

xiv) For women, small and marginal farmers subsidy element under various central schemes should be increased to 75%.

xv) State bio-security units must be set up in all States.

10. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF HIMACHAL PRADESH FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT SHIMLA ON 26th MAY, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Shimla on 26th May, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Shri Y.C. Nanda, Member and Ms. Mamta Shankar, Director. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) A Separate Policy for Hilly Regions is needed.

ii) Awards for farmers should also be instituted at the Gram Panchayat level.

iii) Farmers should get facilities and incentives, which are available for the small-scale industries sector.

iv) A State Commission on Farmers should be set up with farmers as members. The Commission should submit bi-annual Report to the State Assembly.

v) Agriculture, especially marketing should be made a concurrent subject under the Constitution.

vi) Central projects should take local conditions into account before setting conditionalities.

vii) Community Development Programme is destroyed and the line Department’s control has not helped farmers much.

viii) H.P. can’t use heavy fertilizers adequately since top soils are thin.

ix) There is a problem in extension since there is a ban on recruitments and old staff is retiring.

x) Farmers should be awarded by Padma Awards to encourage them.
3. **Land**

i) Two-third area in Himachal Pradesh is with the Forest Department. Substantial proportion of this land is unutilized. It is either encroached or is in the form of wasteland for which Forest Department has no road map.

ii) There is no focus on farmer or fodder in the Himachal Pradesh forest policy.

iii) People should be associated in the management of forests.

iv) Fodder varieties should be planted in afforestation programmes.

v) Land Use Board should be with Planning Department for better coordination and acceptability.

vi) Industry should not be promoted at the cost of agriculture. Agro-based industries would be more appropriate for promotion.

vii) Urban expansion under schemes like ‘Rajiv Gandhi Urban Renewal Mission’ should not be at the cost of agricultural land.

viii) There should be a law on constructing houses and drawal of water, since these have a major impact on Agriculture.

ix) Size of landholding is getting smaller and land is getting fragmented.

x) Nearly 80% land holding is small. There is need to diversify into multi livelihood options, through non-farm/off farm activities and mixed farming under the guidance of specialists and with adequate training.

4. **Water**

i) Forestry and irrigation departments should have been invited to participate in the Consultation.

ii) In Himachal Pradesh only 18% of cultivated area is under assured irrigation. Retention of water is therefore critical. Under Horticulture Technology Mission an incentive is given for water harvesting structures and there is a good demand for these structures from the farmers.

iii) Different rate of subsidy was given by different departments for water harvesting structures, confusing the farmer. These should be harmonized.
iv) In upper reaches, melting snow and glaciers could be harvested with the help of check dams and shrubs.

v) Water recharging should be made compulsory at village level. Ear marking of common land (100 canals) for water recharge should be made compulsory.

vi) A boom in the construction of industrial, commercial and residential projects has placed a huge and unsustainable demand on the water resources.

vii) The drainage systems constructed by PWD etc. usually terminate in farmer’s fields resulting in flooding of these farms in the rainy season. There should be separate provision for this purpose.

viii) There is a need for strengthening and enhancing irrigation especially lift irrigation.

ix) Micro hydel projects are retarding recharging projects. They also do not allow for storage reservoirs.

x) Before diverting water through tunnels, farmers should be consulted and cost/benefit should be weighed.

xi) Farmers should be involved in water management.

xii) Water should be a community property and managed by local community. The government should bear the cost of water management.

xiii) All rivers should be nationalized and managed by a National Water Authority.

xiv) Rainwater harvesting should be encouraged especially in hill areas.

xv) In case of nationalization of water, the originating State should have the first right on hydel generation.

5. **Climate Change and agro meteorology**

i) The frequency of storms, hail and untimely rains have increased. Snowfall has decreased. The weather has become perceptibly warmer and apple no longer grows below 8000 ft. The production of apple has declined.

ii) Calamity Relief Fund guidelines need change to provide substantial help to farmers. Compensation under Calamity Relief Fund should be given to the farmer directly.
iii) Weather monitoring centre is ineffective and farmers do not get timely information.

6. Livestock

i) No attention is being paid to stray and unproductive cattle. Government should be responsible for them and treat them as resource.

ii) Scientific management of pasture land is required.

iii) Policy for migratory livestock is required.

6.1 Livestock Feed

i) There is a ban on green felling leading to shortage of fodder.

ii) No single agency has taken responsibility for fodder supply.

iii) The Government is providing the feed for trout fishing at present but the quality is not guaranteed and the supply is also insufficient.

7. Fisheries

i) Trout farming is a good source of income and it should be promoted among more farmers.

ii) Trout culture is very costly and risky too, unfortunately a subsidy of only Rs.7,000/- is available for an investment of Rs. 1 Lac.

iii) The level of subsidy should be increased especially in hill region where trout can be an important source of livelihood and employment.

iv) Hill farmers have specific training need but presently there is no Institute in the country where farmers as well as extension workers could receive training in latest techniques in hill area fisheries.

v) There is no assured market for trout.

vi) Since trout farming was risky there was a need for insurance for protection against flood/ poisoning.

vii) The electricity and water rates are charged at industrial/commercial rates, whereas rates applicable for agriculture should be applicable.
viii) The micro-hydel projects were also destroying trout farming by obstructing the flow of the rivers and churning of beds. The entire riverine water is sucked through a trench weir.

ix) No allocation of water is made for fish ponds in irrigation projects.

x) Centrally sponsored schemes for fish reared in plains have provision for first year input subsidy. No such provision is there for cold water fish in the hills where expenditures could be substantial in view of the specialised nature of trout and mahseer.

xi) Natural fish breeding grounds are being destroyed by road construction and micro hydro project.

xii) University and premier research institutions involved in research in fisheries should develop artificial seed production technology.

7.1 Fish seeds

i) No seeds are available for stocking of reservoirs.

ii) Narrow view is taken as environmental issues leading to a set back in seed multiplication.

iii) Quality control of fish seed is very important.

8. Research and Extension

i) Pesticides Sales license should be given only to agricultural graduates.

ii) SAUs should be strengthened. Research efforts are inadequate and no benefits are accruing to the farmers.

iii) Micro-survey is needed to decide what to grow if there are frosts.

iv) SAUs are in dire need of funds.

v) Vacancies of extension staff should be filled.

9. Organic Farming

i) Organic farming was advantageous in the hill States where there was a danger of contamination of the water bodies by excessive use of chemical fertilizers.
ii) Animal Husbandry was very important for organic farming and it was claimed that a single cow could give profit of Rs. 50,000/- against the supply of organic manure and cow urine which was used as pesticide.

iii) Organically grown peach had a longer shelf life.

iv) Awareness should be created to encourage good practices in organic farming. For this purpose training was required.

v) Chemical fertilizers were subsidized whereas no such subsidy for organic manure was available. On top of it 8% VAT was charged on organic manure from other States. Use of organic manure should be subsidized.

vi) Government should provide financial assistance for organic farming and bear the certification cost (At present Morarka Foundation was helping in certification).

10. Horticulture

i) Productivity of apples is very low compared to Jammu & Kashmir. Most of the apple varieties grown are at least 100 years old. Whereas Jammu & Kashmir has introduced new varieties, new varieties have been only recently imported from US. The State government is carrying out high density plantation in upper reaches for testing purpose.

ii) Apple is also grown on wastelands with the help of the area expansion scheme of NHB.

iii) Soil health in horticulture orchards is declining. Nutrient replenishment is required.

iv) KVKs are needed in each district. Farmers should be given professional and business orientation.

v) There is a need for Horticulture Price Commission and a Market Intervention Scheme in years of excess production to protect farmers from price crash. Every State should have a Horticulture Produce Board, to take care of marketing needs in view of the highly perishable nature of horticultural commodities.

vi) National Horticulture Mission should provide adequate assistance.
vii) With so many research institutions and universities there should be no need for importing varieties from abroad.

viii) Subsidy should be given on ‘made tea’ from Kangra region. Subsidies will also encourage the production of diversified products like chantelli and beer.

ix) Due to liberalizing of trade, a niche market catering to the rich has come up for imported apples. However imported apples coming into India are waxed which is banned in the world. The local Kinnaur variety is of superior quality but is not fetching high prices.

x) Imported fruits have the advantage of heavy subsidy in their countries of origin, window dressing and packaging.

xi) Small farmers do not have export permits//licenses. Efforts to take up the matter with Commerce Ministry have been in vain.

11. Inputs

11.1 Seeds

i) The Agricultural Universities should produce good quality root stock.

ii) There is a problem of shortage of good quality seeds/sapling faced by Nursery Growers. This should get a thrust in the National Horticultural Mission.

iii) There is a need to grow new varieties and carry out location specific research. We must develop our own varieties in order to fetch good prices and compete globally.

iv) Germplasm Bank and Root Stock Banks should be established.

v) Nursery growers are neglected in the horticultural policies. Multi-nationals are taking major benefits of seed production by farmers.

vi) The provisions under the proposed Seeds Act 2002 proposing that no farmer should keep his own seed, are unacceptable since this would only benefit seed companies.

11.2 Implements and Tools

i) Women farmer friendly tools and implements suited for small farms in hill areas should be designed and distributed.
11.3 Soil

i) Soil has been extensively exploited and its health is precarious. It has stopped responding adequately to chemical fertilizers.

ii) Soil mapping should be carried out with proactive advice to farmers on crops to be sown.

iii) The fertilizers usage is unbalanced in favour of Nitrogen. Due to poor extension, MNCs were dictating usage. The research is slow and does not percolate to the grass-root level.

iv) Subsidy on Nitrogenous fertilizers should be reduced and subsidy on potassium and phosphatic fertilizers should be restored to improve soil quality since the requirement of nitrogen in the soil could be met by Vermi compost etc.

v) Top soil is thin and heavy fertilizers are generally not effective.

vi) Cost of organic inputs is higher compared to NPK. There should be a subsidy on organic inputs.

12. Other Support Services:

Rural Infrastructure

i) Roads are essential for rural infrastructure and more money needs to be allocated for building roads in the hilly regions since cost of laying roads is higher.

ii) Small apple farmers do not have holding capacity for their produce. Their marketing efforts should be supported.

iii) Transport costs are very high in hilly and tribal areas.

iv) Cold storage and cold chain infrastructure is required. Cold storage should come up in production areas. At present the subsidy on setting up cold storage has been taken by the middlemen in cities and the cold storages are located there (the State Government has recently asked the Adani Group to set up seeds stores and cold storages near the orchards. The Group will buy directly from the farmers and will do the grading, packaging etc. so that the farmers will be spared these costs as well as the inflated costs of the transporters. Reliance is also
expected to participate in a big way. A model code of conduct for arrangement between farmers and companies had been drawn up by the State Government.

v) Department of Fisheries should have a refrigerated van for transporting fish.

13. Credit & Insurance

i) Role of Banking Institutions was painted in very poor light.

ii) Farmers found it very difficult to approach the banks due to commission, harassment and corruption. This along with cumbersome paper work had forced borrowers to resort to borrowing from moneylenders at very high interest rates or resort to microfinance by forming Self Help Groups [SHGs].

iii) Too much land is being asked as collateral even for small loans.

iv) Loan should also be given for consumption purposes. Status and the repayment history of the borrower should be taken into account.

v) Processing charges should be waived.

vi) There is very little institutional finance for Apple growers. Middlemen dominate the financing.

vii) Rates of interest for loans from NABARD are higher and should be brought down especially for Cooperative Banks.

viii) Rate of interest on the agricultural loan should not be higher than that for housing or automobiles.

ix) It should not be mandatory to take bank loans for availing subsidy from the National Horticulture Board.

x) Corruption in obtaining no demand certificates from Banks should be curbed.

xi) A Revolving fund for farmers should be set up, to support them in case of artificial/natural calamities.

xii) Consumption loan should be provided to the farmers by the Banks in order to save them from falling into the clutches of money lenders.

xiii) Insurance is needed for horticulture crops just like cereals/cash crops.

xiv) The premium on agricultural insurance is very heavy. The premium should be reasonable based on crop yield estimation.
There is a problem faced in assessing the losses for insurance purposes. Crop yield estimation methods like crop cutting may not give accurate results.

14. **Marketing**

i) Fluctuating market and non-remunerative prices create difficulties for farmers.

ii) It is felt that there is a huge gap between the prices that the producers get and that which the consumers pay. The proportion going to middlemen should come down. Farmers are harassed by truckers while carrying their produce and have to pay commission in Delhi mandis and they get a raw deal.

iii) Marketing should dictate area wise production plans for deciding what should be grown where. Information regarding spatial and temporal pattern of demand in various parts of the country should be made available for proper production planning and remunerative prices to farmers growing off season vegetables.

iv) Pre and post harvest losses should be cut.

v) MSP should be extended to horticulture crops.

vi) The MIS allocation is too low to permit institutions to really benefit farmers.

vii) The central Price Stabilisation Fund scheme is not a success in H.P. because land holdings were very small. Separate price stabilisation fund is needed for hill states.

viii) Price Stabilization Fund should be established with 1:1:1 ratio between the farmer, State and Central Government.

ix) Due to the scattered settlements and poor road links to interior villages, there is a problem in Marketing of milk and other perishable commodities especially in remote areas.

15. **Women Farmers**

i) Women farmers expressed their appreciation of the Krishak Mahila Samiti Scheme run by the state government.
16. **Agro-tourism**

i) Tourism could be combined with agriculture. Especially orchard tourism has great potential in H.P.

ii) Farmers could also be taken out to visit model farms in the country and abroad.

iii) Model farms are needed in the villages for field visits.

17. **Youth and Agriculture**

i) Every year a huge number of youth join the job market after finishing school; however there is a ban on Government jobs. They could be absorbed in Agriculture if they are trained. Hence, Agricultural training institutes, like ITIs, should be set up to train farmers to enable them to undertake scientific agriculture.

ii) Agricultural University graduates should have compulsory experience/training in villages.

iii) Agriculture University students should not double up as extension staff. The Departments should be doing it. In Himanchal Pradesh Agriculture Department staff was merely working for sale of pesticides and seeds.

iv) Today’s youngster does not see much benefit in agriculture. To attract youth to farming, the cost of farming should be brought down, and its profitability should be increased through better marketing.

v) Our education policy is not farmer oriented. Farmers do not get research support.

18. **Animal Human Conflict**

i) Farmers are threatened by the increasing population of the monkeys, wild boars and neelgai. There is ban on killing/capture and export of monkeys and they are playing havoc with the agricultural and horticultural crops.

ii) Monkeys should be declared “Vermin” under the Wildlife Act.

iii) Laws are needed for protection from wild animals.
iv) Forests should take care of wild life by planting trees which can sustain bears, monkeys etc.

v) Forests Department should plant Crabpine to feed animals and monkeys so that farmers’ crops are saved.

19. **Suggestions Made by the Hon’ble Minister of Agriculture, Govt. of Himachal Pradesh**

Members of the NCF held separate discussions with Hon. Minister for Agriculture, H.P. He mentioned about the problem of Extension caused by substantial number of vacancies due to the ongoing ban on recruitment. He pleaded for consumption loans to be given by credit institutions to farmers to save them from moneylenders. He opined that cooperatives and RRBs had performed poorly in the state and had limited capacity for helping farmers. Bankers did not have appropriate mindset in favour of farmers. He felt that the growth of credit should be studied to see if it had gone for productive purposes. Regarding inputs, he indicated that the top soil in H.P. was thin and it was not feasible to apply heavy doses of chemical fertilizers. Decontrol of potassic and phosphatic fertilizers had led to unbalanced use of nitrogenous fertilizers. While vermi compost was being encouraged by the state, there was a need to provide subsidy for organic inputs in view of their high cost. He also informed that the state was encouraging rainwater harvesting and backyard fisheries. He opined that Agriculture, especially marketing, should be made a concurrent subject. Member Secretary, NCF, thanked the Minister for the courtesy shown to the NCF team.
STATE LEVEL CONSULTATION OF JAMMU & KASHMIR FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT SRINAGAR ON 18th MAY, 2006

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Srinagar on 18th May, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member, Shri Y.C. Nanda, Member and Dr. (Mrs.) Laxmi Joshi, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. Hill Farmers and Hill Farming: Agro-Ecologically Differentiated Approach

i) Differential policy for hill farmers for capturing the special and unique physical, ecological, cultural and socio-economic settings in the hills should be carved out.

ii) The State of J&K has four distinct agro-ecological zones, the temperate and cold arid zones being limited to the State which should receive specific R&D support.

iii) The State is rich in biodiversity, particularly in those of fruits, vegetables, legumes, medicinal and aromatic plants. Unique variability exists in rice (glutinous), wheat barley and maize (multiple cobs) which should be conserved and judiciously utilised. In the cold arid zone, Kala Jeera, seabuckthorn, walnut, apricot, flowers, unique possessions of livestock, such as Pashmina
goats and cold fish variations are highly impressive and need to be conserved and commercially utilised. A State Biodiversity/Biosecurity Board should be established which should also address Plant Variety Protection and Farmers’ Rights issues.

iv) Indigenous knowledge, including farmers’ selections of crops and crop species, viz turmeric, walnut, etc. should be scientifically evaluated and encouraged; community conservation and farmers’ rights should be supported and realised.

v) Transport subsidy for achieving price parity in inputs procurement and output delivery among hill and plains farmers should be provided.

vi) Special support is needed for the pastorals and tribes like Gaddi and Bakarwals, who have often been “cheated” in getting access to forest areas and to degraded lands for grazing and raising their animals. Strengthen “grazing rights” of the pastorals. The pastoral tribes and local communities should be mobilised for collection of genetic resources and should be compensated suitably.

vii) To help nomadic tribes, activities like grafting wild ber and planting of amla and citrus fruits on barren forest land should be undertaken and local people should be involved in this.

viii) In Ladakh, only 6 months are available for field farming; the need to store inputs and create grain, seed, fodder and feed banks was emphasised; buffer storing and single window delivery systems should be promoted.

ix) Green House cultivation should be promoted in Ladakh in view of the large number of sunny days there.

x) Solar driers need to be encouraged in Ladakh for dryfruits.

xi) More investments are needed on tubewells rather than canals in Jammu region.

xii) NHB/APEDA should have offices in Srinagar.

xiii) There is only a single road linked to New Delhi which is the most important market for the produce from the State. Blockage of the road due to weather conditions results in losses for the farmers. More road/rail linkage to Delhi should be provided.
xiv) Baramula was earlier a rail head and this facility should be restored.

xv) Diesel should come in as an agricultural input for the State in view of its dependence on road transport.

xvi) Jammu & Kashmir State has niche advantage in May-June due to its varied climate.

xvii) Agricultural Universities should guide farmers on what, when and how for farming, depending on local conditions.

xviii) Farmers should not attempt to grow everything; everywhere otherwise incentives get distributed too thinly and also get dissipated.

xix) All schemes should be regularly evaluated to cull out the non useful ones and focus effort and resource on schemes which are succeeding.

3. Natural Resource Management

i) Given the acute shortage of agricultural land in the State, prime agricultural land should not be diverted to non-agricultural purposes. Land consolidation is essential. The State of J&K was pioneer in registering and allocating land to the tiller – a historical development which promoted equity and reduced poverty, but the Revenue Act is outdated and should be amended.

ii) Rainfed agriculture should be intensified through the National Rainfed Area Authority (NRAA). Forest conservation, forest rejuvenation and transparent forest management are highly unsatisfactory. Command area development, water conservation and community-based land and water management are missing. These shortcomings should be addressed urgently and wells should be dug or recharged at strategic points.

iii) Integrated soil-plant-nutrient management, based on soil/plant analysis, is totally missing. Each District should be provided with at least one soil testing laboratory and mobile soil testing should also be encouraged. The KVKs and ATMAs should play an important role in this context. Soil Health Card should be issued to each farm family and judiciously used for maintaining soil health.
iv) The Land Use Board is non-functional; extension services are equally poor; innovative farmers’ farm field schools should have special usefulness.

v) Soil survey should be conducted in each zone.

vi) Forest wasteland should be identified for growing organic walnut.

4. Technology

i) There is a need to strengthen the Agricultural University and its linkage with public and private sectors for generation and effective transfer of appropriate technologies (there appeared limited interaction between the Agricultural University and the State Government extension and development machinery).

ii) Horticulture Technology Mission has only been partially successful. Projects worth Rs 33 crore, against an allocation of Rs 100 crore, have been submitted for approval. The State should take due advantage of the NHM and prepare itself suitably for the purpose. The State University and Department of Horticulture must work closely, and alongwith private sector, should harness the following opportunities:
   a) Low-cost green houses in the cold arid region.
   b) Management of Cuddling moth in apple in Leh.
   c) Promotion of walnut, apricot and dry fruits as a whole.
   d) Minimum support prices for horticultural produces.
   e) Production and distribution of quality planting materials and seeds.
   f) Exploitation of “off-season” production and marketing of vegetables viz green peas and vegetable seeds.

iii) Fish industry has a bright future. Cold water fisheries should be promoted. Rohu was not doing well even in Jammu, which needs to be investigated. Private fish culture has good prospects for self-employment. Fish disease diagnostic and improved management practices should be promoted.

iv) Livestock, especially goats and sheep, have special role. Despite the huge local potential, over 50% of the meat consumed in J&K is imported from other States.
Alongwith fisheries, this gap should be filled by local production. Buffaloes in J&K have great prospects; efficacy of local vs crossbreds or exotic breeds should be compared.

v) Organic Farming, especially of medicinal/aromatic plants which deserve intense scientific and development attention, including certification and marketing should be promoted.

vi) Quality control of organic manure should be ensured through legislation.

vii) Selective mechanisation was considered strategic for increasing land and labour productivity.

viii) The desirability of developing and introducing hybrid rice varieties in the State should be critically examined.

ix) High tech Green House technology should be encouraged to attract youth to make better profits from small holdings.

5. Credit and Other Institutional and Policy Support

i) Private sector has not been proactive in investment (primarily due to security reasons). The local trained/educated youth should organise themselves into SHGs and establish producer-processing-marketing-consumer linkage. In general, SHGs, both in farm and non-farm sectors, have been active and successful and the approach should be further mentored and supported both by the State and Central Government Schemes. Credit should be readily available also for promoting entrepreneurship which should be duly supported by SFAC and NABARD as youth unemployment is a major problem in the State.

ii) Flow of formal credit to the poor is highly unsatisfactory. Everyone emphasised the need for additional and larger credit and financial support to J&K farmers and farming systems. Kisan Credit Card to each farm family to facilitate access to formal credit was advocated.

iii) The State Government invests the least in agriculture and farmers’ welfare which is a tragic trend. Farmers complained that subsidies provided under
different schemes are rather meagre and they face several hassles in procuring
them.

iv) Quality of inputs is generally poor; there should be faster and more effective
action against adulterators; State Pesticide Board should be created to regulate
quality of pesticides, with a farmer in the Board to safeguard their interest.
Provisions should be made for establishing and operating inputs storages or agri-
clinics at strategic sites.

v) Supply of seed is poor and not on time and there is need for stringent quality
testing.

vi) Because of the dominance of fruits cultivation, the demand for Potash is high,
but its supply is extremely poor. Special attention is called for improving cost-
effective availability of Potasic fertilisers.

vii) Poor governance and the lack of transparency were voiced by most of the
farmers and NGOs; the small and marginal farmers remain neglected; there
should be regular monitoring and evaluation of resources allocations and
outcomes; land tenure and land rights must be rendered pro-poor.

viii) Rural industrialisation should be strengthened to improve off-farm employment
and income security. The NREGP and Bharat Nirman initiatives should be
linked with self-employment of agricultural graduates and other educated youth
and for strengthening infrastructure, especially roads, transport and
information/knowledge connectivity. “Kisan Wani” programme and each village
cluster as a knowledge centre are urgently needed to share technology, market,
price and weather related information.

ix) Institutional systems at grassroot levels, such as Panchayats and Gram Sabhas,
are absent, and the administrative machinery at the block level is defunct.
Necessary grassroot community-based institutions are a must for planning,
preparing and overseeing the implementation of agricultural and other
developmental programmes at village level.
x) Schemes of SFAC/NHB should not be compulsorily linked to credit. Since small entrepreneurs face many difficulties in the bank and would instead, like to invest their own resources for their projects.

6. Marketing, Distribution and Trade

i) Highest attention is needed for linking producers with markets, and ensuring appropriate returns; removal of middlemen; providing cold chains and promoting the use of non-wood packaging materials such as corrugated boxes through higher subsidies in order to bridge the cost differential with wooden boxes and gradual elimination of wooden boxes for packaging in order to save trees.

ii) Linking distant production centres with (proposed) rural market centres; promotion of niche production and markets and branding of the products; other things being equal, promote consumption of local products, including supplies to military personnel and establishments in the region.

iii) High priority should be given to post-harvest, agro-processing, value addition, marketing and entrepreneurial development.

iv) Regional Trade Agreements are hurting the interest of local farmers, and should be reviewed and restructured to meet India’s overall competitiveness. For instance, in case of J&K, the apricot produced in Ladakh is superior to the apricot imported from Afghanistan, but still the Government goes on importing apricot at the cost of the local production and distribution.

7. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
1. **Introduction**

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Ranchi on 13\textsuperscript{th} July, 2006. The NCF was represented by Shri Y.C. Nanda, Member, Dr. R.B. Singh, Member and Dr. Ramesh Singh, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. **General Observations and Suggestions**

i) Participants appreciated the draft National Policy for Farmers and felt it was in the interest of the farmers.

ii) It was hoped that the implementation would also be in tune with the spirit in which the Draft Policy for Farmers was prepared by the National Commission on Farmers.

iii) Much greater attention was needed from the Government for the agriculture sector.

iv) Urban elite had no awareness about the plight/problems of agriculture.

v) Jharkhand is ‘Ratna Garbha’.

vi) 80% population of Jharkhand is dependant on agriculture for their livelihood.

vii) Government schemes are centered on people below the poverty line [BPL]. For better results, the Governments should cover agriculture and the related sectors as such, covering people both below and above the poverty line. People who are above the poverty line have capabilities to achieve better results.

viii) The ecology of Jharkhand is the economy of Jharkhand.

ix) Mahua & Karanj plants of Jharkhand have the potential for producing bio-diesel.
x) Sale of fertilizers is in the hands of few dealers who exploit the farmers because of their monopolistic status in their area. The State Government needs to be more active in controlling such practices.

xi) The participation of IFFCO and KRIBHCO should be strengthened in distribution of fertilizers to eliminate sale of spurious fertilizers.

xii) Lac cultivation is an important source of livelihood for people of Jharkhand. Nearly 50% lac production in the country is from the State.

xiii) The programmes of the Grain Banks should be strengthened.

xiv) Need for an integrated approach for all the State and Central Govt. Schemes/Programmes.

xv) Profitability in agriculture is declining.

xvi) There is a need of coordinated approach for solving the problems of the farmers.

3. Soil Health Care

i) Land and soil health problem are the major problems in Jharkhand.

ii) Jharkhand soil is generally deficient in lime and if there is no lime treatment the yields from even high quality seeds remain low.

iii) 25000 Soil Health Cards have been issued to the farmers in Jharkhand. The target is to issue the Soil Health Card to each farmer.

iv) Immediate analysis of soil is essential with the help of mobile soil testing laboratories. This programme should be launched on a national scale.

4. Irrigation

i) Most of the area of Jharkhand is under rainfed farming and it is essential to plan cultivation of those crops which require less water.

ii) In Palamu region, citrus and grape cultivation should be encouraged.

iii) A major programme for Soil reclamation is needed for the State.

iv) In Jharkhand annual rainfall is 1100 mm. There is need of water harvesting and watershed development in a scientific manner. Each farmer should try to harvest rain water.
v) Diesel pump sets are the main source for lifting irrigation water which is costlier than lifting water with electric motors.

vi) Maintenance of check Dam is an important issue.

5. Research, Technology and Extension

i) Field centric approach for development agriculture is essential. Research which is not oriented to solve field level problems is not of much use to the farmers.

ii) Village level approach for appropriate technology is necessary.

iii) There is huge potential for organic farming in herbs/medicinal and other aromatic plants as the State is rich in natural vegetation and is home for of several species [for example, 114 medicinal plant species]. The tribal pockets of the State where no chemicals are used in agriculture could be declared as ‘Organic Zone’.

iv) Crop wise detailed package of practices is necessary for a State like Jharkhand.

v) The State Agriculture Department officials do not appear to be favouring organic agriculture as the productivity levels and production figures which they have to report are quite low in system of organic agriculture.

vi) Jharkhand is capable of producing many horticultural crops. The uplands could be mainly used for developing horticultural crops.

vii) The work of the National Horticultural Mission is progressing well in the State.

viii) The diversity of agro-climatic conditions in Jharkhand should be taken into consideration in formulating the projects/schemes.

ix) Rainfed agriculture is important as only 10% area has assured irrigational facilities.

x) Awareness of farmers about the latest technology of agriculture is rather low.

xi) Integrated farming approach is essential.

xii) Seed replacement rate is only 5-10%.

xiii) There is need for strong extension network in Jharkhand.

xiv) At primary school level the children should be made familiar with plants etc.

xv) There is a lack of extension workers.
xvi) How to retain the youth in agriculture is a serious issue as most of the farmers are elderly persons.
xvii) Rejuvenation of old orchards is extremely important.

6. Credit and Insurance

i) Land passbook should be issued to each farmer.

ii) Backward blocks should be identified for greater focus by the financing institutions.

iii) Outreach of Kisan Credit Card should be increased manifold.

7. Market and Investment

i) Not only marketing of agriculture produce is a problem, the marketing system is also inefficient. The producers get a very small part of the price paid by the consumer. Large profits are made in the supply chain.

ii) There is need for much greater capital investment in agriculture.

iii) Production should be market oriented.

iv) Around Ranchi vegetables like cauliflower & capsicum are available throughout the year. The need is for a good market chain to market these vegetables. The Market Yards should also have facilities for grading, storage etc.

v) Litchi is being grown in Ranchi even before the plant was introduced in Muzaffarpur [Bihar] on a commercial scale. There is considerable potential for developing this fruit crop in the State.

vi) Farmers do not have any trade organisation of their own to articulate their issues as in other trades and industries. Hence their problems are often overlooked.

vii) Product price should be based on input cost with at least a profit margin of 8-10%.

viii) A vegetable export zone should be established in Jharkhand.

ix) Market development without the assistance of Govt. is extremely difficult in the State.

x) Private sector is now becoming interested in entering the agricultural produce market.
xi) The prevailing prices of many agricultural crops often remain below the MSP announced by the Govt. of India. The MSP should be protected.

xii) Transport subsidy is needed for input distribution in tribal areas.

xiii) There should be free movement of lac to strengthen the lac market all over the country.

xiv) MSP of the lac should also be announced.

xv) Soil testing units should be established at KVKs.

xvi) NGO should also be permitted to buy agricultural produce directly from the farmers without going through the APMCs.

8. Shri M.K. Mandal, Chief Secretary, Government of Jharkhand, gave an overview of the current agricultural situation in the State and the future roadmap. He emphasized the need for policy for development of agriculture in the State which should be implemented both in letter and spirit and not merely remain just a document. He regretted that despite 80 per cent of the Jharkhand population being dependent on agriculture, the State has so far given only secondary importance to this vital sector, most of the attention going to industries and minerals. While appreciating the contents and implications of the draft NCF Policy on Farmers for development of livelihood security of the people of Jharkhand, he identified the following aspects for priority action at the State level:

i) Notwithstanding the priority for small and marginal farmers, attention should also be paid to medium and large farmers so that they could serve as role models for small farmers.

ii) Generally, most of the Jharkhand farmers have not benefited from the Green Revolution and still continue to practice traditional methods of cultivation. The thrust, therefore, should be given to the development, identification and transfer of appropriate modern technologies, duly blended with indigenous knowledge, and by emphasizing integrated use of chemicals and organic products throughout the producer-consumer chain. Agricultural Renewal (as highlighted in the NCF Draft Policy) should earnestly be started during 2006-07
and Birsa Agricultural University, in collaboration with other stakeholders, should lead this **Renewal**.

**iii)** Tribal belts and other niche areas suitable for organic farming should be declared as Organic Farming Zones and appropriate production, post harvest management, certification and marketing facilities should be provided in an integrated manner. Organic production of medicinal and aromatic plants holds a great promise in the State.

**iv)** Since most of the upland in Jharkhand is marginally utilized, there is ample scope for diversification towards horticultural production. Enterprises like dairy, poultry and fisheries should also be promoted in an integrated manner. Agricultural diversification should be based on market demands. While training should be intensified in the diversification programme, training of women farmers should be given special attention.

**v)** Irrigation remains generally neglected in Jharkhand. The Government of India should give special support for increasing irrigation intensity in the State.

**9.** After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF KARNATAKA FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT BANGALORE ON 24th JUNE, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Bangalore on 24th June, 2006. Prof. M.S. Swaminathan, Chairman, NCF was accompanied by Shri Atul Sinha, Member Secretary, NCF, Dr. R.B. Singh, Member, NCF, Shri Y. C. Nanda, Member, NCF and Ms. Mamta Shankar, Director. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. Inaugural Session

2.1 Welcome address by Shri Bandeppa Kashempura, Hon’ble Minister for Agriculture, Government of Karnataka

During his welcome address, Shri Bandeppa Kashempura, Hon’ble Minister for Agriculture spoke about the following pro-farmer programmes initiated in Karnataka State by the present Government:

i) *Panchasutra* programme for accelerated growth in agriculture sector.

ii) Distribution of soil health cards covering 9000 villages at a cost of Rs.5 crores in a span of three years.

iii) Credit facilities through co-operatives to the extent of Rs.3 lakhs per farmer at 4% interest.

iv) Schemes for agricultural processing and post harvest technology with financial allocation of Rs. 20 crores and Rs. 10 crores respectively.
v) Further, he requested farmers, experts and representatives of NGOs and other organizations to suggest to the National Commission appropriately to improve economic status of the farming community.

2.2 **Address by Shri Doreswamy, Freedom fighter**

Veteran, revered freedom fighter Shri Doreswamy expressed on Gandhian thought about import of food grains as “Colossal insult to the Nation”. He opined that agriculture be treated as an industry. He also suggested that while making policies, attention be given to the small and marginal farmers. Further, he said that agriculture is a fine art occupation and creates opportunities for work.

2.3 **Opening Remarks by Prof. M.S. Swaminathan, Chairman, NCF**

i) Dr. M.S. Swaminathan released *Panchasutra* poster designed and brought out by the Department of Agriculture, Government of Karnataka.

ii) Chairman, NCF informed that the main purpose of the interaction session was to elicit advice from farmers, subject study groups, other allied institutions, NGOs, input supply agencies etc which reflect the need of farming community, for making necessary amendments in the Draft Policy. His discussion was mainly centered around the following subjects:

iii) Slow growth rate of agriculture as against the target of 4% was alarming.

iv) Market surplus has no meaning for small and marginal farmers.

v) He appreciated the credit policy of the State at 4% interest through co-operatives.

vi) He narrated Shri M.K.Gandhi’s visit to NDRI, Bangalore and recording in the visitors book as Porabandar farmer against profession column in the register which signified Gandhiji’s concern towards the farming community.

vii) He appreciated the *Panchasutra* programme suggested in the Draft Policy of NCF that had been adopted in Karnataka State.

viii) Need for creating broad based policy which would also take care of interest of landless labourers, other stakeholders, trend setters and farm related distribution.
3. **General Observations and Suggestions**
i) Investment in agriculture sector should be increased.
ii) Budgetary allocation to agriculture and horticulture sectors should be enhanced.
iii) There is a need for recognition of farmers’ efforts in their innovations, methods and experiments.
iv) Farmers’ Organizations should be involved in drafting farm policy.
v) Interaction sessions of NCF should be held at Gram Panchayat level also.
vi) Small scale and cottage industries that generate income for rural people should be encouraged.
vii) Bottom up approach - Gram Panchayat plans should find place in annual action plans of line departments.
viii) Farmers need not only be ensured remunerative prices but also they should get respect/dignity.
ix) Men farmers should also be encouraged to form SHGs on the lines of women SHGs.
x) Uninterrupted power supply to be ensured for villages.

4. **Land**
i) Selling of agricultural land for non–agricultural purposes should be avoided.
ii) Transfer of land for non agricultural purposes should be banned.
iii) Need for land reforms was stressed.
iv) Extension of cities should be restricted and infrastructure facilities should be developed in villages to make rural life attractive to youth.

5. **Livestock**
i) SHGs should be given training in production of animal feed concentrates for which raw materials may be supplied to them.
ii) Every Gram Panchayat should have a Veterinary hospital.
iii) Cultivation of fodder should be encouraged and surplus fodder stored in silos constructed for the purpose.
iv) Programmes to supply ½ liter milk to pregnant and lactating women to meet their special nutritional needs should be launched.

v) Under milk sector private firms are allowed in Milk & Milk Produce Order (MMPO) – this should be avoided.

vi) Local breed of livestock should be improved as they ensure self-sufficiency.

vii) Breed improvement centres are needed all over the country.

viii) Medicinal properties of *Panchagavya* should be popularized.

ix) Subsidiary occupations like rearing cows, sheep and goats should be encouraged in order to help farmers to come out of financial crisis.

x) Farmers should be given permits for sustainable grazing of sheep/goats in reserved forest areas.

xi) Rearing of small ruminants must be encouraged.

xii) Extension education and vaccination facilities should be extended to sheep rearing also.

xiii) 5 to 10% of land may be set aside for rearing/grazing livestock.

xiv) Hybrid fodder variety development should be encouraged.

6. **Research, Technology, Inputs and Extension**

i) Special agricultural schools should be established in rural areas to educate agricultural labourers on agriculture and essential modern technologies.

ii) Vacant posts in Department of Agriculture and Horticulture should be filled up.

iii) Horticulture universities should be established.

iv) Priority should be given to organic farming and training given to farmers. Some however expressed that Indian agriculture should not be taken 100 years back through adoption of organic farming.

v) Forest based agricultural system through growing tree crops should be promoted.

vi) Medicinal plants should be encouraged.

vii) A farmer informed about existence of 2500 species of plants in his farm and produces which are converted to 500 value added products – such farming should be encouraged.
viii) Production and supply of organic inputs at a subsidized rate is required.

ix) Contributions of green revolution should be appreciated. Mistakes should be rectified. Modern technology should not be neglected. A proper balance is needed.

x) Programmes related to conversion of plant and animal residues to manures should be adopted.

xi) Villages should have internet facilities for accessing meteorological information and technical information on agriculture.

xii) Diploma course in agriculture may be introduced in universities at the undergraduate level and syllabus on agriculture needs to be included in school curriculum.

xiii) Small farmers should be given subsidies for purchase of bullocks and carts (at present big farmers are getting benefit for purchase of tractors).

xiv) Quality control of inputs and their regulations should be strictly enforced.

xv) Quality seeds should be supplied - Sellers of spurious, sub-standard seeds must be punished.

xvi) Supply of spurious/non-standard fertilizers, seeds and equipments has continued-legal action should be strictly enforced.

xvii) Quality seeds should be supplied through SHGs.

xviii) SHG members should be educated on Seed treatment methods.

xix) SHG members need training on preparation of Bio fertilizers.

xx) Farmers and SHGs should be involved in Seed production.

xxi) SHG members should be trained on ascertaining quality of agricultural inputs.

xxii) Any new information/technology should be routed through SHGs; Technical support should be provided to SHGs for dissemination of knowledge in agricultural development.

xxiii) As SHGs empower farmers, Policy should be oriented towards such efforts.

xxiv) Karnataka State Seed Corporation should enhance its production capacity.

xxv) State Agricultural Universities should be encouraged to take up seed production.

xxvi) Co-operatives with limited number of members will be more successful.
xxvii) Seed Bill 2004 is against farmers’ interest; hence, do not hand over seed industry to MNCs. There should be suitable orientation for effective utilization of technology and research findings by them.

xxviii) Agricultural University scientists should not transfer seed production technology / seed lines to MNCs and exploit farmers.

xxix) Government should supply inputs like improved implements, machinery, bio-fertilizers etc. at 90% subsidy to poor farmers.

xxx) Fill up vacancies of technical staff in the related departments.

xxxi) More agricultural assistants should be employed at the grass root level and the necessary facilities should be provided to them.

xxxii) Effective utilization of modern technologies and audio-visual aids for reaching farmers are necessary for agricultural development.

xxxiii) Small and marginal farmers should be taken care of in horticulture development programmes.

xxxiv) There is a need to improve transfer of research innovations developed in the laboratories to the farm level.

xxxv) There is a need for the adequate supply of agricultural implements, machinery at subsidized prices.

xxxvi) Implements and machinery should be available on hire basis.

xxxvii) Information on agriculture should be given as prime news in newspapers and other mass media.

xxxviii) State departmental activities should not be reduced to mere distribution of subsidies.

7. Credit and Insurance

i) Creditworthiness of farmers should be improved through bio-metric profiling.

ii) Provisions to avail loans by small and marginal farmers both for development and for crop production programmes to be made.

iii) Provide subsidies on the lines of NABARD (credit subsidy to loan accounts after proper utilization of loan amount).

iv) Channelize credit from urban / Sauharda Banks to agricultural sector.
v) Banks and Insurance Companies must be farmer friendly.

vi) Credit policy needs to be changed – RRBs should not die down, credit supply formalities should be reduced. National and State Credit Policies should be same. Co-operative structure should be strengthened and easy credit should be provided to SHGs.

vii) Commercial banks should also provide loans at 4% interest and small/marginal farmers should be given priority

viii) National banks provide credit at 7% interest but in reality it is 9%.

8. Marketing Distribution and Trade

i) Farmers should be given proper advice on remunerative crops.

ii) Role of corporate farming should be enhanced.

iii) Mandates of such corporate farming should include
   a) Participatory research programme.
   b) Cold storage structures.
   c) Alignment with NGOs

iv) Minimum and maximum prices for agricultural inputs and produce should be fixed.

v) Petrol, diesel prices are enhanced every few days – but it is not so with the prices of agricultural produce.

vi) Fruits and vegetable markets should be strengthened in the line of silk cocoon markets.

vii) Local markets should be established to ensure guarantee price.

viii) Co-operative market outlets for the products produced by Sthreeshakthi groups should be launched.

ix) Benefits of APMCs have not reached small, marginal and medium farmers.

x) Cold storage facilities at taluk level and small food storage centers at Gram Panchayat level were needed.

xi) Weekly shandies in villages should be encouraged.

xii) Farmers have to practically pay 8 to 10% commission while marketing agriculture produce. This should be done away with.
xiii) MNCs should not be allowed in agriculture produce marketing.
xiv) Remunerative prices to agricultural produce should be ensured.
 xv) SHGs may be involved in marketing of agricultural produce on the lines of **Rythu Bazaars**.
 xvi) Mini Dairy co-operatives run by women groups have been very successful in a few villages- needs to be extended to other villages.
 xvii) Assistance was needed for marketing vermi compost produced by SHGs.
 xviii) Farmers’ share in consumer’s rupee should be increased.
 xix) Proper market for agricultural produce should be ensured.
 xx) Processing of agricultural commodities should be encouraged.
 xxi) There is a need for strengthening of APMC Act (not to privatize it).
 xxii) Ensure fair prices instead of providing subsidies.
 xxiii) Export promotion policy is not clear in NCF draft report.
 xxiv) Export subsidy should be provided and agricultural exports should be strengthened.
 xxv) Quantitative Restrictions (QRs) to protect interest of farmers should be brought back.
 xxvi) Marketing organizations should be improved on the lines of HOPCOMS.
 xxvii) State Governments to recognize producer companies as done by the Government of India.
 xxviii) There is a need to establish independently managed separate fund to meet the distressed farmers’ needs.

9. **Dryland Agriculture**

i) Restrictions to be imposed for installing 1 to 2 pump sets per family.

ii) Low External Input Sustainable Agriculture (LEISA) is the need of the hour.

iii) Bring back life to the soils in drylands; change in attitudes/perceptions of farmers regarding rational use of natural resources is needed.

iv) Minimum distance between two bore wells to be enforced.

v) Need for special packages to the drought prone areas (North Karnataka districts).
vi) To establish systematic progress, there is need for adoption of climate dependent agricultural methods.

vii) Efficient use of irrigation water is needed.

viii) Lands cultivated by landless labourers should be decided for allotment immediately.

ix) NCF to fix land to forest ratio so as to avoid further deforestation.

x) Agro-forestry and ‘Green for Fuel’ should be encouraged.

xi) Irrigation cost per acre needs to be worked out.

10. PRESENTATION BY SUBJECT COMMITTEE EXPERTS

10.1 Subcommittee on Soil Health & Productivity Enhancement

Dr. S.A. Patil, Chairman of the Sub-committee highlighted the following strategies:

i) Listing of soil quality indicators.

ii) Strategies and action plan for
   a) Mechanism to create soil health awareness
   b) Soil & water conservation techniques
   c) Developing packages for reasons specific sustainable farming
   d) Setting up of precision farming centres.
   e) Promotion of organic farming

10.2 Subcommittee on Irrigation Water Supply Augmentation and Demand Management

Capt. S. Raja Rao, Chairman presented on the following terms of reference and detailed report was submitted to the Commission:

i) Mainstreaming Rain Water harvesting

ii) Policy incentives and awareness creation

iii) Crop planning

iv) Improving water use efficiency

v) Water use regulatory mechanism
vi) Strengthen Water Users’ Association
vii) Low cost technology for water conservation & management

He gave remedial measures under short term and long term duration as follows:

10.2.1 Short Term remedial measures

i) Extend Under Ground Drainage system to all class-I cities.

ii) Provide tertiary treatment for domestic and industrial water and recycle the treated water and thus reduce the requirement of fresh water.

iii) During drought years, practice “cloud seeding” and harness additional 15% to 20% of water.

iv) Adopt canal automation synchronizing with computer controlled management to use ground water and surface water.

v) Resort to desalination of water in coastal areas and other problematic areas.

vi) Adopt ‘pumped storage concepts’ wherever possible for all hydel projects and thus save water and produce more electricity.

vii) From ecological consideration, maintain a minimum flow in the river.

viii) Encourage less water intensive crops as far as possible.

ix) All polluting and water based industries (17 Categories) should have to mandatorily seek ISO 14001 Certification by law.

x) Encourage private participation in the construction, operation and maintenance of Water and Sewage Treatment Plants.

xi) National / International Benchmark for water consumption and water reuse in each of the 17 category of industries should be fixed and a rigid time frame be set to achieve it.

xii) Create public awareness for economizing water use with more and more participation of women.

xiii) Waste utilization technologies / use of clean production technologies with emphasis on waste minimization, recycling and reuse have to be encouraged for adoption.
xiv) All local authorities having piped water supply scheme should conduct leak detection studies and take remedial action to save precious water.

10.2.2 Long Term Measures

i) Piped water supply for irrigation
ii) Desilting of Reservoirs
iii) Inter-Basin Transfer
iv) Canal Automation
v) Extend Under Ground Drainage and Sewage Treatment Plants to all habitations.

10.3. Subcommittee on Agricultural Technology and Extension Management

Dr. Dwarkanath, Chairman of the Sub-committee pointed out that the average farm size is becoming smaller each year and the cost-risk–return structure of farming is becoming adverse. He put forth a strategy for achieving 4% growth rate in agriculture and discussed exhaustively regarding Asset reform, Land reform, Power and Economy of scale, Livestock, Fisheries, Water, Water use efficiency, Agro Biodiversity, Animal genetic resource, Climate change and Science & Technology. As a separate chapter, he presented views on pro-small farmers and pro-women programmes regarding knowledge connectivity, rural employment guarantee, digital revolution, organic farmers, crop diversification, agro-meteorology, bio-security, credit & insurance, co-operatives, assured & remunerative marketing opportunities. Finally, he suggested public policies for sustainable livelihood and further course of action.

10.4. Sub-committee on Credit & Insurance

Shri. D.B. Ghosh, Chairman of the Sub-committee explained briefly about credit facilities provided through NABARD. He also suggested the issue of Kissan credit cards to farm men and farm women. Besides he suggested popularization of Farmers’ Contact Center and e-Grama.
10.5 **Subcommittee on Agriculture Market Reforms and establishing Indian Trade Organization**

Dr. R.K. Deshpande, Chairman of the Sub-committee gave presentation on the following issues:

i) Enabling provisions and the required amendments in the APMC Act.
ii) Contract farming and direct marketing with an established code of conduct.
iii) Establishment of Indian Trade Centre, supported by a Trade Advisory Body for Small Farmers
iv) Supporting /strengthening Producers’ co-operatives and market linkages.
v) Synergy between forward and backward linkages, agro-processing & export market development, production planning, use of information technology in agricultural marketing.
vi) Establishing Hope Generation Teams.
vii) Price Stabilization Fund, Market Intervention Scheme, group farming for self help groups, corporate farming, company farming.
viii) Creation of SHG capacity building and mentoring centres.

11. After the Consultation session, Chairman and Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Thiruvananthapuram on 25th July, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member and Ms. Mamta Shankar, Director. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) Farmers should be issued Identity Cards. Farmers’ rights should be defined and farmers’ courts should be set up. A constitutional body to listen to farmer’s woes is required.

ii) The cost of labour was high as compared to other States. Instead of depending on raw produce, emphasis has to be given on value addition.

iii) The Plantation Labour Act should be amended.

iv) For assessing crop loss, per ha. or per crop criterion was adopted. This was not practicable in Kerala where homestead farming is practiced. The National Horticulture Board, Ministry of Agriculture, NABARD and Commodity Boards may be asked to restructure their schemes of assistance for crop support and assessment of crop loss to farmers of Kerala on homestead basis.

v) Given the agro ecological diversity in the State and the localized nature of agrarian distress the farmers requested that the Commission should hold discussions in hard hit districts like Wayanad, Idukki, Kasargod, Kuttanad and Calicut.
vi) The services of Panchayati Raj organizations, like Gram Sabha and Ward Sabha (in respect of Municipalities and Corporations) should be utilized for identifying social evils.

vii) Definition of farmers should include mushroom cultivators and people practicing apiculture and mariculture and other farming related occupations.

viii) There should be a provision for the forest – dwelling communities to object to or seek changes in ‘development’ projects that are impinging on their lands and resources. The decisions should be based on specific studies.

ix) Ecotourism should be encouraged.

x) Some mechanism was required for control of wild animals.

xi) While framing national plans, Kerala must be given a special package like the North Eastern State due to diversity of plantation and agriculture crops.

xii) Agriculture must be included in the school curriculum.

xiii) The Agriculture Communication System should be redesigned with farmer at the core to provide public space where farmers could discuss their problems.

xiv) Cottage Industries related to agriculture, livestock, marine products appropriate for Kerala should be developed.

xv) Environmental problem due to sand mining, filling up of paddy fields, mining of granite mounts, sea erosion and indiscriminate use of chemical fertilizers and pesticides were a great cause for concern in the state.

3. Land

i) National Land Reform Policy and a National Land Use Policy would have to be evolved immediately.

ii) Due to land shortage, intensive and mixed agriculture with crop rotation within the small holdings or home gardens would be beneficial.

iii) The ‘Pattam’ system was creating problems which may have led to suicides and other adverse social evils. Under ‘Pattam’ system, cultivators take land for cultivating paddy for a season without any written agreement. The farmers are
unable to raise the loan. To facilitate credit, ‘Pattam’ may be legalized by providing fair rent @ 1/6th of the produce.

iv) Kerala should look at the possibility of introducing hazelnut and other high value fruits. To achieve this, the Land Ceiling Act had to be relaxed.

v) Before introducing Soil Health Pass Book farmers should be given training.

vi) Soil Health Card should include bacterial count.

vii) Land should be surveyed with the help of GIS application and computerization of records should be done for simple and transparent land transfer. The Karnataka model could be emulated.

viii) ‘Cooperative Production Samiti’ should be strengthened.

ix) A review and reorganization of “Swarsraya Sangham” is required.

4. **Livestock & Fishery**

i) A Resource map of livestock resources should be drawn up and the carrying capacity of these resources should be calculated.

ii) Appropriate breeding policy, appropriate culling rate and integrated development projects (taking care of all elements up to marketing and institutional support etc.) should be emphasized.

iii) Disease control programmes were confined to few districts in the State. There should be comprehensive state wide disease control initiative.

iv) Reasonable slaughter of cows for export could be carried out.

v) By products like glands and bones should be utilised.

vi) All Universities should do need based/demand based research.

vii) Health care linked animal insurance scheme should be made available.

viii) Fish may be included along with cattle, sheep, poultry in developing living heritage gene banks of the germplasm.

ix) The development of Ecotourism should not be at the expense of traditional fish farmers. The application of Geographical Information System in fishing and the concept of virtual university in fish marketing should be exploited.
In the present scenario, fishery is extractive in nature. Schemes were needed for promoting fish rearing and protective fishery.

5. **Issues specific to major crops**

5.1 **Coconut**

i) Coconut was sown in homesteads and covers a huge dispersed area unlike rubber which was done in compact area.

ii) Considering the number of people dependent on it for their livelihoods the investment was very low.

iii) Problem of root wilt disease prevalent in 5 major districts in southern Kerala with no cure.

iv) Replanting programme was very important. There was a provision of replanting under the National Horticulture Mission for horticultural crops. Even for rubber there was provision for replanting. There should be provision for replanting of Coconut under Technology Mission or Coconut Board.

v) Most of the coconut was unirrigated.

vi) Coconut Board has no mandate for research and no field units.

vii) Coconut Board should be under Commerce Ministry.

viii) Assistance required for replanting, irrigation and processing of coconut.

ix) Ministry of Agriculture was going to give assistance for micro irrigation with 50% subsidy.

x) Assistance required for replanting had to be of a high magnitude since the coconut tree had a 7 year gestation period.

xi) Innovative diversified products like ‘Nira’ have been launched.

xii) Amendment in excise rules of States was required, since at present a farmer could tap only 5 trees. For processing Nira more inputs were needed and a catchment area of 250 plants was required for setting up a processing plant.

xiii) FTA with ASEAN would pose a threat as they were cost effective competitors and so far the domestic sector was protected with a high tariff wall with 100% tariff on imported coconut. Coconut should be in ‘Sensitive list’.
xiv) It is in sensitive list under SAFTA but coconut is also coming from illegal means and hurting our farmers.

xv) With the help of Coconut Technology Mission processing units and tender coconut project had been initiated and cluster approach was being adapted for assistance under the Mission.

xvi) 45% duty was imposed on imported soyabean oil. Given its importance to the Kerala Economy coconut should be declared as ‘protected oil’. For this, even 45% duty rate was not enough.

xvii) Coir, rubber were not considered as agricultural commodity in WTO.

xviii) Coconut oil was a canalized item for import through STC. Under Advance Licensing Scheme (ALS) it had to be re-exported but no time limit was specified and there was a sudden spurt in import of coconut oil.

xix) Due to multifarious problem faced, Coconut plantations were being converted to rubber plantations. Coconut cultivation should be subsidized.

5.2 Pepper

i) Farmers in the State should be consulted before agreeing to FTAs and import tariff.

ii) Ministry of Commerce were signing all FTAs without consulting Agriculture Department of States.

iii) Industry was paying premium to Sri Lanka pepper.

iv) Quality of Vietnamese pepper was poor.

v) For pepper we have to change our support for better revenue.

vi) Illegal smuggling of areca nut, cardamom, pepper should be controlled.

vii) Central Government aid should be given to the State Governments to promote our agricultural commodities by branding each produce like ‘Kerala black Pepper’. This would help the farming community to fetch higher price in domestic and international markets.

viii) Under SAFTA Agreement, countries had violated rules of origin and imported pepper from Vietnam and re-exported it to Kerala. The mixing of this low
quality pepper with world famous Kerala pepper was bringing bad name to Indian pepper.

5.3 Rubber

i) Rubber should be re-defined as agricultural product due to influx of cheap import.

ii) Certification of wood products by Forest Stewardship Council for export was necessary. Rubberwood must be included for that purpose.

iii) Rubber producers society may be exempted from Value Added Tax as they were self help groups.

iv) Subsidies for planting as well as replanting should be same.

5.4 Cardamom and Ginger

i) Traditional export like ginger cardamom were facing stiff competition. These crops may perish if the interests of the farmers are not safeguarded with the help of research and price support.

ii) Cardamom was cultivated in forest areas of Idukki by small growers. Small growers affected by the Indian Forest Act should be protected with a package.

5.5 Vanilla

i) Crash in prices of vanillin had ruined the vanilla farmers. The import of synthetic vanillin should be banned.

5.6 Paddy

i) In Kuttanad area, due to the fall of price of paddy, crop failure for the last three seasons also created a crisis like situation. Specific importance should be given to this region.

ii) The Government should fix floor price of agricultural products like, paddy coconut etc. and procure the product from the farmers without middlemen. The produce may be sold through Public Distribution System (PDS). The Kerala
model of procuring paddy by the State Supplies Corporation @ Rs.700/- per quintal during the previous panja season could be adopted.

5.7 Pineapple

Pineapple was grown as intercrop in rubber replantation areas. Pineapple was also grown as intercrop in coconut. It was highly labour intensive and high wages were paid to pineapple farm labourers. Proper recognition was not given to pineapple farming still its area and production was increasing. If pineapple intercropping is expanded in coconut root wilt areas it will partially compensate the loss of coconut farmers.

Suggestion for development of pineapple cultivation include: -

i) Trucks and rail wagon with cooling facilities should be provided.
ii) Indirect benefit like interest free loan, low cost input should be provided.
iii) Legal sanctity for contract farming should be ensured.
iv) Facility for product diversification and promotion of alternative fruit should be provided.
v) Low cost machine for land preparation should be designed.
vi) Coir Geo textile were useful in soil conservation and weed control, make it cost effective and modify its design.
vii) Liberal facility for pest and disease management, quality control of input be given.
viii) Pineapple Centre should be established with facilities for market information, e-commerce, training and processing and recreation.
ix) Pineapple Board should be established.
x) Lab was required to test agricultural inputs on payment basis.
xi) Inadequate credit and insurance facility was a constraint. Security asked by the Cooperative banks was very high.

6. Organic Farming

i) Organic farming should be encouraged.
ii) Organic farming needed to be systemized and inputs may be provided in cash or kind to promote it. It should be subsidized for first three years.
iii) Government should subsidize certification and set up organic marketing chains.
iv) State Agricultural Universities may be declared as the competent authority for certifying the organic products.

7. Credit and Insurance

Most Farmers made demand for concessional, timely and adequate credit. For agrarian distress cases, writing off of debt, further help in the form of loan and agriculture inputs to marginal farmers should be considered. Specifically it was suggested that:

i) NABARD should give loan to farmers at 3% interest directly.
ii) Interest free loan up to Rs. 1.00 lakh for small and marginal farmers and at 4% for other holdings up to 2 ha land should be given.
iii) Insurance scheme should be launched for farmers with pension and medical benefits.
iv) Government should make necessary arrangements for providing interest subvention to cooperative bank for involvement of their own high cost funds in agricultural lending or NABARD may provide 85% of the total credit provided by Cooperative Banks by way of refinance. In case of Cooperative Banks, NABARD has offered refinance of only 35% of total crop loan and has not proposed any interest relief in respect of the own funds to be used by cooperative banks for agricultural lending.
v) Convenor, SLBC, informed that the indebtedness to money lenders has increased manifold in the last decade in the state. He mentioned the various initiatives taken by the lead Bank like expansion in coverage no collaterals for loans below Rs. 50,000 etc. He also spoke about the pilot project on 100% financial inclusion in Palakkad District and the proposed survey of farmers’ indebtedness in the State. Following suggestions were made:

a) The state government should allow to deposit registration deed in the Bank before taking loan as was the case in Bihar.
b) At present, only annual agricultural crops were being covered by insurance. Perennial plantation crops should also be made eligible for insurance.
c) Leasing of land was not valid in Kerala, it should be allowed to enable financing to oral lessees

vi) The representative from NABARD suggested that consultation for agriculture credit policies should be held at corporate level. He also talked of Kerala specific issues like decline in competitiveness of traditional crops, importance of water harvesting and need for sustainable organic farming.

8. **Issues related to the Production, Marketing, Distribution and Trade with respect to some important crops in Kerala:**

The State is producing paddy, coconut, vegetable and fruit, medicinal plants, spices, plantation crops like tea, coffee, pepper, cardamom etc. These are concentrated in different areas of the State. There were special problems facing all these products. Farmers from these districts made the following suggestions:

i) Areas of AEZs should be expanded.

ii) Producers’ companies working on cooperative basis for procurement, grading and value addition of agricultural produce with Government participation to ensure reasonable price for the produce should be constituted. Cooperative farm shops on the lines of ‘Ryathu Bazaar’ in AP should be started.

iii) Fair Prices instead of subsidies and pesticides to be given.

iv) Boards should be formed for all commodities.

v) The number of small growers (less than 2 ha) should be represented in various boards.

vi) Transportation of agriculture produce was hindered by forest laws. Laws which restrict movement of goods should be rescinded.

vii) MSP for spices should be improved.

viii) There should be a Price Stabilization Fund for farmers.
ix) Price Insurance Scheme was needed.
x) Competitiveness in terms of costs was required. Productivity should be raised.
xi) Top priority should be given by the Central Government for selection of quality seeds which will help the farmers to attain maximum productivity from their holdings.

xii) There was a mismatch between input and output prices, Govt. should subsidize seed price.

xiii) Industry and Trade Bodies should be more active.

xiv) Role of PDS should be expanded.

xv) While cost of all commodities had gone up astronomically, price of farmer produce had gone up only arithmetically.

xvi) Comprehensive replantation programme for perennial crops and senile orchards should be adopted for coconut, arecanut, cashew, rubber, and tea with the help of high quality planting material. NREGP should include replantation activity in Kerala.

xvii) Steps to expand medicinal plant cultivation and scientific Ayurveda treatment should be taken up.

9. Issues related to Import Policy

i) Implication of the new IPR regime and pending Seeds Bill should be elaborated.

ii) Given the agro-climatic and ecological diversity, States should be final arbiters on policy issues be they IPRs, trade negotiations or aggregate measures and support.

iii) WTO negotiations should be made subject to satisfactory resolution of livelihood security arising from opening of the trade.

iv) Competition from other countries and the threat of imports at low duties were cause of concern to cash crops.

v) Before formulating the Import Policy the views of the Farmers should be consulted. All import policies should be examined from the viewpoint of their impact on farmers.

vi) FTAs should be entered only after consultation with States.
vii) Quality test on the import commodity should be strictly monitored.

viii) Seeing the plight of the Kerala farmer the import duty on spices should be raised.

ix) M.S. Swaminathan Committee recommendations should be implemented.

10. **Rural Energy**

i) Biogas should be taken up as a National programme.

ii) Flowers of cashew nut and nutmeg shell could be used for ethanol.

iii) Energy problems in rural areas should be given importance – a comprehensive rural energy plan was needed.

11. **Suggestions and Observations made by the Honourable Minister for Agriculture, Cooperation, Finance and Fisheries:**

After the Consultation session, Members of the NCF held discussions with Ministers in-charge of Agriculture, Animal Husbandry, Fisheries and Cooperation of the State Government. The Minister apprised the Members about the steps taken by the State Government in favour of farmers and raised various issues needing attention of the NCF relating to their State.

i) Hon’ble Minister of Agriculture, Shri M. Ratnakaran, highlighted the acute crisis faced by the major crops in Kerala due to volatility in prices. The removal of quantitative restriction has led to an annual loss of Rs.7000 crores due to price crash. While signing the bilateral and multilateral agreement on trade, the State was not consulted although agriculture is a State subject. Unless the credit policy was restructured to provide interest free loan till prices improved for farmers, coconut and paddy would not survive. A viable crop insurance scheme was needed. He expressed his reservation over corporate and contract farming and alienation of land and diversion of prime agriculture land for other purposes. The cooperative Amul model should be adopted. He made a request to hold one consultation at Calicut.

ii) The Hon’ble Minister for Cooperation, Shri G. Sudhakaran, Government of Kerala highlighted acute distress faced in Kuttunad region of the State where
the paddy and coconut farmers were facing a debt trap. He requested for a Vidarbha like package for the region and a reduction in rates charged by NABARD from cooperative banks.

iii) The Hon’ble Finance Minister, Dr. Thomas Issac also highlighted the unprecedented agrarian crisis and the drastic squeeze on agricultural income due to impact of WTO policies. He requested that the stand taken by the Swaminathan Committee should be reflected in the Policy. He also requested that there should be a separate paragraph on lack of public investment in agriculture. He also mentioned about the difficulties faced by the State Finance Department in spending for farmers due to restriction under the FRBM Act. He suggested that the Centrally Sponsored Schemes should be amenable for decentralized local level planning. He also mentioned that all local plans of Kerala would be watershed based henceforth.

iv) Hon’ble Fisheries Minister, Shri S. Sharma, recommended adoption of sustainable fishery with community management, aquarian reforms and a National level social security programme for fish farmers. He also suggested that there should be legislation for coastal water property ownership as the tourism resorts were taking away the beaches. The traditional catch should be included in the sensitive list in WTO.

12. The Members assured the full consideration of the suggestion and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF MADHYA PRADESH
FOR FEEDBACK ON THE DRAFT NATIONAL POLICY
FOR FARMERS AT BHOPAL ON 21st JULY, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Bhopal on 21st July, 2006. Prof. M.S. Swaminathan, Chairman, NCF was accompanied by Shri Atul Sinha, Member Secretary, NCF, Dr. R.B. Singh, Member and Ms. Mamta Shankar, Director, NCF. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) Farmer should be those who depended wholly on Agriculture.

ii) There was a need to develop segregated planning for every group covered under the definition of the farmers otherwise some practical difficulties may arise during the implementation of various schemes.

iii) Detailed study was needed for identifying the reasons behind the suicide of the farmers and best possible efforts were needed for rehabilitation of the family. Serious punishment should be given to the accused.

iv) There was need to conduct a comparative study of standard of living in urban and rural areas.

v) Policy must speak about the illiteracy and poor health conditions of the children of bonded labourers.

vi) National Farmers’ Welfare Fund and State Farmers’ Welfare Fund must be established.
vii) There was need to strengthen extension mechanism in an efficient manner through ICT for Agriculture.

viii) Information on various inputs, labour availability and success stories should be highlighted.

ix) Area specific information rather than broad information was needed.

x) Local language or dialect should be used.

xi) Information should be delivered quickly at farmers’ doorstep.

xii) Viability of ICT mechanism and proper management were vital for ICT to be successful.

xiii) Training one man and one woman at panchayat level for solving local problems related to agriculture was not practically possible as availability of such person in every village was doubtful. This kind of training programme should be of high quality and preferably given to agriculture graduates.

xiv) Visits to progressive area of the country for one progressive farmer from every Gram Panchayat should be facilitated.

xv) Reimbursement of fare to farmers for attending the Panchayat Meeting would act as an incentive.

xvi) Meeting with farmers should be held at Mandi levels.

xvii) Crop competition, honouring farmers and nominating top farmers at all levels in Zilla Parishad, Zilla Panchayat, Vidhan Sabha etc. should be encouraged.

xviii) Officers at senior level should be responsive. For agriculture the District Collector should have enough time to devote for Agriculture.

xix) Secretary of Agriculture, Horticulture, Animal Husbandry at centre and state level should be a technocrat for proper implementation of agricultural and allied activities as envisaged in the Draft Policy for Farmers.

xx) A Twenty-four hour channel on agriculture on Doordarshan should be introduced for farmers.

xxi) Section 35 (2 AB) of the Income Tax Act provides for 150 % deduction on pharmaceuticals, electronic equipments etc involved in research. This should be extended to agro based companies too as they were engaged in agri-research and development, farmers training and education etc. Agro based companies should
also get exemption from Fringe Benefit Tax for free distribution of samples of various agro inputs, expenses on sales promotion and market research.

xxii) Private sector should be attracted by providing tax benefits and subsidy for a period of five years for strengthening the extension services of agriculture.

xxiii) The concept of village trade balance was put forward. While seed, fertilizer, pesticide, diesel, equipment make the village trade balance negative, crop production and animal product make it positive. Policies should strive to include all suggestions which made this village balance positive.

xxiv) Every place had its USP. We should market and exploit our quality parameters.

xxv) Recommendations should be backed by financial implications.

xxvi) Small Scale Units based on local crops should be set up.

xxvii) Help to farmers in States where there were no suicides cases should be given to prevent suicides.

xxviii) Issues related to tribal women in agriculture and women labourers were not addressed adequately.

xxix) All Agricultural Universities should reserve one month period for village visit once a year.

3. Land

i) Prices fixed for Land acquisition were very low considering market rates. Even this was not paid to farmers.

ii) Farmers were spending too much on litigation over land acquisition for dams and urban and industrial expansion.

iii) Government had promised that 20% of developed land would be returned to farmers but this was not put to practice.

iv) Farmers protesting over these issues were beaten up. A ban on lathi charge on farmers should be recommended.

v) Policy was needed to stop acquisition of agricultural land and for establishing industries. Only uncultivable waste land should be transferred to corporate sectors or business houses.
vi) Long term lease (30 years) for ravines of Chambal and other degraded waste lands may be given for the purpose of rehabilitation of these lands through different agricultural systems.

vii) There was need to formulate a strong developmental programme with hundred per cent assistance from Government of India to check the erosion.

viii) NCF should gather data for the last 20 years on acquisition of agricultural and waste land for industrialization, urbanization and construction of roads, the pending cases for distribution of compensation and total amount distributed as compensation against acquisition of land.

ix) In the interest of Scheduled Tribe (ST) farmers, measures should be included in the policy for land acquisition, sale of land, land transfer etc.

x) There should be a law which protects tribal community from problems arising in taking their animals for grazing in plain and forest areas.

xi) Schedule Tribes (ST) involved in production and conservation of forest product should get similar right on forest products as given to land owner. Similar law must be there for fishers who are totally dependent on the fishing.

xii) Farmers should be freed from various articles of land revenue and other judicial activities which hindered the progress of agriculture leading to loss of wealth.

xiii) Size of holding below which fragmentation was uneconomical should be fixed by a law.

xiv) Consolidation of holding was required.

xv) Private sector was providing soil testing as the Government machinery was not providing them.

4. Water

i) Farmers irrigating their crop using electricity should get more subsidy as compared to farmers having access to canal irrigation.

ii) Dry land horticulture including medicinal plants should be encouraged in water scarce areas.

iii) Water Resource Conservation Bill should come in place to protect the various water resources.
iv) Efficient management of irrigation (from head to tail end) and uninterrupted supply should be ensured for the development of agriculture.

v) Government may dig deep tube wells and sell the water to farmers.

vi) Problems of tail enders should be addressed. The productivity of crops was lower in tail areas. Give free water and electricity but charge taxes.

vii) Duty on sprinkler drip irrigation should be reduced.

viii) To avoid problem of displacement, tank irrigation should be adopted.

ix) Equitable distribution of water and water use efficiency was very important.

x) Technology Mission on Rainfed Agriculture should be established.

5. **Livestock and Fisheries**

i) Policy for livestock feed and fodder security system must be developed in each State.

ii) Poly clinics (Agro –Veterinary) should be established in remote areas.

iii) Since dairies of improved breeds of buffaloes were around big cities, no care was being taken for the maintenance of calves and heifers of buffaloes due to high rearing cost. Free/ subsidized land with financial support from the govt. may be provided to landless/ small farmers/ NGOs to rear them for their benefit.

iv) There was need to promote traditional varieties, modernize them and to motivate farmers for rearing domestic livestock.

v) There should be provision of compensation for crop production losses due to stray cattles.

vi) Unproductive animals should be castrated.

vii) There was a need to setup a National level body for intensive enquiry during the last five years of the progress of various corporations before constituting Livestock Feed Corporation.

viii) Subsidy for calf rearing was necessary for improved varieties.

ix) Livestock insurance should be expanded.

x) Outreach and extension services are very poor. Training of farmers in Animal Husbandry was required.

xi) Use of agricultural equipment with Bullocks should be subsidized.
Law about National Parks being open for grazing should be reviewed.

Farmers should be given free of cost vaccination, mineral mixture, deworming and A.I. for breed improvement.

Farmers should adopt animal husbandry as it is less affected in comparison to crops during drought and heavy rains.

Poultry should also be added in the list of assets.

Policy of livestock feed and fodder security system should be developed in each state.

Fishermen require credit cards and insurance for animal husbandry.

River ranching was needed.

Each train should have a refrigerated compartment.

OBC fishermen should get same level of subsidy as SC/STs.

Assistance was required for pre-harvest operations in fisheries.

6. Research, Extension Technology and Input

There was need to suggest to farmers regarding which farming system they should adopt according to availability of resources with them so that farmers could get assured income on per day, weekly or monthly basis.

Lac cultivation, sericulture, mushroom cultivation, bee keeping and floriculture needed promotion for livelihood security.

Appropriate infrastructure in villages be developed for enhancing the quality of seeds preserved by farmers.

Policy for development of seed security systems and buffer stocking of quality seeds was needed.

GM crops and Bio technologies should be promoted through public sector organizations. GM seed certification procedure should be looked into.

We should not depend too much on costly seeds.

There was a need for introduction of anti bio-piracy regulatory systems.

No work had been done in traditional knowledge.

There was a need to intensify the research related to organic products and to introduce National Organic certification Process so that it cost less as compared
to international certification. Farmers should be trained in the process for getting international certification of their produce.

x) There should be subsidy on organic fertilizer. We should certify organic fertilizer for domestic market also.

xi) Several bacteria could be investigated for bio fertilizer. More research was needed for this.

xii) Govt. should ensure timely availability of inputs to farmers at appropriate prices. Remunerative prices should be ensured to the farmers based upon their costing. Efficient monitoring system was needed to be developed for ensuring quality inputs to the farmers.

xiii) Agriculture judiciary should be constituted to solve the problems related to supply of sub standard or fake inputs and compensation to farmers. These cases must be solved within the crop season.

xiv) There is need to establish more and more labs by autonomous or private agencies for testing the quality of inputs used in agriculture. Timely availability of high quality inputs must be ensured.

xv) Contributions made by the farmers should be acknowledged by scientists.

xvi) The technical dominance of the Agriculture Department was diminishing as the farmers receiving advice from private sector.

xvii) Tractorization led to displacement of labour. This should be studied.

xviii) Inputs should be available at Panchayat level.

xix) National Horticulture Mission (NHM) should be implemented in a well planned manner with timely evaluation. Dryland Horticulture should be given importance in NHM.

xx) Lack of extension was hampering horticulture.

xxi) Government should not dictate what should be grown where in NHM.

xxii) The outreach and reverse feedback of departments and university was very poor.
7. **Credit and Insurance**

i) Complete list of farmers who had committed suicide needs to be prepared. Their complete socio-economic profile should be studied and “Debt Relief Board” should be constituted to provide relief to the farmers. Unproductive utilization of credit should be checked.

ii) Indebtedness was high due to high spending on inputs and lack of control over prices.

iii) 73% of farmers depended on moneylenders. Car is available at 0% interest but tractor loan is available at 14% interest.

iv) Farmers should get loan at 4%.

v) Banks should have consultancy services for farmers.

vi) Actual implementation of crop insurance scheme was very poor.

vii) At present G.O.I was providing subsidies (7 % interest) to RRBs and thus loans to farmers may be provided at lower interest rates i.e. 4 %.

viii) Agri clinics must be supported by direct finance at a lower rate of interest

ix) Institutional sources should be expanded or new branches should be opened for lending credit to more and more farmers. Experienced agricultural scientist should be employed for sanction of loan and timely training on various schemes of State and Central Govt. should be provided to them. Bankers could involve retired officers of Agriculture Department to sensitize them.

x) There was need to develop separate Agriculture Insurance Scheme for the Scheduled Tribes as they do farming in very harsh conditions and exposed to more risk.

xi) Crop insurance scheme should be improved.

xii) Co-operative election should be conducted by EC. The cooperative Banks and other cooperative credit institutions should be strengthened.

xiii) Vaidyanathan Committee recommendations should be implemented by banks.

xiv) MP was the only state which had consented to Vaidyanathan Committee Recommendations but implementation of these Recommendations was slow.

xv) Kisan Credit Card for women could be given if there was a Credit Guarantee. Guarantee was needed not only for deposit but also for credit needed.
Subsidy for failed well was needed.

Bankers were generally slow in issuing credit to the farmers.

8. Market, Distribution & Trade

i) Farmers did not have the right to decide their price based on their costs.

ii) Central and State agencies should provide assured markets to the farmers for their produce.

iii) MSP should be declared for all crops and before onset of sowing season. Premium price support must be provided during crises.

iv) Self Help Groups may be assigned quality seed production, value addition and their marketing.

v) There was a need to strengthen the marketing intelligence, agro-parks and an agricultural expert in the foreign embassies for providing proper marketing intelligence.

vi) A policy for market intelligence and support system for organic production must be developed.

vii) MSP should be differentiated. Special price should be given for ‘Sharbati’ variety compared to ordinary wheat.

viii) There was a need to establish a market like that in Chandigarh where farmers could sell their produce directly to the consumer and entry of middlemen was prohibited. Action should be taken against middlemen if they restricted farmers from selling their produce in these markets.

ix) Farmers produce should be procured at remunerative prices (20 percent dividend plus average cost) in place of Minimum Support Price. The farmers should get foodgrains at prices lower than prevailing in Public Distribution System as farmers were big producer and consumer too.

x) The farmers should be motivated to establish small processing units and products should be marketed by NAFED, MarkFed, Agro, Food and Public Distribution System.
xi) Resolution should be prepared to protect interest of the farmers involved in contract farming and it should be flexible enough from the farmer’s point of view.

xii) A white paper may be issued on Futures Market to make available the information on its benefits and losses and a study should also be conducted to know how much loss farmers incurred due to it.

xiii) Forward trading in food grains and agricultural commodities should be stopped. In case of ‘guargum’ trading was disproportionate to production.

xiv) Govt. should provide timely and assured market for the produce of ST farmers.

xv) Terms of Reference of the Commission for Agriculture Costs and Prices were not upto the mark as one of the TOR of CACP inter alia was that prices of agricultural commodities should be fixed keeping in view the poor consumer of the nation which was against the farmers. Govt. should fix two prices for the same commodity, one which was beneficial to the farming community and another for poor consumers. CACP should be reconstituted involving 2 to 3 farmers as Members. Close surveillance of the soaring prices of the inputs, variation in production and cost differences, transportation costs and impact of WTO should also be taken into account.

xvi) Agri-Export Zones (AEZs) need to be promoted for exports of agricultural commodities by providing assured markets to the farmers.

xvii) Traders normally decide the price and farmers have no say. Middlemen charge 8% commission in Mandis. In Mandi taxes have to be paid by farmers for everything. ‘Aarhat’ was charged on garlic.

xviii) 50% grant should be given to well working Mandis. NABARD provides subsidy of 50% to private sector but only 25% to mandis.

xix) Mandis should have right to make rules themselves without political interference.

xx) The arrangement between the ITC and Government for licensing was not known. There should be a control on them also. ITC etc may exploit once they were in monopoly.
Marketing in tribal areas should be with Mandis Samiti. Representation of Mandis should be there in all district monitoring bodies.

9. **Youth and Farming**

i) Agricultural graduates should be trained as entrepreneurs. Problems in implementing Agri-clinic scheme should be rectified.

ii) Conditions and working style of Agriculture Department in the State was not upto the mark and therefore intelligent youth of the village should be engaged as agricultural development agent. The farmer who wins first prize for his contribution in the field of agriculture at block level should be nominated as Member, Janpad Panchayat, Zila Panchayat, Legislative Assembly for a period of one year.

iii) Agro-Entrepreneurship was not developed because there was no assured marketing.

iv) Agriculture Entrepreneurship may be empowered to act as second tier extension.

v) Banks should give priority to agriculture background while lending in rural areas.

vi) Bankers did not visualize aspiration for a quality life in rural areas.

vii) Training of rural labourers was very necessary.

viii) Youths were not utilized in villages due to lack of infrastructure facilities. Their peers toiled much less for more returns in urban areas.

ix) Panchayat Members could not be trained as farm managers. The agriculture graduates may be trained as farm managers.

x) We should recognize youth and give them responsibility making them agents of growth.

xi) “Krishak Mitra Yojna” should be launched by selecting one educated person at each village for promoting agricultural development activities in the village.
10. **Rural Energy**

Policy on energy component was missing. Alternate source of energy as well as electricity must be made available for agricultural purposes on priority basis.

11. Chairman, NCF, along with Members, separately held discussions with Hon’ble Chief Minister, M.P. and Ministers in charge of Agriculture, Cooperatives, Animal Husbandry and Fisheries. Hon’ble CM recommended that interest rates for farmers should be reduced. Most of the cooperative banks did not have eligibility for free finance and in view of the three-tier system of cooperatives, their lending rates tended to be higher than that of commercial banks. It was mentioned that in spite of agreeing to the Vaidyanathan Committee recommendations, the state had not received any benefits yet. He also felt that interest should not be charged by banks on overdue interest. Turning to problems of fishermen, he pleaded that traditional fishermen should be getting the facilities available for SC/ST. Inland fisheries should also get the level of help being provided to marine fisheries. Fishermen should get liberal credit. He felt that the MSP recommended by the CACP were very low and announcements were not made well in time. He pleaded for 75% subsidy for drip irrigation to improve efficiency in use of water. He felt that four crop-cutting experiments instead of eight should suffice for assessing damage to crops. A reference was made to the launch of a Khet Talab Yojana for providing life saving irrigation to farmers in rainfed areas. Lastly, he informed that the state had decided to set up a State Farmers’ Commission and was also going to rename Agriculture department as Department for Farmers’ Welfare and Agriculture, as recommended by the NCF. Lord Balram’s birthday would be celebrated every year as Kisan Divas. Chairman, NCF, thanked Hon’ble CM for the courtesy shown to the NCF team.
STATE LEVEL CONSULTATION OF MAHARASHTRA FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT NAGPUR ON 1st MAY, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the College of Agriculture, Panjabrao Deshmukh Krishi Vidyapith (PDKV) at Nagpur on 1st May, 2006. Prof. M.S. Swaminathan, Chairman, NCF was accompanied by Shri Y. C. Nanda, Member and Ms. R. V. Bhavani, Director (Technical). Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Universities and ICAR Institutions, Bankers, officials of State Govt. and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:

2. General Suggestions and Observations

i) The deficiencies in rural infrastructure like energy, roads and communication were highlighted. There should be proper all-weather roads to bring the produce home.

ii) Concern was expressed that both renewable and non-renewable energy sources were incapable of meeting demand for electricity for irrigation and other purposes.

iii) Enquiries about alternative energy sources like bio-fuels were also discussed but it was also felt that the land requirement was very high and often income to be generated was exaggerated.

iv) Farmers complained that bribe had to be given for inclusion in the BPL list.

v) Due to declining predator population the threat of attack from wild boars had increased. These were causing widespread damage to crops. The Wildlife Protection Act must be reviewed to enable some solution to address this problem. There should be compensation for crop damaged by wildlife attack.
vi) There should be thrust on organic farming in the region; inspite of huge investment on chemical farming, farmers were not getting adequate return.

vii) There should be taluka and district level farmers’ associations.

viii) Representatives of farmers should be there in the Vidhan Sabha and Rajya Sabha.

ix) Like Govt servants, farmers also need financial security.

x) Crop-livestock integrated farming should be introduced in the region.

xi) Healthcare facilities in villages is very poor.

xii) There should be village-level storage facility to prevent distress sale.

xiii) Farmers should also be provided with appropriate schemes for insurance, pension and old age support.

xiv) Most cooperatives had degenerated with control by vested interests; a major overhauling is needed with a fine blend of autonomy and regulation.

xv) A Farmers’ Welfare Fund should be setup to be used for meeting crisis situations.

xvi) Lot of agricultural land is being usurped by industry without adequate compensation. Owners are given promises of jobs that never materialize.

xvii) Counseling Centres maybe setup to provide advice and counseling to farmers in distress areas.

xviii) There should be both Land Use and Labour Use Policy.

3. Cotton Farming

i) The difficulties faced by the cotton farmers in the Vidarbha region like low productivity, high input cost, lack of marketing infrastructure etc. were discussed in detail.

ii) The Cotton Corporation of India and the Mill Federation did not honour their promises to the farmers. They bought locally only if it was cheap. Otherwise cotton is imported.

ii) The NCF recommendation to increase import duty on raw cotton to 30% had not been accepted.
iii) While the input cost rose 6 times due to rise in prices of the pesticides, seeds etc. the output prices remained the same in Vidharbha.
iv) It was also felt that sugarcane was the favoured crop and there was an inherent bias against cotton farming.
v) The importance of setting up processing units in the region was emphasized.

4. Inputs
i) Farmers complained that the power supply was highly erratic which led to the burning of motors.
ii) Several irrigation projects awaited completion in the region.
iii) The waiting time for connection to energize pumps was really long.
iv) The issue of failed bore-wells was also raised.
v) In Chandrapur the conflict between irrigation project and forest conservation was highlighted. Part of the project is through forest area and it is therefore lying incomplete. A study on the subject carried out by Drs. Rani Bang and Prakash Amte was mentioned.
vi) There was shortage of agricultural labour. It should be ensured that agricultural labour gets the statutory minimum wage to encourage labour retention; The minimum wage for agricultural labour should be as per the 6th Pay Commission recommendation for IV class staff.

vii) Quality inputs should be made available at affordable price.
viii) Farmers should be encouraged to keep their own seeds.
ix) Terminator technology for seeds should not be allowed.
x) Soil health enhancement should be taken up to enhance productivity.
xi) Seed cost is very high. There should be safeguards in the Seed Bill to ensure that farmers are allowed to use their own seed.

5. Credit and Insurance
i) A number of credit related issues were raised. It was pointed out that interest payments were far greater than the principal amount.
Questions were raised on whether the cutting down of the layers of the cooperative credit structure will help.

Stakeholders complained that the bank staff was not available after 5 p.m. when it was convenient for farmers and their behavior was rude.

Farmers’ debt should be waived; when banks can help loss-making corporations, why not rehabilitate farmers.

Credit should be given at less than 4% interest rate.

Agri graduates should be given subsidy to start agro-units at village level.

Crop insurance coverage is poor. Farmers lack information.

Insurance compensation takes a long time in coming; does not provide relief at time of need.

Indebtedness is the main cause of farmer suicide.

Just interest rate reduction will not solve the problem; total restructuring of loans is required.

Separate provision should be made in the budget for payment of premium and compensation to farmers.

The concessions given for industrial loans are not extended to farmers.

There should be a loan window with provision for personal consumption loans for farmers.

6. Market and Price

The Purchase Centre set up by the government did not work. The general perception was that the intervention of State was not strong enough.

Opening of Purchase Centres should synchronise with harvesting of a crop and number of centres should be increased; Payment should be prompt and there should be safe storage facility available in case of delay in purchase.

MSP should cover cost of production; It should be decided State-wise because cost of production varies from State to State.

Import duty on cotton should be increased.
7. The Members assured the full consideration of the suggestions received and the written representations made by the participants. They also thanked the PDKV and State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF MAHARASHTRA & GOA FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT PUNE ON 5th SEPTEMBER, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Pune on 5th September, 2006. The NCF was represented by Prof. R.B. Singh, Member, Shri Atul Sinha, Member Secretary, Dr. (Ms.) Chanda Nimbkar, Member, Part-time and R.V. Bhavani Director (Tech.). Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The Pune Declaration of a workshop of NGOs organised in Pune on Aug 18-19 to discuss the Policy was also highlighted at the meeting. The major suggestions/issues raised during the Consultation were as under:-

2. General Suggestions and Observations

i) Agriculture is an activity in the service of the nation – it is an investment not an expenditure and should get due attention. We need a separate agriculture budget.

ii) There should be a model farm in each district and even taluka if possible.

iii) Promotion of farm tourism can be one of the measures to attract and retain youth in farming. It also adds dignity to the life of the farm labour.

iv) The definition of ‘Farmer’ should be qualified as one who remains in the field for more than six hours.

v) Service providers i.e. ‘rural artisans’ who cater to agricultural needs in villages should also be included in the definition of farmer.

vi) SEZs should be established only on waste and barren lands.

vii) We need reorganize policies.
3. **Land – Livestock**

i) Soil health programmes should indicate extant government schemes and integrate the same with soil testing as follow-up action.

ii) Integrated farming model is required to increase productivity.

iii) Dry land agriculture needs special attention and allocation.

iv) Farmers need advice on what to grow where.

v) Farmers whose land is taken for other use have to be compensated adequately.

vi) The pressure of population on land has to be reduced.

vii) There should be a ceiling on fragmentation of land holding.

viii) Land reform implementation and land rights protection should get priority.

ix) Saline land reclamation needs agency approach.

x) Boundary dispute is one of the most contentious litigation issues among farmers.

xi) Vaccination information for livestock should be disseminated on polio campaign mode.

xii) The recommendations of the Dhariya Committee on Wasteland Development should be implemented.

4. **Water**

i) Micro watershed planning is needed to reduce the vagaries of monsoon. The Pani Panchayat model should be promoted in drought prone areas to retain water.

ii) The energy supply component is crucial for effective irrigation and needs attention.

iii) In the name of public property, ownership over water is being hijacked.

iv) Water consumption should be determined as per agro-climatic condition. Crops like sugarcane and paddy should be grown only in high water areas.

v) There should be water budgeting at the village level and attention to drinking water availability as well.

vi) Artificial ground water recharge and rainwater harvesting should be promoted.
5. **Research, Technology & Training**

i) The benefit accruing to farmers from research should be one of the criteria for evaluating performance of scientists.

ii) Farmer – Educational institution linkage should be promoted with students coming to work on farms during peak periods like the harvesting season when there is shortage of farm labour. In Israel, schools give a break for this purpose.

iii) Weather prediction and disease forecasting has to improve at the micro-level. As on date only the grape and potato Research Institutes have disease-forecasting facility.

iv) Community and FM radio should be popularized and promoted for technology dissemination.

v) Very little digital content is available in the local language for farmers to access.

vi) Organic Farming should be included in the educational curriculum.

vii) Promoting Post Harvest Technology wing in KVKs also requires making provision for additional manpower to handle the task.

viii) Agricultural education should not be restricted to those who have land only. In Maharashtra, those who have land get greater weightage in the admission process.

6. **Input Supply**

i) Farmers’ Clubs can promote cooperative or contract farming and hire out agricultural implements and supply inputs.

ii) The Seed Village Concept should be promoted to ensure availability of good quality seeds. Small farmers undertaking seed production should get bank assistance.

iii) Government companies meet only 10% of seed requirement. The rest is in the hands of private companies.

iv) Minor pests have become major and pest control companies are making hay.
7. **Fisheries**

i) Aquaculture should be treated on par with agriculture.

ii) Fishery exports should be exempt from sales tax as they are earning forex for the country; Export prices should be assured.

iii) The Murari Committee recommendations on uniform fuel rate and taxation levels should be implemented.

iv) The NFDB should have at least 3 fishers on the Board, to represent the interests of all the nine coastal States.

v) Leasing Policy of reservoirs should be uniform across the country.

vi) Closed period allowance should be more than what was recommended.

vii) Fuel station for trawlers should be close to point of vessel parking. The Coastal Zone Regulation (CZR) should permit this or Fishers’ Societies should have permission to store fuel, so as to prevent cost incurrence on transporting fuel.

viii) CZR should not apply to small fishers.

8. **Credit and Insurance**

i) There is no insurance for vegetable cultivation.

ii) Banks don’t reach small and marginal farmers.

iii) Crop loans should be sanctioned on yearly basis instead of for just the cropping season.

iv) Land Development Banks should be revived.

v) Lower rate of interest on credit will require interest subsidy.

vi) Farmers availing credit should not have to pay stamp duty on documentation.

vii) The formal credit institutions do not treat the farmer with dignity and the procedure for lending is cumbersome.

viii) Banks levy charge for issuing NOC – this should not be there.

ix) Cooperative credit societies do not extend credit to fishers.

x) Banks should have database of farmers with less than 3 acres land holding.
xi) Ideally any farmer who approaches a bank should be allowed to open an account and extended credit as per ceiling fixed for different land holding categories and landless, with minimum documentation requirement.

xii) There should be insurance cover for crops regardless of whether the farmer has availed of credit and also life insurance cover for the farmer.

9. Price and Market

i) Price of produce should be decided in accordance with cost of production.

ii) Like Special Economic Zones, we should have ‘Special Agriculture Zones’ with supporting centralized infrastructure facilities like storage and quality testing.

iii) When there is excess supply of a commodity, we should have the necessary information and tie-ups in place to export.

iv) There should be direct farmer-consumer linkage with transparency in sale and reduction of intermediaries.

v) Farmer needs advice on what can be sold where.

vi) Advance MSP needs to be fixed for commodities and perishable crops to enable farmers to decide what to grow.

vii) All weather road connectivity should be available to enable farmer to transport his produce to the market.

viii) Farmers’ Markets should be promoted.

ix) Measures like giving preference to fruit juice over coke in tender applications will promote agro-processing activity.

10. Women in Agriculture

i) Joint patta in land ownership should be implemented.

ii) Women farmers need concentrated training and capacity building.

iii) Women SHGs can be engaged in seed production on State farms.

iv) Women’s entrepreneurship should be promoted in specialized areas like floriculture and medicinal and aromatic plants.
11. **Extension and Dissemination**

i) Success stories should be widely publicized. There should be at least one successful model in each Block.

ii) Effective innovations should receive priority attention.

iii) There should be coordination between the different departments dealing with agriculture, technology and food security like, Departments of Agriculture, S&T and Health.

iv) Farmer-Scientist Interaction Forums should be promoted – ‘Krishi-Vigyan Mandal.’

v) Interface between progressive and common farmer and exposure visits will promote farmer-farmer learning.

vi) There should be Help Desk Centres with farmer grievance officers and Information Centres equipped with database of farmers in the local language, whom farmers can approach easily.

vii) There should be district level extension education centers with full-fledged team of agriculture specialists.

12. **Governance**

i) Agriculture department should be allowed to handle only responsibilities related to agriculture information outreach and implementation and not saddled with other non-extension activities and administrative responsibilities.

ii) Motivated staff should be recognized and encouraged.

iii) Horizontal integration in extension is not good – a change in approach is needed.

iv) Budget provision for agriculture has to increase.

v) Departments should be more sensitive and responsible. A system of monitoring has to be brought in place.

13. After the Consultation session, Members of the NCF assured the full consideration of the suggestions received and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF ORISSA FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT BHBANESWSAR ON 28th JULY 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Bhubaneswar on 28th July 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member, Shri Jagadish Pradhan, Member, Part-time and Shri G.C. Pati, Joint Secretary. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) The electricity distribution companies are showing complete apathetic attitude for supplying power to farmers. While electrification for industries and urban areas is being taken up on priority, the same for agriculture is often delayed. Moreover, the cost of electrification is prohibitive. If a farmer wants to take electricity line to his field, he has to pay for the cost of poles, which he cannot afford. Therefore, electrification to farmers’ field should be subsidized to boost agricultural production.

ii) ICAR was urged to establish a sugarcane research station in the State.

iii) There is lack of co-ordination between various Departments involved in farmers’ affairs. For instance, release of water in canals by Irrigation Department is not done as per the advice of the Agriculture Department. Hence, coordinated efforts of all related Departments related to agriculture should be ensured.
iv) There should be single window facility for attending to the works/ grievance of farmers rather than directing a farmer to go to different agencies.

v) Some farmers (particularly younger ones) stated that the Banks, Govt. officials were not extending respect/courtesy due to the farmers. The issue of dignity of farmers was highlighted as an important problem.

vi) There are many schemes in agriculture sector involving farmers, but the farmers and other stakeholders are hardly aware of them. Moreover, frequent changes made in the schemes & the guidelines are detrimental to the overall growth of agriculture.

vii) Mass production of a particular agricultural produce in a cluster should be encouraged. But contract farming should not be encouraged, as it is not farmer friendly. Entire State should be covered under ‘Organic Farming’ instead of encouraging it in certain zones.

viii) Agriculture should be given the status of industry in true spirit. There should be agricultural estates with all required infrastructural facilities as is done in industrial estates/SEZs etc.

ix) Jeypore region of Orissa is famous for rice biodiversity. This treasure and heritage should be adequately conserved. Niche production and marketing of selected landraces/ traditional varieties should be actively promoted. Participatory breeding and protection of farmers’ rights should be strongly supported.

x) Development of infrastructure related to agriculture like drainage, road, market is necessary.

xi) Training and capacity development of farmers and SHGs of farmers to take up agro-processing/food processing industries and marketing of products should be encouraged in the Policy.
3. **Land**

i) The soil of Orissa is mostly acidic (about 70% to 80%) which needs corrective measures and it was suggested to use both chemical and organic fertilizers to optimize the soil health. This cannot be achieved by organic intervention only.

ii) Management of acid soils is crucial for Orissa.

4. **Water**

i) The State receives an average annual rainfall of about 1400 mm which is nearly 300 mm in excess of the country’s average annual rainfall. But, much of the water is wasted.

ii) Although the State’s irrigation intensity is 40%, scarcity of irrigation water and poor maintenance of canals/channels affects the area irrigated in several parts of the State.

iii) In coastal areas water logging was a major problem. Drainage facilities in water-logged areas should be developed to make the land agriculturally more productive.

iv) Efforts should be made to provide irrigation water in water scarcity areas by proper maintenance of canal system and installation of other efficient water use system.

v) Farmers should be associated while designing and executing minor and lift irrigation projects since the cost of such projects implemented through farmers is invariably less.

vi) Underground tube/pipe irrigation network to increase water use efficiency was advocated.

vii) The provisions for irrigation under Bharat Nirman could be made available for efficient use of water, for promoting micro-irrigation and for completing the several unfinished irrigation projects.

viii) Govt. of Orissa has introduced a scheme of Pani Panchayat for management of Lift Irrigation Points (LIP) for last 4 to 5 years. Once Pani Panchayats are formed, the LIPs are handed over to them and the Govt. withdraws itself totally.
from maintenance of LIPs, the farmers face lot of problems. Since the concept of Pani Panchayats is quite new, Govt. should ensure hand holding to the farmers’ Pani Panchayats for successfully operating the Lift Irrigation Points. A sizeable number of Lift Irrigation Points under the management of Pani Panchayats have become defunct reducing the crop coverage area substantially due to the lack of handholding support from Government after formation of Pani Panchayats.

ix) The primary right on use of water of any irrigation project should be with the farmers and only after meeting the irrigation needs the balance available water, if any, may be given to urban areas or the industries, which at present tend to get preference over farmers.

x) Coastal land and water integrated management; desiltation/dredging of rivers, particularly at the points of confluence with sea; management and utilization of waterlogged areas; linking of rivers within specified areas may be examined for long term solution to the problem of flood.

5. Livestock & Fisheries

i) Pisciculture should be adopted by the farmers along with paddy cultivation to make farming more profitable.

ii) CRRI demonstrations have shown that rice-fish-vegetable-livestock integrated farming could yield about Rs. 60,000 per acre. This model should be widely replicated.

iii) Accent on Aquarian reforms and appropriate water reservoir leasing policy was necessary.

6. Research, Extension, Technology & Inputs

i) One of the major problems of the farmers was getting high quality seed at right time. Supply of seeds by Govt. agencies is often delayed. When Govt. announces subsidy on seed in natural calamity affected area and such subsidized seeds are made available after sowing, the farmers are really not benefited.
ii) High quality seed, fertilizer and pesticide, essential for farming, must be made easily available to the farmers in time and in desired quantity.

iii) Proper technological know-how must be made available to the farmers in production of quality seeds so that farmers can produce high quality seeds in their own fields rather than purchasing the same with uncertainty about its quality from the traders.

iv) The Societies are not providing quality fertilizer/seeds and other inputs required by the farmers.

v) Large-scale exploitation and cheating of poor farmers is going on in the sale of fertilizers, pesticides and seeds etc. by the traders. The same item is sold to different farmers at different rates sometimes at 50% of the MRP (Maximum Retail Price). Therefore, an innocent farmer who does not bargain with the trader takes an article at a higher price whereas some other farmer may get the same article at a much lower price. Therefore, actual MRP should be written and quality of fertilizers/pesticides should be ensured.

vi) The agricultural extension in the State has become very weak due to large-scale vacancies and for other reasons. Farmers are not getting right information or advice in right time.

vii) Most of the farmers are using diesel and kerosene pump sets to irrigate their land. Therefore, special subsidy for agricultural use of diesel and kerosene was proposed by some farmers.

viii) The cost of inputs, labour rate and transportation charges have become so high that farming is gradually becoming more and more un-remunerative. Moreover, the MSP fixed for different crops does not ensure adequate returns to the farmers.

ix) Agricultural advice by the extension workers and scientists must be in tune with the need of the farmer. For example, paddy which does not produce straw should not be encouraged in rural areas where straw is a major requirement of farmers for house construction as well as for cattle feed.
x) At least one progressive farmer in every Gram Panchayat should be extensively trained by Govt. so that he or she can further train other farmers of his or her Gram Panchayat.

xi) Subsidy on fertilizer, pesticides, seeds etc. is benefiting the manufacturers and traders of these items. The farmer does not get any benefit. Therefore, instead of subsidizing fertilizer, pesticide, seed etc., the fund can be better utilized for fixing higher MSP which will directly help the farmers.

xii) Another suggestion was that rural women must be trained in capacity building and food preservation and their wasteland should be earmarked for development through women farmers. Cost-effective production and timely distribution of quality hybrid seeds must be ensured. Hybrid rice seed villages should be tried.

xiii) Production of hybrid rice in Orissa should be encouraged in view of its higher yield potential compared to best of HYVs.

7. **Credit & Insurance**

i) Availability of easy and soft credit from the banks in time was presented as a major problem. The interest on short-term crop loan to farmers has been reduced by Govt. of India to 7%. But the benefit is not available to the farmers since most of the Banks and Cooperative Societies are charging higher rate of interest.

ii) The procedure of processing the documents for crop loan should be simplified. The processing fees charged by various banks need to be minimized.

iii) The rate of interest and the processing fees for crop loan to farmers should not vary from bank to bank.

iv) Despite the shortcomings, the State has some successful experiences of loaning to farmers’ groups and to tenant farmers, and such experiences should be replicated.

v) The educational and health needs of the rural farmers must be taken care of by credit institutions along with their farming needs. Kalinga Kisan Gold Card scheme of the Govt, is a step in the direction of widening the credit canvas, but its outreach is still very limited.
vi) A long-term credit policy must be evolved which should also provide for credit stabilization fund in the event of rescheduling of loans.

vii) Customers’(farmers’) awareness should be enhanced on various credit and insurance schemes and their operation.

viii) Cooperative Societies account for about 70 percent of the loan disbursed to the farmers in the State, but by and large have failed to benefit the needy farmers.

ix) The State has adopted the Vaidyanathan Committee Report but is far from its implementation.

x) Crop Insurance Scheme was ineffective in extending benefit to the farmers affected by crop loss. Since block is a unit for determining crop insurance, many farmers who genuinely sustain loss because of un-favourable weather or otherwise do not get the benefit of insurance. Therefore it was proposed to make crop insurance individual based and all crops and plantations must be included under the Crop Insurance Scheme.

xi) The Compulsory Rice Insurance Scheme should be revisited and all major crops including horticulture and cash crops such as cotton and livestock should be brought under insurance umbrella.

xii) Though some progressive farmers want to venture into innovative agriculture, they are not daring to do so because of extremely high risk associated with it. Therefore, there is need for solid crop insurance backup for such farmers.

xiii) Nationalized Banks are not attitudinally helpful to the farmers. The schemes of NABARD have not benefited the farmers due to apathetic attitudes of Bankers.

8. Market, Distribution & Trade

i) Distress sale of agriculture produce, especially rice and vegetables, is a major problem, which affects farmers of the State. Lack of storage, preservation and agro-processing facilities were projected as the main reasons for inadequate marketing facility.

ii) Marketing infrastructures at every Gram Panchayat level need to be built linked to the areas of mass agricultural production.
iii) Farmers’ Federations may be encouraged to facilitate storage, marketing and processing. Simultaneously, farmers, particularly women farmers/women SHG members, need to be trained on food preservation and food processing skills so that it will not only prevent distress sale but will also add value to the produce.

iv) For cultivation of medicinal and aromatic plants, marketing is a big problem. Centres must be opened by Govt. to purchase the produces at appropriate rates from the farmers. At the time of glut, Govt. should itself purchase the agricultural produces at MSP.

v) Govt. of Orissa has amended its Agricultural Produces Marketing Committee Act thereby allowing contract farming in the State. Several farmers voiced that there is a risk of permanent damage to the agricultural field by contract farming through excessive application of inputs. The contract farming sponsorers will take away all the benefits and render the land of contract producer useless. Hence, if at all contract farming is to be encouraged, organic farming through contract farming should be encouraged.

vi) Minimum Support Price (MSP) must be fixed and announced before crop operation starts so that farmers can decide to go for a particular crop or not considering its MSP.

9. After Consultation session, Members of NCF held discussion with the Hon’ble Ministers of Agriculture, Co-operation and Fisheries & Animal Husbandry Departments of the State Government in presence of concerned Secretaries and other State Government officers. The Hon’ble Minister, Agriculture apprised the Members about various problems of the State and emphasized the following points necessary for developing agriculture in the State:

i) Enhancing land fertility and preventing degradation of soil was a critical factor.

ii) Optimum utilization of irrigation and rainwater for increasing irrigated area should be ensured. Delivery of water through underground pipe to improve efficiency be considered.

iii) Interlinking of rivers to increase irrigation potential may be examined by Govt. of India.
iv) In Science and Technology from laboratory to land and from scientists to farmers should be major focus. Access of farmers to biotechnology should be improved.

v) Reduction in consumption of chemical fertilizer and pesticides and balance between chemical and organic fertilizer to optimize soil fertility may be ensured.

vi) Contract farming and compact farming to enable farmers to tap larger market should be examined.

vii) Adequate market and cold chain facilities should be provided for benefit of farmers.

viii) Credit & Insurance System for farmers needs strengthening. For the purpose of crop insurance, Panchayat instead of Block should be the unit.

ix) Farmers be kept away from taxes like excise/VAT.

10. The Hon’ble Minister, Cooperation informed about the difficulties being faced by Cooperative Institutions in providing crop loan to farmers @7% p.a. as announced by Govt. of India. 3 tier cooperative structure requires additional margin of at least 3-4% over and above the rate of interest @ 5.5% charged by NABARD to the Cooperatives. Amendment of APMC Act was highlighted. Rule was being finalized. There is interest from a number of corporate organizations to take up contract farming in the State as per the amended Act.

11. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF PUNJAB FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT CHANDIGARH ON 24TH AUGUST, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Chandigarh on 24th August, 2006. The NCF was represented by Dr. R.B. Singh, Member, Shri G.C. Pati, Joint Secretary and Dr. Deepak Rathi, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

1.2 Finance Commissioner, Development, welcomed the participants. Member, NCF explained to the participants the broad recommendations made by NCF so far in its Four Reports and the objectives of this Consultation. He expressed satisfaction that Govt. of Punjab has already constituted State Farmers’ Commission as per recommendation of NCF. He explained that the main objective of recommendations of NCF was to improve the well-being and income of the farmers and to improve the agricultural growth rate to 4%.

1.3 The women farmers, other farmers, farmers’ organizations and other participants were requested to give their views on the Draft National Policy for Farmers proposed by NCF. Views expressed are summarized below:

2. General Observations and Suggestions

i) Subsidy should be targeted and need based according to time, place, quantity and be directly available to appropriate farmer in time. All the schemes of Central Government must have substantial subsidy components for providing proper and timely benefit to the beneficiaries.
ii) How to integrate responsibilities with Panchayati Raj Institutions? About 25 percent population in India were poor and underfed for the last 25 years. How this can be tackled should be dealt within this Policy.

iii) Whatever policies were decided in the interest of the farmers, it always remained on paper and never reached the farmer.

iv) Contract farming as a tool for reducing the distress among the farmers was not found successful as it was not beneficial till clear cut code of conduct could be decided in the interest of the farmers.

v) Govt. should provide twenty years of tax holiday for establishing industries near villages with condition that out of total employment generated 90 percent must be recruited from that locality only.

vi) Part time farming must be promoted; in Japan 87 percent population is involved in farming and about 90 percent income comes from non-farm employment.

vii) Recently foodgrain was imported by Govt. of India. A little increase in demand increased the prices of these commodities at international level. Hence a comprehensive Food Policy is needed.

viii) Farmers require continuous and quality electricity supply.

ix) To provide better health service, there should be one hospital with all the facilities for every 2-3 blocks. Mediclaim policy must be mandatory for every farmer and there should be 75 percent subsidy on it.

x) If Punjab would be saved, then the country would be saved as the State was contributing 22 million tonnes of foodgrains production every year and about 50% of it is procured for the national bufferstocking.

xi) Detailed report of the Commission was welcomed but concern was its implementation. The policy must impart the grassroot people. Therefore, it would have been better if Draft National Policy could have been prepared by bottom up approach rather than top down approach.

xii) Cooperatives like Gujarat must be promoted in the State also.

xiii) Provision of Award or recognition to the farmers at Govt. of India level should be considered.
xiv) For the last 2-3 years, no Punjab farmer representative had been invited to attend the pre budget meeting with Finance Minister, unlike the past practice.

xv) In the last fifty years, contribution of agriculture to GDP declined from 51% to 20%. But nearly 65% of the population depend on agriculture. Hence there was need to increase the investment in Agriculture and improve the share of agriculture in GDP.

xvi) Non-farm employment, good education and health facilities in rural areas must be the priority.

xvii) Indebtedness in Punjab has been rising fast.

xviii) Farmers of Punjab were bound to grow paddy for food security due to the pressure of Government but paddy should be produced on sustainable basis.

xix) Seed security and seed sovereignty must be maintained. PVPFR Act should be made farmer friendly.

3. **Land**

i) Deterioration in quality of soil and water was an area of concern in Punjab due to rice/wheat intensification. Specific Land Utilization Policy should be specified and enforced according to area specific crops. No agriculture strategy, which may deteriorate the quality of land, environment including other natural resources should be implemented.

ii) Fragmentation of land had resulted in underutilization of tractor – contract servicing of agriculture can be tried – cost will be reduced.

iii) It was necessary to save the agriculture land from other land uses. For housing development near cities/urban areas, multistoried buildings should be encouraged to save prime agriculture land.

4. **Water**

i) Ground water level in Punjab had gone down and is further going down at alarming rate, resulting in increase of cost of irrigation. Small dams/check dams
to increase irrigation potential should be encouraged and Ground water recharging should be taken up on priority.

ii) Fisheries may be raised in canal water. Dams should be constructed on Beas and Ravi rivers for recharging of ground water. Plantation for conservation of water should be undertaken.

iii) Efficient utilization of water was a basic issue. In UP, yield per ha of irrigated wheat is 2.8 m.t compared to 4.5 m.t in Punjab. In Orissa yield of irrigated rice was 1.5 m.t/ha which can easily be increased to 2.5 m.t/ha. If irrigated land productivity in these States can be increased, it would ensure better food security in the country. Punjab agriculture in that case would go for diversification.

5. **Livestock**

i) Scarcity of dry fodder in Punjab was hindering the development of livestock. Hence further intensification of livestock schemes would not be viable. Livestock farmers should be given concessional loans.

ii) Fishery should be encouraged in a big way in Punjab in view of its excellent potential in the State.

iii) Breeds like ‘Thai magur’ did not allow culture of indigenous fishes in the same pond, hence these should be banned.

6. **Technology**

i) Spurious Bt cotton should be checked and the SAU should help the farmers by releasing Bt varieties for increasing the productivity and income.

ii) Farmers should listen to the advice of KVKs and scientists as no revolution can take place through policy only.

iii) Bee keeping and Mushroom growers should be covered under the definition of the farmer and these activities should also be financed. Wolamite in bee keeping was similar to bird flu in poultry and attention be given to control in an effective manner.
iv) Environment and natural resources were precious but farmers committed mistake by over exploiting them. Therefore the policy should be area specific with emphasis on proper land utilisation and crop combinations to save precious resources and providing market with remunerative prices to the producer for various commodities.

v) There was an urgent need for contract servicing due to fragmentation of land since with small land holdings farmers can utilise only 25 per cent of the total capacity of the machinery available with them.

vi) Farmers were ready to go ahead with diversification but alternative crops must yield more or equal income to that from rice or wheat.

vii) Labour scarcity is a problem and there was a need for labour saving farm equipments.

viii) Bt vegetables were reported to be injurious for health. Europe and Canada had banned Bt vegetables. The SAU should ensure food safety of Bt. releases.

ix) Organic goods produced by the farmers fetched better price and income. This should be encouraged by the Government.

7. **Credit & Insurance**

i) Credit should be extended to women with the due share in the total credit allocated for agriculture.

ii) All interest dues should be waived as farmers were unable to service the interest.

iii) There was need to waive all the credit to the farmers, but this alone cannot solve all the problems of the farmers.

iv) Forty five per cent of the farmers were totally economically unviable and used credit for consumption because through agricultural activities from small piece of land as they cannot generate sufficient income to meet their basic needs. Hence there was need to provide consumption loan without collateral security.

v) Kisan credit card must be provided to the farmers to check bribe at banks.

vi) Private money lenders have tried to build social and human relations with their customers. But this kind of behaviour was not observed in case of nationalised banks. Hence change in mindset of bankers is required.
vii) The interest rate should be reduced to 4%. How to pull out the farmers from indebtedness without giving more credit should be worked out.

viii) Instead of Block, individual farmer should be the unit on the basis of which insurance cover is given.

8. Market

i) Farmers experienced difficulties in marketing mushroom and other agriculture products.

ii) For diversification of crop, market was the biggest problem. Contract farming would not be effective unless the market prices were fixed.

iii) Better market facility be created where remunerative price was assured to the farmers.

iv) Niche market for crops like “Basmati” should be encouraged. Even organic “Basmati” can be encouraged. “Basmati” should not be called as ‘Super Basmati’ as announced by some traders.

v) It was necessary to think about agriculture globally in the context of WTO. Govt. should not abandon WTO. Zoning for different areas depending on strength/ weakness like grapes in Maharashtra should be done for improving global competitiveness.

vi) No MSP for crops like Sugarcane, Pulses etc. was available for the farmers. MSP should be linked to wholesale price index. Procurement should be at market price higher than MSP and should be effected in time.

vii) Inadequate agro-processing capability was hindering diversification to oil seeds/pulses and other crops.

viii) Production of farm be planned and oriented as per market demand. In this context, food parks can prove effective.

ix) Level Playing field should be ensured in WTO regime. USA was giving high subsidy to agriculture compared to India. How can Indian product be competitive in international market should be indicated in the Policy.
x) Agricultural price and labour minimum wages were decided by the Govt. of India. Pay Commission should also look into the living condition, income of farmers and suggest the minimum pay for the farmers also.

xi) Organic farming can give more yield and higher farm income as compared to the ongoing chemical Agriculture.

xii) Agriculture farming should be treated like enterprise, not as a way of life.

xiii) Farmer of Punjab could not transport surplus wheat outside due to stringent provisions in 9th Schedule of Essential Commodities Act. It had acted to the detriment of interest of the farmers in the past.

xiv) PM in his speech on 15.08.2006, mentioned that farmer must get appropriate remunerative price from the market. This must be implemented.

xv) Value addition to agriculture produce by farmers was discouraged. Provision of license for setting up rice mill/huller was cited as an example. Due to all these and lack of access to market, farmers had lost heavily. Hence all loans of farmers be waived.

xvi) When there was shortage in production, Government imports foodgrain at higher price – against the interest of farmers.

xvii) One TV/Radio channel exclusively for farmers should be commissioned both at the Central and State level.

xviii) In contract farming detailed guidelines should be specified to protect interest of farmers.

9. Views of State Govt. representatives.

9.1 Views of Dr. S.S. Johl, Vice Chairman, State Planning Board, Govt. of Punjab suggested the following:

i) 45% farmers in Punjab were economically non viable due to small land holding even if entire loan was waived. Diverting them to alternative off farm employment was the answer. For that education was stated to be the most important factor. The farmers were at a disadvantage in Higher Education. For instance, only 3.7% of the students in the PAU veterinary College are from rural areas. Thrust in the next Plan should be “Rural Education”.
ii) Employment in industries of local persons should be incentivised fiscally so as to divert people from non-viable agriculture.

iii) Technology be developed for small farmers like organic farming in Cuba.

iv) Rs.17,500 crores loss (approx.) was incurred by Govt. in carrying huge stock of cereal and exporting about 35 million tonnes a couple of years ago, 90% of which was contributed by Punjab. Further, about Rs.14000 crores were spent for import of edible oils and pulses. Against this, had Punjab been provided with the requested assistance of Rs. 7400 crores, the state would have produced the quantity desired by the country and thus avoided the huge loss. With India’s entry into the world market for imports, the international prices are jacked up—hurting both India and other importing developing countries.

v) Drought loss in Punjab was mostly borne by industry due to power cuts etc., but crop (rice) yield increased, hence Punjab was not eligible for drought relief. Industrial loss be also considered for drought relief. Social loss for paddy produced by Punjab was about Rs.5000 crores per year mainly for using ground water, soil fertility etc. But most of the rice produced in Punjab was going to the deficit States.

vi) Farmer wanted quality electricity, not free power, which was ultimately costlier.

vii) Health service quality has gone down in rural areas. This should be improved.

9.2 Views of Dr. G.S. Kalkat, Chairman, State Farmers’ Commission, Punjab:

i) Financial condition of Punjab farmers had worsened; real income from wheat from 2001 to 2006 had declined.

ii) Definition of small and marginal farmers should be changed. Small farmers should be up to land holding of 4 ha instead of 2 ha. 70% of farmers were small with unviable holdings. These farmers be trained at Government cost for off farm occupations.

iii) Procedure of banks should be farmer friendly. This should be directed more towards small and marginal farmers to improve their income and to diversify the occupations.
iv) Indebtedness Act should be passed to register the village moneylenders and to fix a limit on rate of interest.

v) FCI did not pay to the farmers directly in Punjab. The payment was made through a system of commission agents. This should be changed and farmers be paid directly by FCI.

vi) Capital investment subsidy for small farmers would be more useful compared to subsidy on fertilizers, equipment, electricity etc.

vii) Crop diversification should be encouraged in Punjab urgently with following steps to prevent hydrological suicide:

   a) Law may be enacted to provide that there is no rice transplantation after 10th June.

   b) Diversified crops should be procured under MSP and for this purpose Price Stabilisation Fund be created.

   c) Agriculture for fuel like ethanol from maize or jatropha which will increase farmers’ income by about 20% even if the fuel from this produce is sold @ Rs.18 per kg, should be encouraged.

9.3 Other major suggestions of the State Government:

i) Small farmers need special attention from the commercial and cooperative Banks, which should ensure availability of cheap credit to small farmers in time.

ii) Diversification of paddy area to crops consuming less water should be encouraged in Punjab to arrest depletion of ground water.

iii) Special efforts be made to improve the quality of rural education.

iv) Production of bio fuel from crops like maize with processing facilities should be encouraged.

v) Price stabilization fund should cover losses incurred by Govt. agencies on account of procurement of the crops being promoted by Government.

vi) Criteria for drought relief should be based on the extent and time of failure of rainfall instead of the loss of production.
vii) Funds be made available for supply of quality fodder seeds, fodder conservation facilities and for supply of fodder to small dairy farmers at reasonable rates to improve livestock productivity.

10. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF RAJASTHAN FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT BIKANER ON 29th AUGUST, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government and Rajasthan Agriculture University at Bikaner on 29th August, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member, Ms. R.V. Bhavani, Director (Technical) and Dr. Prabhu Dayal Choudhary, Research Assistant. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) Rajasthan’s north-western and western regions, comprising 11 districts covering 61 per cent of the total area and 40 per cent population of the State, form the "Great Indian Thar Desert". People there did not have any vocational skill/education. They were therefore not likely to benefit much from the growth of the economy. They would not benefit from trickle down effect unless they had some productive asset or marketable skills. Jobless growth was really joyless growth.

ii) Differentiation between the dryland agriculture and semi arid and arid agriculture was very pertinent issue for Rajasthan State.

iii) There was a need for recognition of progressive farmers, as they succeeded after facing many hardships.

iv) A State Commission on Farmers should be established.

v) Farmers should be educated and made aware of latest developments in the agriculture sector.
vi) Issues of farmers related to their suffering due to natural calamities, need for a support price for all the crops, education and training for farmers, role of women in animal husbandry, lack of good breeds, AI facility, need for formulation of direct farmer oriented schemes, establishment of laboratories for testing of soil and water, testing of fertilizer, pesticides at district level, regularization of forest land occupied by the farmers, continuation of subsidies on fertilizers, control on conversion of agriculture and pasture land into urban land and provision of land for pastures, by reserving community land for grazing of animals.

vii) Awards should be given to progressive farmers and innovative farm-women. There should be model farms in each district.

viii) There was a need to include agriculture as a compulsory subject in school education so that basic knowledge of agriculture and agro-based industries was imparted to all. A special effort was needed in this direction as farmers’ suicide rate had increased.

ix) For protection of farmers from natural calamities, integrated farming could be a good option.

x) Impact analysis for every programme should be conducted.

xi) Policy developed for Rajasthan may be developed as a policy for high risk category cropping system.

xii) Drought proofing had not been mentioned or discussed in the draft policy.

xiii) Village-level processing units should be set up by farmers and there should be tax concessions.

xiv) Decision on Farmers’ Policy or any Farmers’ Issue should involve farmers.

xv) Cultivation of dates may be encouraged in the desert areas; even agricultural labourers can be given date trees for backyard cultivation.

xvi) Just like roads, waterways are needed and should be planned for.

xvii) There was a need for a larger budget for agriculture.
3. Land

i) Higher subsidies for the construction of water reservoirs may be provided to encourage construction of larger sized reservoirs so that fisheries could be combined with traditional agriculture.

ii) Land along the national border was taken from farmers for use by the army, and very low compensation was paid to the farmers. In urban areas, if land is taken from the landlord, better housing facility is provided to him. This bias against the farmers’ interest needs to be mentioned in the Draft Policy.

iii) Special mention was needed regarding water logging problems in the draft policy.

iv) The disadvantages of flood irrigation should be explained to farmers.

v) Rights of tribal farmers over forest land that was occupied before 1980 should be regularized.

vi) Land mutation procedure should be simple. It costs Rs.5000/- currently. There should be a separate officer to handle it.

vii) BOT system of tree plantation may be introduced.

viii) Forest cover in the State is less than that prescribed.

4. Livestock

i) Establishment of Livestock Feed & Fodder Corporation should be useful for Rajasthan.

ii) As a measure to take care of animals during drought period, the ‘Goshalas’ may be strengthened for maintaining the animals surrendered by the farmers due to their inability to look after the animals.

iii) Public-private partnership in fodder production must be introduced.

iv) Development of elite herds and establishment of veterinary clinics on the line of agri-clinics well supported by helpline and ambulatory clinics are also the need of the State.

v) Heritage Gene Bank and progeny testing must be taken up as an integral part of livestock development.
vi) Fodder banking technology developed by the University under which feed blocks for animal consumption are prepared required less storage space and at the time of shortage of fodder, these could be used as alternative non-conventional feed.

vii) Livestock owners could be provided with subsidy, loan facility for green fodder production.

viii) Relaxation should be provided in Wildlife Protection Act/Cruelty to Animal Act as the problem of *Nilgai* in the area needs attention.

ix) Policy for input supply and vaccines for livestock may be developed.

x) Extension in animal husbandry should be strengthened by developing veterinary diagnostic laboratories and hospitals at each KVK in Rajasthan.

xi) Animal welfare programme, land use planning for various kinds of wasteland for the cultivation of forage crops were needed to prevent loss of animal during drought.

xii) Sheep migration was a serious problem in this region and it should be dealt with by developing alternate pasture lands so that the migration could be controlled to some extent.

xiii) Women’s role is predominant in milk production. But there are no special schemes to encourage this.

xiv) Pastureland should be clearly demarcated and protected in every village. It should not become wasteland.

xv) There are no slaughter houses for goats.

5. **Fishery**

i) Fish cultivation could be done in the running water of Indira Gandhi canal, which stretched up to around 600 kms and it could also be tried in low lying areas near the canal.

ii) Getting good seed for fisheries was a problem in this region, forcing fishers to get seeds which were not even of very good quality from private agencies at higher price from distant places.
6. **Research and Technology**

i) Inter-linking of rivers was a tangible solution to deal with famine in Rajasthan.

ii) Instead of talking about purely organic or chemical farming, we must talk of sustainable farming and the loan to the small scale agro-cottage industries should be free from interest.

iii) There was a need for post-harvest management including on-farm wastage, proper storage of grains because proportion of wastage was more than 25% which was very high.

iv) Model technology demonstration facility must be available at district level.

v) To check migration of rural youth to urban areas, provision of essential facilities like hospital, market in group of villages, quality evaluation centres for inputs and rectification of policy for digging of well and electric connection would be needed.

vi) Suitable dams should be constructed for water storage and conservation, and a Farmers’ Welfare Fund should also be created.

vii) The problem of saline water in the region, particularly for fruit growers should be attended to. Water testing facility is needed.

viii) Contract farming may lead to dominance of corporate sector in rural areas, which would not be in favour of the farmers.

ix) Post harvest management and value addition should be important components of the policy for farmers.

x) Farmers’ training colleges would be opened by the banks in the villages, and land purchase schemes should also be started for small and marginal farmers.

xi) There was a need for use of non-conventional solar and wind energy in agriculture, because the region has abundant untapped potential for these and the State faces acute shortage of electricity. The same could also be used for irrigation. Energy farming should be encouraged.

xii) Fodder production through watershed may be promoted and the banks of canal may also be used for this purpose.
xiii) Provision should be made for use of city waste water, water effluents of the industries; after treatment the water could be utilized for fodder development.

xiv) Agri-clinics and agri-business should be promoted and incentives must be provided for such schemes to make them popular.

xv) Theoretical as well as practical trainings were essential to utilize mustard crop in winter season for Bee-keeping.

xvi) Strategy should be planned to meet out the scarcity of feed and fodder at the onset of drought.

xvii) Research was needed on medicinal plants which could be used for producing medicines for livestock. Medicines and vaccines for most of the diseases were not available in proportion to animal population in the State.

xviii) Weather forecasting stations should be available at each KVK

xix) Trainings provided at KVKs should be job oriented.

xx) Harvesting of solar energy was the need of the hour.

7. Inputs

i) B.Sc. (Agri.) should be a mandatory qualification for the registration of shops meant for the sale of insecticides and pesticides.

ii) Supply of substandard agriculture inputs was a matter of serious concern.

iii) Subsidies should be directly given to the farmers than to the companies. Schemes should be encouraging the farmers and not the private companies.

iv) Fencing of horticultural fields should also be considered for the provision of credit or subsidy so that farmers could go in for plantation of horticultural saplings.

v) Subsidy should be extended to all suitable fruit plants for the area, and not only for a restricted list under NHM.

vi) Subsidy should be provided for diesel-based equipments on the basis of cultivable land and cropping intensity of the individual farm as well as the diesel for tractor fuel.

vii) Sale of seed should be against bill/invoice.
viii) Electricity connection should be prompt. Currently it takes about 2 years and wells fail in the interim.

ix) The many small rivers in the region should be harnessed through proper planning.

x) Mobile soil testing labs can be run through fertilizer companies.

8. Credit and Insurance

i) Agricultural credit procedure was very cumbersome.

ii) Subsidy should also be given on solar based pumping sets.

iii) The unit for the crop insurance schemes should be the individual farmer’s field rather than the tehsil or the panchayat.

iv) The rate of interest on agriculture loan including co-operative credit should be reduced.

v) Interest on farmer’s share money in the cooperative society should be provided.

vi) There was a need to rectify the anomalies related to agricultural loan recovery.

vii) A defaulting farmer is arrested and cell rent as well as food bill is also charged from his family and even his land is auctioned. His respect in the rural area suffers. Such harsh provisions do not exist even for criminals.

viii) Insurance should be available for horticulture crops also.

9 Marketing

i) Beneficial support price was needed for the crops.

ii) No market for Aloe and mushroom was available at local level, and farmers were discouraged from taking to these crops.

iii) Support price for animal products should also be fixed, because a large share of consumer expenditure went to the marketing/private agencies.

iv) Cheating by the marketing agencies, discouraged the farmers from taking up animal husbandry.

v) Cultivation of medicinal plants and the like should be under buyback mechanism.

vi) The Mandis should have farmer-friendly facilities.
10. **Technical Manpower**

i) Shortage of technical manpower was a serious problem and interfered with the execution of policies and extension work.

ii) Officers appointed should live in the villages and work with the farmers. Adequate infrastructure should be developed for this.

iii) Staff posted in Universities, are largely on contractual appointment and the commitment is not there.

iv) The Department of Fisheries is headed by a non-technical person.

v) There is no extension division in Animal Husbandry Department.

11. After the Consultation session, Members of the NCF assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government and Rajasthan Agriculture University for the courtesy shown.
STATE LEVEL CONSULTATION OF TAMIL NADU, PONDICHERRY AND ANDAMAN & NICOBAR ISLANDS, FOR FEED BACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT CHENNAI ON 27th JUNE, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Chennai on 27th June, 2006. Prof. M.S. Swaminathan, Chairman was accompanied by Shri Atul Sinha, Member Secretary, Shri Y.C. Nanda, Member, Ms. Mamta Shankar, Director and Ms. R.V. Bhavani, Director (Tech.). Farmers, Farmer Organizations, NGOs from Tamil Nadu, Pondicherry and Andaman & Nicobar Islands, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Observations and Suggestions

i) The current agrarian crisis has to be placed in the context of globalisation and its detrimental impact on agriculture and farmers.

ii) All Govt. departments should explain the extant schemes in the Gram Sabha Meetings.

iii) Need for separate section for dalit women farmers and workers, small and marginal farmers.

iv) Falling investment in agriculture, closure of State farms, is a cause of concern. Investment of more funds by Government in agriculture is needed.

v) The Seed Bill should be reviewed carefully before passing by Parliament.

vi) The PURA (Provision of Urban facilities in Rural Areas) model proposed by His Excellency the President of India, should be extended all over India.

vii) There should be assured income status for farmers.
viii) All parts of a crop should be put to use – with facility for value addition; e.g. we can get sugar and ethanol from sugarcane.

3. Land

i) Agricultural labourers be given 10 to 15 cents homestead land to prevent migration to other places in search of jobs; wasteland reclaimed maybe so distributed for this.

ii) Get back Government lands occupied by private persons.

iii) Need to consolidate lands for collective farming.

iv) Sustainable agriculture is to be achieved by proper fertility management of the soil. We should leave the soil to the coming generation to produce sustainable yield and eco friendly produce. For that we have to promote organic farming.

v) For social and cultural uplift of small farmers and agri workers, distribution of surplus lands is essential.

vi) As per the 9th schedule of the Constitution itself, one cannot challenge in the Court against Government taking over the lands.

4. Water

i) Implement interconnectivity of rivers to enable better water management.

ii) De-silt the tanks and ponds in the villages and deepen wells, to store rain water

iii) Deep borewell of big farmers affect the water yielding capacity of shallow wells of small farmers.

iv) Besides desilting tanks, new irrigation projects are to be taken up; the new irrigation projects in the villages can be implemented from Member of Parliament Local Area Development (MPLAD) funds.

v) Rainwater harvesting should be mandatory and tank rejuvenation should involve the local populace.

vi) Encroachment in riverbeds and construct check dams in the forest for improving ground water table should be removed.

vii) The rivulets in the hills are being harnessed by company estates, and small farmers are not able to use them.
viii) Promotion of sprinklers is needed in Nilgiris for better crop in water lean periods.

ix) There should be construction of separate canals for effluent flow to prevent contamination in Orathamalayam dam.

5. Livestock, Poultry and Fisheries

i) Cattle maintenance is not profitable with less number of cattle; a minimum of 5-6 cows is needed.

ii) Setting up of milk societies managed by SHGs can cater to local needs, generate income and promote local development

iii) Subsidy to be given for cattle rearing; availability of cattle feed; There is no support for dairy farming

iv) Abolish fishermen associations now headed by the non-fishermen and hand over to the Panchayat for better management.

v) Poultry should get status of agriculture

vi) Electricity tariff for poultry should be that for Agriculture. There is need for IT relief.

vii) Abolition of ST on poultry feed, formation of poultry development board, minimum support price for egg and chicks, abolition of tax on medicines are some of the measures needed.

viii) Inclusion of one egg daily in the noon meal scheme implemented in Tamil Nadu should be extended across India.

ix) Transport subsidy for maize used for cattle feed received from other States is needed for maize received for poultry feed.

x) The Namakkal region should be declared Bird Flu Free Zone to promote poultry exports.

6. Technology and Training

i) Transfer of technology and access to the technologies to the largely illiterate small and marginal farmers in the areas of soil health, quality planting materials and seeds, micro irrigation, water harvesting technologies to recharge aquifers,
plant protection, post harvest management through mechanization of harvesting, grading, cleaning, processing and packing is important.

ii) Enhancing the technical skills of extension workers is needed.

iii) Organic farming courses in the schools i.e. holistic training programmes are needed. This can be in collaboration with KVKs. Capacity building of grassroot innovators is important

iv) Train rural youth in post harvest technologies to increase shelf life and help generate employment.

v) For the controlled atmosphere ultra Oxygen technology may be used instead of cold storage.

vi) Advising farmers in growing location specific crops is essential and required.

vii) Mechanical planters are required to tide over scarcity of agricultural labour.

7. **CPR, NRM and Biodiversity Conservation**

i) Tanks, Village Ponds and Common Property Resources including pasturelands are to be safeguarded from the private companies.

ii) In some places, where the land ceiling has been implemented, a reversal is being observed. This is a dangerous trend.

iii) 65% of the income from the teak trees is to be given to Panchayat to grow more trees and cancellation of 2-C Patta for better revenue to Panchayat.

iv) Need to plant trees on important occasions and plant 1/3 rd area by trees for perpetual income in the long run.

v) Steps should be taken to get back the occupied pasturelands.

vi) The *Mandevali poromboke* lands should be brought from Panchayat and rejuvenated as pasturelands

vii) Revival of the pastureland is necessary to prevent the decline in household cattle and sheep population.

viii) Replanting of deforested area and planting of useful trees like Mango, Teak instead of Eucalyptus should be encouraged.
ix) Traditional cattle growing people of Yadava community in Manamadurai are conserving biodiversity by breeding Pulikulam traditional animal breeds. They should be recognized and supported.

x) The hill tribals are to be involved in Koottuvana Nirvagam (Combined Management of Forest). Eucalyptus is not to be grown.

xi) There should be restoration of Panchami lands and allowing cattle grazing in hill areas.

xii) Pasturelands occupied for residential purpose should be taken back; CPRs are getting eroded.

8. Food and Nutrition Security

i) Conversion of food cropland to non-food crop cultivation should not be encouraged for example by citing the example of Kerala, Tamil Nadu should not do so. On the contrary, incentives should be given to sustain land under food crop cultivation.

ii) Without compromising on food production, cultivation of horticultural produce is to be promoted. Incentive is to be given to the farmers to produce food crops and reduce import of wheat.

iii) There should be universal PDS, including 14 essential commodities under it. Foodgrain and dhal may be given as wages; Spread of Community Food Banks can help ensure safe and healthy food for all.

9. Plantation crops

i) Fix minimum rate for tea.

ii) Tea plantation should not be treated as industry; many small farmers are engaged in the industry; their plight needs attention.

iii) To have prosperous tea industry, the Auction Centre for tea at Connoor should be handed over to the local people.

10. Labour & Inputs

i) Constant vigil on the quality of seeds supplied by private sector is needed
ii) While MNCS were offered many perquisites, farmers are not even assured of uninterrupted power supply.

iii) With regard to GM seeds – we should work to make the price lower; China has for instance developed low cost Bt seed.

iv) Government agency can produce and sell seeds at cheaper rates.

v) Appoint a committee for pre-inspection of Private and Government nurseries while calling for the tenders. There is dire need for quality planting material.

vi) Farmers can earn more profit in pear grafting from the old pear trees instead of cutting down.

vii) With job guarantee, migration of labourers can be controlled.

viii) There should be some protection for migrant labour.

11. Island Farmers

i) Separate lands should be given to farmers whose lands were submerged after tsunami and turned saline and uncultivable

ii) Middlemen should be stopped from getting and marketing the agricultural produce.

iii) Rain water harvesting by constructing check dams is needed. Inspite of heavy rain for nine months, most of the water runs off.

iv) The loans of farmers who availed loans from banks should be waived to overcome the loss due to crop submergence.

v) Land patta should be given to the farmers who have been cultivating for years without proper patta.

vi) There should be cold storage facility on each Island.

12. Women in Agriculture

i) Women in agriculture devote time to agriculture, composting from cattle and poultry waste, etc. - need for training to women self help groups and establishment of agro-based industries.

ii) Equal wages to women, reduction in working time and more payment as noted in draft policy, should become reality.
iii) Need to give encouragement to the women self help groups by Government and take steps to reduce the crop loan interest now given at 9%.

iv) Revenue Forests are getting re-classified as Reserve Forest, squeezing the source of income for women from NTFP. Women should be allowed to gather forest produces to enhance their income.

v) Besides implementation of Kolappan Committee recommendations, women should be given training in irrigation methods, marketing etc.

vi) Under urban farming, flower and vegetable cultivation can be an income generation option for women.

vii) Alternate jobs for women are needed to prevent migration and there should be priority to women while making payments.

viii) Pressure should not be increased on women SHGs, by passing on responsibilities of the State.

13. **Credit and Insurance**

i) To prevent fleecing by private moneylenders, allocation of more funds to Government agencies at lower interest rate of 4% is necessary, to enable them to onlend.

ii) Credit to small farmers needs special attention;

iii) Under crop insurance, only loanee farmers are getting insured or benefited. Crop Insurance should be made mandatory, non-loanee farmers should also to be covered and the unit of assessment for damage should be changed from block to village.

iv) Adequate compensation is to be given for crop loss due to natural disaster.

v) Farmers need consumption credit. The KCC should be comprehensive, covering all purposes and all farmers should be eligible for it.

vi) Crop insurance should include coverage against pest and diseases.

vii) Health insurance for farmers should also be there.

viii) Crop loan interest rates are higher than housing loan interest rates.
ix) National Agricultural Insurance (NAI) is covered at block level. This year the Insurance Company came forward to cover at firka level. The farmers feel that the coverage should be at village level / individual field level.

x) Co-operative Societies should be revamped and LAMP Societies revived.

14. Market and Price

i) There should be affordable price policy and rational export and import policy to protect farmers’ interests.

ii) Cold storage facilities are needed to store the perishable produce like tomato.

iii) The role of MNCs in the entire chain from input supply to market should be carefully scrutinized and regulated to ensure that farmers’ interests are protected.

iv) The minimum support price should be extended to all crops.

v) Impact of Liberalisation, Privatisation and Globalisation (LPG), WTO negotiations and tariff imposition on farmers should be highlighted.

vi) Direct purchase by Government to avoid middlemen interference to prevent price fall is essential.

vii) State Price Commission should be setup to determine price locally and cover all crops.

viii) In contract farming, tripartite agreement between farmers, agencies and Government is needed; the purchaser is usually a MNC; a govt. representative should monitor and check.

ix) There is a need for farmers’ market.

x) We should have mechanisms to protect our produce; if production is low, we should not indulge in online trading.

xi) Daily market prices to be made available in local languages in electronic media.

xii) Income tax exemption should be given for floriculture Industry. Floriculture is not considered to be agriculture by the IT dept currently.

xiii) The NHB should give priority to perishable commodities. There is need for sub-committees under the NHB for this.

xiv) Export of onion should be stopped when there is shortage.
xv) Promotion of industries producing dried vegetables like bottle gourds, onion etc.
xvi) Support is needed for export of organic farming produce.
xvii) Government should intervene to ensure timely payment by the private sago factories.

15. **Policy and Governance**

i) Agriculture development funds are operated under mission mode and allotment given in two instalments - first instalment of 50% in the beginning and another instalment six months after getting utilization certificate. This should be changed to 90% in the first instalment and 10% in the second instalment to enable proper implementation. State Governments are not in a position to spend first and then claim.

ii) Seed replacement under paddy is 17% percent by the department, 33% is from private parties, 50% by exchange between farmers. Many times the Government of India funds are lower than the department’s need. So, Government of India should provide subsidy to all the stocks available.

iii) Hill area development projects should not be stopped.

iv) Need for contingency practices at policy level with minimum standards for disaster situations, coordination among different departments, e.g. in clearing of blocked irrigation and drainage canals, partnership with participants and intervention to be continued on sustainable basis.

v) The Geographical Indications Act should find a place in the Policy.

vi) Formation of State Trade Policy Council may be formed to act as a platform for discussion between farmers and the policy makers and officials from all departments of the State.

vii) Introduction of compulsory agricultural education in schools and measures to re-attract youth to agriculture are needed.

viii) Need for pension for farmers.

ix) The death of sheep due to Bt cotton consumption must be investigated.

x) Programmes and entitlements should reach people – information dissemination

xi) Safeguard traditional knowledge by paying royalty.
xii) Need for formation of Commodity Boards under the umbrella National Horticulture Board for better attention to individual crops. Grapes, Banana Turmeric and Chilly can be special thrust areas in Tamil Nadu.

xiii) Formation of agency to implement Minimum Wages Act is essential; there should be legislation for agriculture labour.

xiv) Panchayat and Gram Sabha may elect a body that can be registered and entrusted to handle the implementation of govt. schemes – this can be a SPV.

16. After the Consultation session, Chairman and Members of the NCF assured the full consideration of the suggestions made and the written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF UTTARANACHAL FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT DEHRADUN ON 20th JUNE 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Dehradun on 20th June 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, NCF, Dr. R.B. Singh, Member and Dr. (Mrs.) Laxmi Joshi, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

2. General Suggestions and Observations

i) Shortage of agriculture labour was being experienced in the hills particularly for horticulture crops since the labour had moved to cities where they found higher wages and better life style.

ii) More of infrastructure should be given top priority in the Uttaranchal particularly for roads in order to facilitate quick and efficient movement of its horticulture produce which was highly perishable. In view of poor industrialization in the hills and in view of Uttaranchal being a new State, its own resources were not adequate. Liberal Central assistance should be forthcoming especially through Bharat Nirman Programme of Prime Minister.

iii) There should be separate policies for the Himalayan areas and for the coastal areas in view of the uneconomic nature of the holdings.

iv) There was a need to prepare Village Plans based on local resources but this was not happening because of the poor PR set up in the State.
3. **Land**

i) The names of women should be recorded in the land records since men folk in the hill areas tended to migrate to cities for livelihood and their wives had to cultivate.

ii) Since the names of women were not listed, they could not access credit and other inputs.

iii) However, it came out that there were specific difficulties in recording the names of women and there were likelihood of long delays in mutation and getting the consent of men folk to the recording of the names of their wives. It also came out that there could be difficulties if the women were divorced or if they left the husbands on their own will.

iv) Land management policies should be drawn up for Uttaranchal keeping the fact that mostly women were cultivating such land. This would involve special extension programmes for women, general specific tools and implements, credit support for women as well as additional nutritional support in view of the burden on them to manage agriculture as well as home.

v) There should be a ban on plantation of ‘Cheer’ and ‘Pine’ trees in Uttaranchal since they drew too much ground water.

vi) It would be desirable to plant trees with wide leaves in view of the specific geographic climatic conditions in Uttaranchal.

vii) The limited land resources in Uttaranchal should be optimally utilized through the concept of Udyankunj where horticulture, animal husbandry etc. would be practiced in an integrated manner.

viii) The limited resource prime agriculture land may be conserved by severely restricting acquisition of such valuable land for non-agriculture purposes.

ix) Only 14% of the land was available in Uttaranchal for agriculture since the rest of it was covered by hills/forests. Further, huge parts of this agricultural land were lying fallow since some farmers had moved to the cities in search of jobs and livelihoods. This situation needs to be remedied urgently. This was because of scarce resource.
x) The afforestation programme of the Forest Department should provide for at least 30% of trees which had a nutritional value for their fruits/berries etc.

xi) Consolidation of land was of great importance in small holdings in Uttarakhand. However, the matter could be carefully examined in view of the possibilities of litigation and corruption.

xii) Voluntary consolidation through exchange of land could be encouraged by exempting stamp duty on such exchanges and quick mitigation of such exchanges at the level of Revenue Inspector.

xiii) Fodder crops could be planted on the borders of agriculture fields since enough wasteland was not available for fodder development and access to fodder in the forests was becoming a major problem.

4. Water

i) Excessive expenditure was being incurred for repairs of canals even when there was very little water flowing through such canals.

ii) Water and soil conservation techniques should be popularized among the farmers in the hills in order to check the silting of rivers and reservoirs down stream.

iii) Subsidy for rainwater harvesting schemes should be available to all farmers and not only for SC/ST.

5. Livestock

i) People in the hills had been traditionally relying on livestock like cows, goats and sheep for livelihood in view of the availability of fodder and grazing. This was however becoming scarce. Special programmes of nutrition for fodder development therefore have to be undertaken.

ii) There should be arrangements for baling of fodder through introduction of baling machines to conserve fodder for the lean season. There was also a strong need to enrich the fodder with molasses but it is becoming difficult to access molasses after the bifurcation of Uttar Pradesh as sugar mills were located in
Uttar Pradesh. It was mentioned that NDRI, Karnal had developed some alternatives to molasses for enriching fodder and this avenue should be explored.

iii) Fodder is often burnt and even used for exchange purposes in the plains while Uttaranchal did not have enough fodder for its use. Steps should be taken to optimally utilize fodder both in the plains and in the hills.

iv) There should be a strong programme of conserving local breeds in the hills because of their stamina and other attributes. Special mention was made of Red Sindhi breed of cow which had been taken away by Argentina and rebranded as Brahmini cow.

v) Uttaranchal was already implementing “ParaVet” programme in order to take care of artificial insemination and health care need of the livestock owners and this was giving good results. The fodder production programmes in Uttaranchal were suffering because of the presence of weeds like Lantana and Parthenium. Scientists should suggest methods of eliminating these weeds and using them for production purposes.

6. Fisheries

i) There was a need to set up a Fisheries Technology Mission with special focus on cold water fishery and aqua water in the hills specially for sports.

ii) National Fisheries Development Board which was being set up would have to give a special thrust to fisheries in the hill areas since there were limited livelihood opportunities through agriculture.

7. Technology

i) There was a need to design agricultural implements for women particularly in the hills through agronomic studies. While the Central Institute of Agriculture Engineering, Bhopal had brought out a compendium to agriculture implements, special designs for hill women community should be given greater attention.

ii) In view of the large scale wastage of horticulture produce from the hills, greater attention to development of technology for farm level processing was needed
along with support for marketing keeping the quality parameter and consumers’
demands in the cities in mind.

8. Inputs

i) Increased transport subsidies should be available from farm section to the rail
head in hill States like Uttaranchal in view of the high cost of transportation.

ii) Subsidies should be provided for organic fertilizers on the same lines as for
chemical fertilizers in order to encourage its increased use and also to encourage
production of organic fertilizers and vermi compost by women in the hills. Such
a subsidy is also encouraged for increased use of organic fertilizers for
improving soil health.

iii) Suitable tests should be undertaken for the toxicity and bio efficiency of organic
fertilizers.

iv) In view of the importance of organic agriculture in Uttaranchal because of the
very small or non-existence of chemical fertilizers, suitable facilities for
providing certification for organic crops should be provided. Such certification
should also be subsidized to enable smaller farmers also to benefit from
certification.

v) Uttaranchal had developed a good model for certification by setting up of State
Certification Agency which had a tie up with internationally recognized
agencies.

vi) The seed sector should also be free from VAT in order to encourage a higher
seed replacement rate and maintain the competitiveness of the seed produced in
the Tarai area.

vii) The subsidies available to the State Farm Corporation of India and the National
Seed Corporation should also be available to the Tarai Seed Corporation in order
to ensure a level playing field.

viii) Seed bags should mention the recommended seed rate for the guidance of the
farmers.
ix) A seed valley concept could have a great value for Uttaranchal but the idea coming was not feasible for subsidies from the State Government which was not forthcoming.

9. Credit

i) Kisan Credit Cards should be issued in favour of women since they were mostly cultivating the land in the absence of their men folk who had gone to the cities in search of work. It was suggested that a Power of Attorney and Indemnity Bond could be taken from the recorded farmers in favour of their wives to protect the interest of the banks who come to finance the women. However, it turned out that such POA had been banned in Uttaranchal in view of its misuse by outsiders for fraudulently depriving the farmers of their land at low prices.

ii) The target for distribution of KCC had almost been made and the entire State would be covered by the end of the year.

iii) While many Self Help Groups (SHGs) of women have been formed, they had not actively engaged in agri or other productive activities because of the absence of loans. Credit may be made available to the SHGs of women and the banking institutions should be proactive and lenient in such matters.

iv) It was noted that some women SHGs had set up nutrition gardens and were also engaged to produce seeds but adequate information about nutrition etc. was not provided to them.

v) There was then adverse credit deposit ratio in Uttaranchal and the savings of the people were moving out of the State since there was not much of industrial activities either in the hills.

vi) There was need for a separate credit policy for the hilly areas like Uttaranchal, J&K and Himachal Pradesh.

vii) Credit should become available as soon as new technologies were administered to the farmers.

viii) NABARD was not able to exercise adequate control on the loans by Finance because banks had their own funds and do not know much of refinance.
ix) The ICOR level of 2.2:1 in Uttaranachal was too high and there was very little capital formation in agriculture.

x) Most of the cooperative credit was being channeled in the plains whereas there was a great need for better outreach and greater flow in the hill areas.

xi) National Agriculture Insurance Scheme is currently available only for wheat, ginger, ragi, potato and tomato but was not benefiting the hill areas sufficiently.

xii) Banks were not deducting insurance premium while sanctioning loans to farmers primarily because the farmers did not see money gains in the scheme for them. This was primarily because of the units for crop cutting experiments and sanction of the system being too large.

xiii) The possibility of giving assistance to farmers on account of pending crop cutting experiments to help them immediately after a crop failure should be explored sympathetically.

xiv) Crop insurance and its present form was not farmer friendly.

xv) There were also procedural problems in sanctioning of loans and the simple people in the hills faced corruption and other difficulties.

xvi) The procedure for obtaining No Objection Certificate from various banks before a loan was sanctioned to the farmer was cumbersome and riddled with corruption. Outcomes should be clearly identified and specific responsibility should be fixed at all levels.

10. Marketing

i) Basmati rice whose home was in Dehradun valley of Uttaranachal had been taken by other States and countries, causing loss to the original growers of Basmati rice. A plea was made to create a brand out of Uttaranchal Basmati rice by using the law relating to geographical origin.

ii) There was a need to promote Tapovan Basmati rice which was rare and was a premium product.

iii) There was substantial exploitation of farmers in the markets and up to 10% of Adhat was charged without receipt.
iv) There was an overall shortage, market was harsh without facilities for grading particularly in apple and other horticulture produce. This led to low price while traders made substantial profits by polishing and grading of horticulture produce and marketing in bigger cities.

v) The State Government had proactively helped the farmers for collective bargaining in order to get them better prices for their produce from the traders.

vi) Even though efforts had been made to set up producers markets for farmers to directly market their horticulture produce, there was a need to set up booths managed by farmer cooperatives in bigger cities in order to bridge the gap between the consumers and the producer prices.

vii) There was a need to set up laboratory for ensuring ASTA-CODEX guidelines in order to get premium prices for quality. In general, there was a need to promote quality literacy among the farmers.

viii) Panchayati Raj system was not functioning efficiently and in particular was not taking adequate interest in setting up rural storage godowns by utilizing rural employment guarantee programme funds. The absence of rural guidelines led to lot of wastage and the farmers often had to sell their produce in compulsion at low prices.

11. After the Consultation session, the Members assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF UTTAR PRADESH FOR FEEDBACK ON THE DRAFT NATIONAL POLICY FOR FARMERS AT LUCKNOW ON 4th AUGUST, 2006.

1. Introduction

The Consultation was organized by the National Commission on Farmers (NCF) in collaboration with the State Government at Lucknow on 4th August, 2006. The NCF was represented by Shri Atul Sinha, Member Secretary, Dr. R.B. Singh, Member, Shri Atul Kumar Anjan, Member Part-time and Dr. Ramesh Singh, Research Officer. Farmers, Farmer Organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR Institutions, Bankers, officials of State and other stakeholders participated in the Consultation. The major suggestions/issues raised during the Consultation were as under:-

1.2 Member Secretary welcomed the participants on behalf of NCF and requested them to give their valuable suggestion on the Draft Policy for Farmers circulated by NCF. He also explained salient recommendations of NCF in its four Reports already submitted to Government. Dr. R.B Singh highlighted the problem of soil and water degradation adversely affecting productivity and institutional reforms necessary to tackle the problem. Shri Atul Kumar Anjan mentioned about low investment in agriculture and inadequate response of Scientists and Researchers to various problems of farmers. He suggested early constitution of State Farmers’ Commission.

1.3 Hon’ble Minster Agriculture, U.P in his remarks highlighted the importance of food security, crop diversification and Bhumi Sena Yojana recently formulated by the State Government to improve “Oosar” in order to allot it to landless persons in rural areas and the need for a second Green Revolution and investment, production and supply of quality seed and other inputs. He stressed that improving functioning of KVKs for dissemination of proven technologies to farmers effectively was essential. APC briefly mentioned steps taken by State Government to improve productivity and income of
farmers and stated that State Government had come out with an Agriculture Policy with a Vision Document on 07.02.2006. He further indicated the need to improve marketing opportunities for farmers through retailing and by suitably increasing MSP.

2. General Observations and Suggestions

i) Spray of cow dung plus cow urine by a farmer protected crop from “Neelgai”.

ii) Coverage of agriculture and farmers in media was stated to be very poor.

iii) Compared to defence and other sectors, the budget allocation for agriculture was stated to be lower.

iv) Subsidy should be given directly to farmers.

v) Lot of funds for agriculture lapsed due to procedural difficulties.

vi) Rights of farmers on seed and water should be firmly established in the Policy.

vii) Strict governance to check corruption should be ensured and highlighted in the Policy.

viii) Diesel should be provided to the farmers at subsidized rates.

ix) Adequate drainage facility should be provided to prevent water logging.

3. Land

i) Land was being diverted in U.P from wheat to sugarcane on a large scale and this could affect overall production of wheat.

ii) Average landholding by farmers was reducing due to excessive land acquisition for industries apart from other reasons.

iii) Yield was going down due to soil degradation and incorrect application of fertilizer.

iv) Fertile land should not be diverted for non-agricultural purpose.

v) Planning at National and State Level was needed for desired land use pattern for growing different crops competitively.

vi) Water logged land should be covered under sugarcane cultivation and fisheries.
4. **Water**

i) In irrigated area water supply from head to tail should be ensured by lining of canals which would reduce loss of water.

ii) Government tube-wells were not working in some cases.

iii) Barrage over Yamuna river was needed to provide irrigation facility to a large number of farmers.

iv) Proper utilization of irrigation water should be ensured.

v) Problem of water logging in some parts of State was highlighted. Varieties, which could withstand water logging, should be developed.

vi) More tanks should be dug to conserve water and increase fish production.

vii) Dredging of river and construction check dams should be taken up.

5. **Livestock and Fishery**

i) Animal husbandry gave sustainable income to farmers if properly adopted by them.

ii) Farmers supported concept of para veterinarian to provide necessary extension services for animals.

iii) Fisher farmers were not treated as full farmer. They got electricity at commercial rates.

iv) Recovery of ponds destroyed by land mafias should be taken up by Government.

v) Lease of village ponds for fishery was taking long time due to procedural hassles

vi) Insurance of cattle was not effective. It was difficult to get the claims for insured cattle.

vii) Increased cost of veterinary medicines was highlighted.

viii) Livestock quality in Bundelkhand region of U.P was inferior resulting in lower productivity.

ix) Animals should be protected through “Goshalas”.

x) Animal drawn implements should be popularized and subsidy on same be allowed.
6. **Organic Farming**

i) Through organic farming sugarcane yield in some cases had gone up to 200 mt./ha and recovery increased by 2%.

ii) Vermi compost was beneficial for the farmers.

7. **Inputs**

i) Input costs were stated to be higher compared to the prices in the market for agriculture produce.

ii) Non-availability of quality seed, fertilizer in time was a major constraint.

iii) Irregular supply of electricity to farmers should be avoided.

iv) Since the Private dealers guided the farmers on pesticides, a minimum qualification should be prescribed for these dealers. Agriculture graduates should be appointed as dealers.

v) Some pumps could save electricity up to 40% with the same efficiency for irrigation. Under different Government Schemes such energy efficient pumps should be provided.

vi) Seed Bill was opposed by some farmers.

8. **Training and Extension**

i) Need for a Counsellor in each Embassy to study agricultural practices in different countries was highlighted.

ii) There should be Training Centers for farmers in each Panchayat.

iii) Public research to identify new varieties which could give sustainable income was not satisfactory mainly due to inadequate investment.

iv) Training of farmers at local level particularly for post harvest management and marketing should be organised.
9. **Credit and Insurance**

i) Every crop and every farmer should be covered by insurance with 75% subsidy on premium.

ii) Crop insurance should be at village level instead of block level which was not beneficial to the farmers.

iii) Loaning procedures adopted by Banks were stated to be very complicated for the farmers. Banks decided shops from where they forced farmers to buy accessories at a higher cost.

iv) Numbers of claims for insurance were rejected on flimsy grounds by private insurance companies adversely affecting the farmers.

v) System of Bima Lok Pal was not effective.

vi) Potential Linked Credit Plans prepared by NABARD for each District should be an effective tool for providing credit by Banks.

10. **Market and Infrastructure**

i) MSP should be fixed based on the cost of cultivation.

ii) Full payment for sugarcane should be ensured to farmers.

iii) MSP increased by 10% whereas input costs had gone up by about 100%.

iv) Sugarcane prices should go up at least by Rs. 200/- per M.T to make it remunerative.

v) Marketing problem for sale of Soyabean was highlighted.

vi) Import of food grain at a higher price than the MSP offered to the farmers was pointed out by some participants.

vii) Marketing was identified as a major problem for farmers.

viii) Middlemen as brokers should be eliminated from market.

ix) U.P. Government had not yet agreed to contract farming.

x) Inadequate processing facility available only for about 2% of agriculture produce was highlighted.

xi) Irregular supply of electricity to farmers was creating problem for farmers.

xii) Facility of assured market should be made available to the farmers.
11. Suggestions and observations made by the Honourable Ministers for Agriculture, Cooperation, Fisheries and Animal Husbandry

During discussion with the Members of NCF, the Ministers incharge, Agriculture, Cooperation, Fisheries and Animal Husbandry, Govt. of U.P. gave the following major suggestions on behalf of the State Government on the Draft National Policy for Farmers:

i) Food and livelihood security is the central issue for the Policy. Government of Uttar Pradesh in its Agriculture Policy 2005 had based its strategy on a 7-point Action Plan to ensure food and livelihood security of people.

ii) To implement the concepts like cooperative farming and corporate farming it is necessary to have a strong legal framework with a code of conduct and there should be consultation with the stakeholders before implementation.

iii) Production of hybrid seeds through SHGs is not feasible. Government farms can be utilized for production of quality seeds according to agro climatic conditions in order to fulfill the requirements of the State.

iv) Certification of organic products is essential to promote organic farming.

v) There is a need to delink agriculture credit from land title.

vi) No restriction on export of agriculture produce should be imposed.

vii) State Government has decided to constitute Agriculture Advisory Council.

viii) The soil quality in a large portion of land has deteriorated due to different reasons. In order to make this land cultivable, State Govts. are implementing “Bhumi Seva” Scheme. It would be desirable for Central Govt. to support such schemes through adequate funding.

12. After the Consultation session, the Members assured the full consideration of the suggestions and written representations made by the State Government and participants. They also thanked the State Government for the courtesy shown.
STATE LEVEL CONSULTATION OF WEST BENGAL FOR FEEDBACK ON DRAFT NATIONAL POLICY FOR FARMERS HELD ON 1ST AUGUST, 2006 AT KOLKATA

1. Introduction

The State Consultation of West Bengal organized in collaboration with the Department of Agriculture of the State, was held in Kolkata on August 1, 2006. NCF was represented by Mr. Atul Sinha, Member Secretary, Dr. R B Singh, Member and Ms. R V Bhavani, Director (Tech). Farmers, farmers’ organizations, NGOs, Media Representatives, Scientists from Agriculture Universities and ICAR institutions, Bankers, officials of the State Government and other stakeholders participated in the Consultation.

2. General Observations and Suggestions

The highlights of the suggestions/issues that came up are summarized below:

i) Of late income from agriculture is coming down. As such farmers have started to switch over to other professions and moving to nearby cities. Measures have to be taken to convert farming into a lucrative profession by giving remunerative price for their produce, reducing the cost of inputs and providing necessary infrastructure support and technical guidance.

ii) There should be substantial enhancement in the central budgetary allocation for agriculture because 60% of the population is still dependent on agriculture.

iii) Adoption of appropriate technology by farmers for higher production in different crops, development of food processing and creation of opportunities for large scale use of farm produce in industry need priority attention.

iv) There should be thrust on moving from mono-crop to multiple cropping system; a composite farming systems approach fitting low water requiring crops with improved productivity will help raise production; no land should be left fallow to the extent possible.
v) There is lack of coordination among the departments like Agriculture, Horticulture & Food Processing, Fishery, Animal Husbandry etc. which are responsible for economic wellbeing of farming community. Development of better coordination among line departments is required.

vi) Number of man days in Agricultural activities is coming down every year. High level mechanization is also a reason for this. Measures have to be taken to address this aspect.

vii) We should ensure our own food and nutrition security before we export foodgrains. Export oriented agriculture can be encouraged once this is satisfied and niche markets developed.

viii) Peasants and agricultural labour should automatically come under the BPL list.

ix) Organic agriculture should be made mandatory in hill areas. Certification procedures for organic agriculture should be locally available; Inputs should be subsidised

x) The agro-forestry section in the Policy is well-developed and complete. Other sections should be organized on similar lines.

xi) Fishery issues have not been covered adequately in the policy.

xii) Agriculture has to be incorporated in the school syllabus to give an overview of the activities to the students.

xiii) Measures have to be taken to attract youth to agriculture by developing youth oriented Agriculture. Diversification was mentioned as a good stimulant.

xiv) Selection of crop should be location and demand specific. Intensive cultivation of some specific commercial crops like Tea, Jute & Cotton will help in improving economic condition of the farmers. JCI and CCI should be strengthened to purchase jute and cotton directly from farmers at remunerative price.

xv) Actions have to be taken for drawing up schemes exclusively for small and marginal farmers.

xvi) Cooperative based approach has to be followed in Agriculture which will minimize production cost and increase productivity.
Rural entrepreneurship development is very essential for economic improvement of farming community

Animal Husbandry also has to be given due importance along with Agriculture. This will help in augmenting farm income.

Specialised personalities are very often honoured by the Government for their extraordinary contributions to the nation. Likewise farmers contributing to Agriculture with their innovative ideas have to be honoured by the Government. This will drive the farmers in doing a lot for Agriculture which will in turn increase production and productivity of different crops.

A Farmers’ ITK Board maybe formed to collect and document all effective ITK;

PDS should be universalized and there should be transparency in governance and implementation.

A large number of Government sponsored projects are lying unfinished, resulting in wastage of resources and blocking of future projects.

Only professionals should be made Directors of technical departments, viz. Director Agriculture/Fisheries/Horticulture.

Agriculture should be brought into the Concurrent List.

NREGP should be extended to all districts of the country.

Small farmers under debt are selling their land and becoming landless labourers.

3. Land

Suitable crop planning is needed to combat the agro climatic stress. Lot of land suffering from acidity needs special treatment and cropping pattern.

The soil of Jalpaiguri district is very light and acidic. Nutrient and water holding capacity is also very poor and as a result yield is low. Soil Health improvement and water retention need attention.

More emphasis should be given on land reform. Though the Left Front Government has given a major thrust to land reforms, more impetus should be given on this prime issue. The impact of Operation Barga has to be reviewed and unfinished tasks completed, like distributing land to landless.
iv) In rainfed farming areas, rainwater holding agro forestry should be promoted.

v) Encroachment on agricultural land by different sectors is also a major threat to Agriculture. Therefore, availability of net cultivable area needs to be worked out in proportion to targeted population keeping in mind the question of food security.

vi) Fragmentation of land is a growing problem. Consolidation through community approach is the need today.

vii) Decisions should be made in advance on how much land should be under high value crops.

viii) Wasteland should be distributed among the landless labourers (one bigha per landless).

ix) Extreme shortage of DAP is causing nutrient imbalance.

4. Water

i) Purulia, a drought prone district with red laterite soil and extreme climate, needs intensive development of rain water harvest structures to boost agricultural production.

ii) Salinity and availability of sweet water is a major problem in South 24 Parganas district which limits the production potential and enables only a single crop.

iii) In some areas, lack of irrigation facility for Rabi crop and Boro Rice is the main problem of harvesting good yield.

iv) Inadequate supply of irrigation water from Tista Barrage Project is a problem for Jalpaiguri farmers. Adequate irrigation water from the State project is to be ensured to increase productivity and cropping intensity.

v) Surface water bodies should be revived and renovated; Problem of arsenic in groundwater has to be addressed urgently

vi) Water, the key input in Agriculture is being polluted by different companies. Thus quality of irrigation water as well as drinking water has been deteriorating, especially affecting downstream farmers. This has to be stopped and such
companies have to be taxed. The fund so accrued has to be utilized for development of farming community.

vii) Modern projects are neglecting and even destroying existing and or traditional drainage systems.

viii) There should be an Emergency Fund to meet out relief to crops damaged by untimely water release from dams.

ix) Micro power generation should be permitted to run motors for irrigation.

x) Down drawing of water from dam hampers production of fish as it generally coincides with the breeding season of fish.

xi) Rivers have a life of their own and river linking programmes should be stopped.

xii) Decentralised, district micro-level water use planning is needed with integrated watershed based approach

5. **Inputs**

i) Production suffers from non-availability of good quality seed and fertilizer and their timely supply. Networking with good NGOs can help solve this problem.

ii) Quality seed should be made available by improving the functioning of Government farms.

iii) Economic status of farming community particularly of the small and marginal farmers is not in good shape. Proper subsidy should be given to them for supply of quality agricultural inputs - quality seeds, fertilizer, irrigation pesticides etc.

iv) Seeds of salt tolerant paddy variety should be provided to farmers along the coast.

v) More emphasis should be given on promoting oilseed cultivation, particularly sunflower.

vi) Government Inspectors should enhance their vigil regarding spurious inputs like seeds.

vii) The policy does not say anything on GM seeds. They should not be allowed.
viii) The Seed Corporation of India should be revitalized to supply to small and marginal farmers.

ix) MNC seed players should not be allowed.

x) The Seed Bill should be reviewed carefully and be in tandem with the already existing PPVFR and Biodiversity Acts and protect farmers’ interest.

6. Technology and Training

i) There should be monthly meetings of the agriculture department with farmers at the block level.

ii) The work of agriculture universities and research institutions is not reaching the farmers.

iii) Production of vegetables through organic farming fetches higher price. Therefore greater awareness should be generated on organic farming.

iv) Knowledge gap to tackle the soil and crop health through use of balanced nutrient and proper crop management has to be addressed.

v) Soil testing service should be available at the village level and at all KVKs.

vi) Emphasis has to be given on application of IT in agriculture.

vii) Farmers need training in composite farming techniques. There should be Zonal Farmer Training Centres.

viii) KVKs should be tapped for educating our farmers.

ix) Each district should have at least one soil testing laboratory. This is very vital because of the fact that research studies show that due to application of chemical fertilizers the health of soil deteriorates.

x) There should be district-level agro-meteorology stations. This will help farmers in drawing their seasonal cropping programme in a comprehensive manner.

xi) Often R & D work is carried in the field of farmers by the MNCs. Tax has to be imposed on such works.

xii) Participatory research should be supported.
7. Credit and Insurance

i) Institutional crop loan is not available to many. The outreach of the formal credit system has to be increased.

ii) The Kisan Credit Card is cornered by the big farmers and is beyond the reach of the small and marginal farmers.

iii) Crop Insurance can be a prime risk aversion type measure in the era of cost intensive modern agriculture; it should cover all crops and be available across the State. But what seems to be the main hurdle to this way is the Unit area for compensation i.e. Block as defined under the existing crop insurance programme. The village should be the unit of assessment. Also, 60% damage should be sufficient ground for compensation and the government should bear the premium burden.

iv) Crop insurance should cover all crops.

v) Why can’t insurance be individual farmer based?

vi) Small and marginal farmers should get interest free credit through credit cards.

8. Price and Market

i) Marketing produce at remunerative price is a problem. The price is there but does not accrue to the farmer because of the chain of intermediaries. Price accruing to the farmer should include the profit component.

ii) Vegetables storage facility for unsold vegetables is lacking. There should be cold storages for crops like potato.

iii) More emphasis should be given to export oriented agriculture.

iv) Fixation of MSP of agricultural commodities is not always reasonable. Rational fixation of price of all the agricultural commodities is urgently required.

v) Proper road infrastructure is important to reach the market.

vi) Our farmers are not equipped to deal with Corporate Farming and Contract Farming. Local NGO of credibility may be involved to ensure that the farmer is not cheated. PRIs can take the initiative in backing PPP model with technical backup from the University. With proper support, contract farming is perhaps
the direction to take in view of the small size of land holdings and the need for assured price for produce. Government should be made a party in the contract as the third party, primarily for dispute settlement.

vii) There should be thrust on food processing and Food Parks maybe promoted. Creation of food parks will inspire the farmers in producing agricultural commodities of extra good quality and they will also get good price of their products.

viii) The regulated markets are controlled by a few wholesalers. They should be brought under control and competition increased.

ix) Farmers should get scope for direct sale in the market; eliminate middlemen.

tax) MSP for fish is not applicable.

xi) Farmers in many States are committing suicide mostly on account of non-receipt of remunerative price of their commodities.

xii) Cost of production of Agricultural commodities varies from district to district. Therefore, different procurement prices have to be declared for different districts. In general, inputs cost has been rising fast whereas output prices remain depressed.

9. **Women in Agriculture**

i) Appropriate measures should be prescribed in the policy for economic uplift of women farmers.

ii) Women should be called to meetings. They need special counseling and training

iii) There should be equal pay for equal work and no discrimination in wage rates to male and female wage labour

iv) Kisan Credit Card should be given in the wife’s name instead of the husband.

10. **Information Dissemination**

i) Information on various extant Government programmes and schemes do not reach the farmers. These are generally cornered by the big farmers.

ii) Agricultural news should be broadcast on regular basis through radio. It would be ideal if there were a separate channel for agriculture and farmers.
iii) Success stories of farmers should be telecast/broadcast.

iv) Interactive Programmes should be increased – farmers should be able to phone-in for advice, write with their queries.

v) KVKs should be given license for radio transmission, like the KVK Baramati model.

vi) Agriculture Internet outlets like E-choupal, E-Agriculture should be opened immediately for facilitating our farmers so that they can access information for fetching remunerative price.

vii) Media should be well equipped and have to come in the forefront for the interest of our farmers.

viii) Weather forecasting system should be more elaborate and accurate for ensuring our farmers have access to them through internet and mass-media.

ix) All possible and effective means of information should be harnessed and effectively utilized, e.g. street plays, community newsletter, Jatra group.

x) A large number of information centres should be opened in West Bengal from where the poor farmers will get the correct message and information for their cultivation.

xi) Model farmer in each block maybe identified and trained to disseminate information and train others.

xii) Grassroot workers and NGOs should be trained on aspects relating to IPR, WTO, BD and PPVFR Acts and they in turn have to disseminate the information to further reach out to farmers. Officials should also have clear idea about the process of patenting.

xiii) Important days like Wetlands Day (June 16), Fish Farmers’ Day, should be observed in each Block to generate greater awareness.

xiv) Setting up of farmers’ schools is essential to disseminate recent know how in farming, creation of extensive facilities for monitoring soil health, generating awareness to minimize dependence on plan protection chemicals to save the health of human, development of Agri-based industry to ensure remunerative prices for the farm produce.
xv) Formation of farmers’ club can help easy dissemination of agricultural technologies among farmers.

xvi) Present extension method followed in agriculture is not sufficient enough for quick dissemination of Agricultural technologies. Measures have to be taken to this effect with the process of involving NGOs or any other private extension agencies.

11. Suggestions from Ministers

After the consultation, the NCF representatives had a discussion with the Ministers of Agriculture, Animal Husbandry, Agriculture Marketing and Fisheries and the concerned officials of these Departments. The Ministers apprised the members about the steps taken by the State Government in favour of farmers and raised various issues relating to the State that needed the attention of the NCF.

The issues and suggestions that came up are summarised below:

i) **Fisheries**: There should be insurance schemes for fisheries also; there is ban on import of brood stock. This has to be reviewed and relaxed on case by case basis, like in the case of certain varieties of ornamental fish. In the entire cycle of breeding-feeding-healthcare-management, a pro-poor approach is needed. There should be a policy based on latest knowledge and assessment of future threats.

ii) **Livestock**: only cattle and poultry have got attention in the Policy. There is no coverage of mulberry; There has to be Livestock Mapping on the lines of Crop Mapping;

iii) There should be 100% insurance for all animals;

iv) There should be KVK exclusively for livestock in each district;

v) There is need for Local Breeding and Feeding Policy; One goat needs on an average 5 cottah of grazing land and a cow requires 10 cottah Low cost production of fodder and feed for animal husbandry has to be promoted;

vi) Breeding of indigenous breed of quality livestock has to be promoted;
vii) Medical care for animals is sparse. There should be two-year para-veterinary courses to setup and man PHCs for animal healthcare; SHG members in villages can also be trained; There is an ongoing scheme of ‘Prani Bandhu’in every Gram Panchayat, the person collects Rs.60/- for every artificial insemination done;

viii) Although export of cattle and beef is banned, there is illegal trade through Bangladesh. This has to be reviewed and a policy beneficial to protect the interests of our livestock rearers put in place.

ix) **Inputs:** Seed multiplication is required on a large scale. Hybrid seed production should be encouraged with atleast 60% subsidy; Organic farming inputs like green manure need subsidy support

x) There should be effective implementation of land reforms across the country to improve the standard of living of the farmer

xi) Agriclinics and Agribusiness Centres have to be promoted; Thrust on small scale cottage and agro-based industries is needed

xii) There should be Pension and PF provision for farmers also. West Bengal Government has introduced a pension scheme

xiii) Contract farming should have protection for small farmers; The terms and conditions should be favorable; Composite Farming with backward and forward linkages and coordination between different sectors should be encouraged

12. The Members assured the full consideration of the representations made by the State Government and all the participants. They also thanked the State Government for the courtesy shown.
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