

MECHANIZATION AND TECHNOLOGY

Overview



Mechanization of agriculture is an essential input in modern agriculture. It enhances productivity, besides reducing human drudgery and cost of cultivation. Mechanization also helps in improving utilization efficiency of other inputs, safety and comfort of the agricultural worker, improvements in the quality and value addition of the produce. Efficient machinery helps in increasing production and productivity, besides enabling the farmers to raise a second crop or multi crop making the Indian agriculture attractive and a way of life by becoming commercial instead of subsistence. Increased production will require more use of agricultural inputs and protection of crops from various stresses. This will call for greater engineering inputs which will require developments and introduction of high capacity, precision, reliable and energy efficient equipment.

Looking at the pattern of land holding in India, it may be noted that about 84 % of the holdings are below 1 ha. There is a need for special efforts in farm mechanization for these categories of farmers to enhance production and productivity of agriculture.

In the existing scenario of land fragmentation and resulting continued shrinkage of average size of operational holdings, percentage of marginal, small and semi-medium operational holdings is likely to increase. Such small holding makes individual ownership of agricultural machinery uneconomic and operationally unviable. 'Custom Hiring Centers of Agricultural Machineries' operated by Co-operative Societies, Self Help Groups and private/rural entrepreneur are the best alternative in **enabling** easy availability of farm machineries to the farmers and bringing about improvement of farm productivity for the benefits of Small & Marginal farmers.

Department of Agriculture & Cooperation has integrated the components of agricultural mechanization under various schemes and programmes aiming at catalyzing an accelerated but inclusive growth of agricultural mechanization in

India. The following specific interventions with a special emphasis on 'reaching the unreached' will bring small and marginal farmers' at the core. With this aim Sub Mission on Agricultural Mechanization (SMAM) has been introduced during 12th plan w.e.f April 2014.

Division introduced Sub Mission on Agricultural Mechanization with following components;

1. **Promotion and Strengthening of Agricultural Mechanization through Training, Testing and Demonstration:** Aims to ensure performance testing of agricultural machinery and equipment, capacity building of farmers and end users and promoting farm mechanization through demonstrations.
2. **Demonstration, Training and Distribution of Post Harvest Technology and Management (PHTM):** Aims at popularizing technology for primary processing, value addition, low cost scientific storage/transport and the crop by-product management through demonstrations, capacity building of farmers and end users. Provides financial assistance for establishing PHT units.
3. **Financial Assistance for Procurement of Agriculture Machinery and Equipment:** Promotes ownership of various agricultural machinery & equipments as per norms of assistance.
4. **Establish Farm Machinery Banks for Custom Hiring:** Provides suitable financial assistance to establish Farm Machinery Banks for Custom Hiring for appropriate locations and crops.
5. **Establish Hi-Tech, High Productive Equipment Hub for Custom Hiring:** Provides financial assistance to set up hi-tech machinery hubs for high value crops like sugarcane, cotton etc.
6. **Promotion of Farm Mechanization in Selected Villages:** Provides financial assistance to promote appropriate technologies and to set up Farm Machinery Banks in identified villages in low mechanised states.
7. **Financial Assistance for Promotion of Mechanized Operations/hectare Carried out Through Custom Hiring Centres:** Provides financial assistance on per hectare basis to the beneficiaries hiring machinery/equipments from custom hiring centres in low mechanized areas.
8. **Promotion of Farm Machinery and Equipment in North-Eastern Region:** Extends financial assistance to beneficiaries in high-potential but low mechanised states of north-east.

Out of the above mentioned components, 1& 2nd comes under Central Sector (Central share 100%) and remaining (3to 8) under Central Sponsored Scheme (central share 50%: State Share 50 %)

Beside above interventions, the Department is promoting Farm Mechanization by making agricultural equipment available among farmers at

cheaper rates. A level of 25-50% subsidy on procurement cost is made available under RKVY, NFSM, and NHM & TMOOP scheme for different categories of equipment. The subsidy on tractors and power tillers is available on the models approved by the department under institutional financing. Besides tractors and power tillers, combine harvesters are also available to the farmers as per approved pattern of subsidy. As an individual farmer may not be in a position to purchase high cost equipment on his own, Self Help Group of farmers (SHGs), user groups, cooperative societies of farmers etc are also made eligible for assistance under the programme. As a result of different programmes implemented by the Government of India over the years and equal participation from Private Sector, the level of mechanization has been increasing steadily over the years. This is evident from the sale of tractors and power tillers, taken as indicator of the adoption of the mechanized means of farming, during the last five years, as given in the Table-1 below:

Table 1 - Year wise sale of tractors and power tillers

Year	Tractors Sale (Nos.)	Power Tillers Sale (Nos.)
2004-05	2,47,531	17,481
2005-06	2,96,080	22,303
2006-07	3,52,835	24,791
2007-08	3,46,501	26,135
2008-09	3,42,836	35,294
2009-10	3,93,836	38,794
2010-11	5,45,109	55,100
2011-12	5,35,210	60,000
2012-13	5,90,672	47000
2013- 14	6,96,828	56000
2014-15 (up-to Nov.2014)	474538	

Average farm power availability for the cultivated areas of the country has increased from 0.48 kW/ha in 1975-76 to 1.84 kW/ha at present and is likely to be achieved 2.0 kW/ha by 2017.

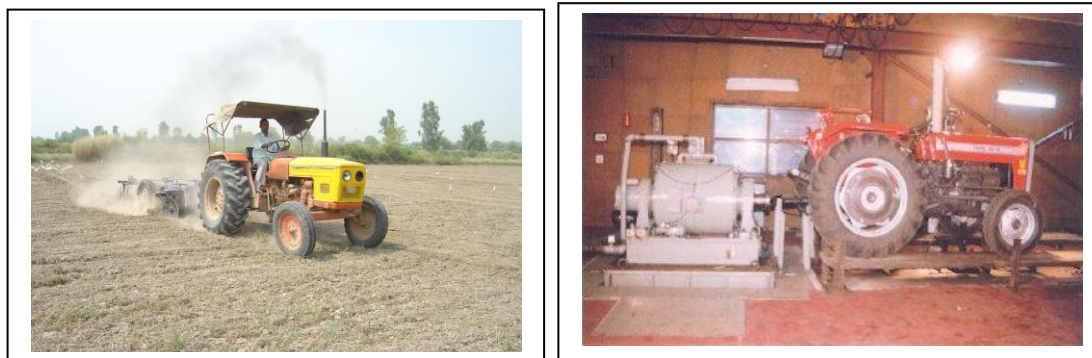
Training of Farmers & Technicians:



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Chariali (Assam), have been imparting training to farmers, technicians, retired/retiring defense personnel etc., in the selection, operation, maintenance, energy conservation and management of agricultural equipments. These Institutes have also been conducting testing and performance evaluation of various agricultural implements and machines. The target of training during the Eleventh Plan has been increased under Sub Mission on Agricultural Mechanization. To supplement the efforts of the FMTTIs in human resource development, outsourcing of the training through the SAUs, Agricultural Engineering colleges, polytechnics, etc., has been approved during the XIIth plan. For training of farmers, the identified institutions are reimbursed Rs 4000 per trainee per week, which also includes a stipend of Rs 500 and to and fro travel expenses by normal mode of transport. .

Testing and Evaluation of Farm Machinery & Equipment:



The Institute at Budni has been authorized to conduct tests on tractors and other agricultural machines; while the institute at Hissar conducts tests on self-propelled combine harvesters, irrigation pumps, plant protection equipment, agricultural implements and other machines including issuing of CMVR certificate of Combine Harvester. The Institute at Garladinne has been authorized to test power-tillers and also conduct tests on various agricultural implements/equipment components. This Institute is being developed as a specialty institute for meeting the mechanization demand in rain-fed and dry land farming systems. The institute at Biswanath Chariali (Assam) tests bullock-drawn implements, manually operated equipment, tractor drawn implements, self propelled machines and small hand tools .

To cope up with the ever increasing demand for testing of newly developed agricultural machines and equipments, DAC has authorized 31 State Agricultural Universities (SAUs)/ICAR Institutions and 5 State Agricultural Departments as **Authorized Testing Centers** for testing and certifying certain categories of agricultural machinery and equipments namely, Hand tools, Manual Operated Equipments/Machines including Plant protection Equipments etc. Relevant information has been made available on the departmental website for wider

publicity among the users/manufacturers. For tractor mounted combine harvesters, Central Institute of Agricultural Engineering (CIAE), Bhopal and Punjab Agricultural University (PAU), Ludhiana have been designated as authorized testing centers in addition to FMTTI, Hisar.

Farm Mechanization Programmes under various schemes of DAC:

Assistance in the form of subsidy at the rate of 25-50 percent of the cost with permissible ceiling limits is made available to the farmers for the purchase of agricultural equipment including hand tools, bullock-drawn/power-driven implements, planting, reaping, harvesting and threshing equipment, tractors, power-tillers and other specialized agricultural machines under the centrally sponsored schemes like RKVY, NFSM , NMOOP & NHM during XIIth Plan. ,

State Agro Industries Corporations:

The Government of India had advised the State Governments in the year 1964, to set up State Agro Industries Corporations (SAICs) in the public sector to act as catalysts in providing access to industrial inputs to farmers, for their use in agriculture. Thus, 17 SAICs were set up in the joint sector with equity participation of the Government of India and the respective State Governments of Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Uttar Pradesh, Tamil Nadu and West Bengal during 1965 to 1970. Many of the State Governments have increased their equity participation as a result of which the Government of India, at present, is a minority shareholder. SAICs have since expanded their basic functions by commencing manufacture and marketing of agricultural inputs, implements, machines, after-sales-service, promotion and development of agro-based units/industries. The Government of India is implementing a policy of disinvestment of its shares in SAICs with a view to giving greater decision making power to the state governments by allowing transfer of its shares to state governments on following guidelines:

- Where the net worth of the SAIC is positive, the Government of India would be willing to consider offering its shares to the State Governments at a price 25 per cent less than the book value of the shares on the basis of the latest available audited balance sheet.
- In the case of SAICs whose net worth is negative, the Government of India would be willing to pass on its stake for a token consideration of Rs 1000 for the value of the shares.

So far, the Government of India's shares in SAICs of Gujarat, Karnataka, Uttar Pradesh, Tamil Nadu, Rajasthan and West Bengal have been transferred to the State Governments concerned. The State Governments of Madhya Pradesh, Assam and Jammu & Kashmir have since agreed, in principle, for transfer of the Government of India's shares held in these SAICs. It is reported that State Govt. had notified closure of the Assam State Agro Industrial Corporation w.e.f 31.08.2006.

Activities in the North-Eastern States: A FMTTI has been established at Biswanath Chariali in the Sonitpur district of Assam, to cater to the needs of human resource development in the field of agricultural mechanization and also to assess the quality and performance characteristics of different agricultural implements and machines in the region.

Gender Friendly Equipment for Women



A list of about 30 identified gender-friendly tools and equipment developed by the Research and Development Organization for use in different farm operations has been sent to all states and UTs. for popularizing them. State governments have been directed to earmark 10 per cent of total funds allocated for the training for women farmers.

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