Brief on Programmes of Natural Resource Management (NRM) Division, Department of Agriculture & Cooperation, Ministry of Agriculture

1. Land Degradation:

As per the available estimates of Indian Council of Agricultural Research (ICAR-2010), out of total geographical area of 328.7 million hectare, about 120.4 million hectare (37%) is affected by various kind of land degradation. This includes, water and wind erosion (94.9 million hectare), water logging (0.9 million hectare), soil alkalinity/sodicity (3.7 million hectare), soil acidity (17.9 million hectare), soil salinity (2.7 million hectare) and mining and industrial waste (0.3 million hectare). State-wise extent of area under various kind of land degradation are at Annexure-I.

2. Programmes of NRM Division:

Soil formation and its erosion are natural phenomena occurring simultaneously. Frequent droughts, floods and climatic variabilities also have an impact on soil fertility and land degradation, thereby, affecting foodgrain production across the country. With a view to prevent soil erosion, land degradation, improving productivity of lands and also to maintain balance in various types of land uses, Department of Agriculture & Cooperation was implementing various development programmes, namely; National Watershed Development Project for Rainfed Areas (NWDPRA), Soil Conservation in Catchments of River Valley Project and Flood Prone River (RVP & FPR), Watershed Development Project in Shifting Cultivation Areas (WDPSCA) and Reclamation and Development of Alkali & Acid Soils (RADAS) upto March, 2013 across the country**.**

Under these programmes, various soil and water conservation measures, namely; contour vegetative hedges, contour/graded bunding, horticulture plantation, contour/staggered trenching, sowing and plantation, silvi-pasture development, pasture development, afforestation, farm ponds, percolation tanks, drainage line treatment (earthen loose boulders, water harvesting structure, check bund, drop spill-way, sediment detention structure, etc.) are implemented on watershed approach. Since inception upto March, 2013, about 22.8 million hectare of degraded lands have been developed at an expenditure of Rs.13133.9 crore under various watershed programme of DAC including Watershed Development Fund, Watershed Development Project in Shifting Cultivation Areas (WDPSCA) and Externally Aided Projects. Scheme-wise achievements since inception upto March, 2013 are at Annexure-II.

3. Brief of programmes:

(A) Centrally Sponsored Programmes (subsumed under MMA):

(a) National Watershed Development Project for Rainfed Areas (NWDPRA): Centrally Sponsored Programme of National Watershed Development Project for Rainfed Areas (NWDPRA) was launched in the VIII Plan (1990-91). This programme was implemented in **all 28 States and Two UTs.,** through Macro Management of Agriculture Scheme upto March, 2013. NWDPRA was thoroughly restructured by retaining technical strength of earlier programme and incorporating lessons learnt from successful projects, especially on community participation. As per available estimates (2010), an area of about 78.0 million ha. is rainfed across the country.

Permissible components includes construction of Contour/Graded, Contour Bund supported with Hedge, Horticulture Plantation, Contour/Stagger

Trenching, Sowing and plantation, Silvi-Pasture Development, Pasture Development, Afforestation, Farm Pond, Percolation Tank, Drainage Line Treatment (Earthen Loose Boulders, Water Harvesting Structure, Check Bund, Spill-way, Sediment Detention Structure, etc. Since inception upto March, 2013, about 11.0 million hectare of rainfed areas have been development at an expenditure of Rs.4499.9 crore. Due to closure of MMA Scheme, RADAS was closed w.e.f. 1st April, 2013. **During 2014-15 of XII plan, Rainfed Area Development (RAD) is one of major components of National Mission for Sustainable Agriculture (NMSA)**.

(b) Soil Conservation in the Catchments of River Valley Project and Flood Prone River (RVP and FPR)**:** This was launched in Third Five Year Plan (1961-62) and from November, 2000 onwards is being implemented through Macro Management of Agriculture (MMA) Scheme in 60 selected inter-state catchments spread over all States (except Goa). Main objectives of this programme were:-

- Prevention of land degradation by adopting a multi-disciplinary integrated approach for soil conservation and watershed management in catchment areas;
- Improvement of land capability and moisture regime in watersheds;
- Promotion of land uses to match land capability; and
- Prevention of soil loss from catchments to reduce siltation of multipurpose reservoirs and enhancing in-situ moisture conservation and surface rainwater storages in catchments to reduce flood peaks and volume of runoff.

Under RVP and FPR programme, various soil and water conservation measures, namely, contour vegetative hedges, contour/graded bunding, horticulture plantation, contour/staggered trenching, sowing and plantation, silvi-pasture development, pasture development, afforestation, farm ponds, percolation tanks, drainage line treatment (earthen loose boulders, water harvesting structure, check bund, drop spill-way, sediment detention structure, etc.) are implemented on watershed approach. Since inception and upto March, 2013, an area of about 7.9 million ha has been treated at an expenditure of Rs.3581.66 crore under this programme against priority area of 30.2 million ha needing urgent treatment. **Allocations of funds under MMA scheme for this programme have been discontinued wef 1st April, 2013**.

(c) Reclamation and Development of Alkali and Acid Soils (RADAS)**:** As per Indian Council of Agricultural Research (ICAR-2010), problem soils exist in about 24.4 million hectare (3.7 million ha. of alkali, 2.7 million ha. of saline and 17.9 million ha. of acid soils) across the country. Accordingly to address the issues of such soils, a centrally sponsored scheme was launched in the 7th Five Year Plan and restructured during 11th Plan for development of alkali and acid Soils. Presently this programme is being implemented through Macro Management of Agriculture (MMA) Scheme in seven states viz. Arunachal Pradesh, Mizoram, Gujarat, Haryana, Punjab, Karnataka and Rajasthan. RADAS aims at improving physical conditions and productivity status of alkali and acid soils for restoring optimum crop production. Major components permissible under this programme are on farm development viz. land leveling, bunding, community drainage systems, application of soil amendments, organic manures, crop/horticultural/fuel wood production, etc. Since inception and upto March, 2013 an area of 0.9 million ha has been developed at an expenditure of Rs.195.2 crore. Allocations of funds under MMA scheme for this programme have been discontinued wef 1st April,

2013. During 2014-15 of XII plan, **reclamation of problem soils has been included as one of the components of Rainfed Area Development (RAD) under National Mission for Sustainable Agriculture (NMSA**).

(d) Watershed Development Project in Shifting Cultivation Areas (WDPSCA): As per Indian Council of Agricultural Research (ICAR-2008), about 1.5 million hectare area is affected by shifting cultivation falling mainly in North Eastern Region states namely; Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura and these states are covered under this Scheme. As shifting cultivation is a way of life for Tribal's and has become social customs; therefore, such practice can not be completely banned, however, such land can be converted into nearly permanent/settled cultivation. As per decisions of National Development Council (NDC), Planning Commission approved a Special Central Assistance to State Plan Scheme of Watershed Development Project in Shifting Cultivation Areas (WDPSCA) to address issues of Jhumia. Accordingly, WDPSCA was launched in 1992-93 for implementation in seven States of North Eastern Region with objective of the scheme is to protect the hill slopes of Jhoom areas through different soil and water conservation measures on watershed basis to reduce further land degradation and also to improve the land productivity and improve socio-economic status of tribal families and minimizing Jhoom cultivation to reduce its ill effects.

Under this scheme, treatment of arable and non-arable land through various measures viz; drainage line treatment, water harvesting structures, farm ponds, horticulture, afforestation, silvi-pasture, crop demonstration, etc. are taken up. Rehabilitation Component (RC) includes improvement of land based and landless /asset less household production systems like piggery, poultry, fishery, sericulture, basket/rope making, tailoring, carpentry, etc. depending on choice of farmers. Since inception upto March, 2012 about 0.6 million hectare of degraded/Jhum land have been developed at an expenditure of about Rs.505.8 crore and scheme has been **discontinued w.e.f. 01st April, 2012**.

4 Externally Aided Projects:

a) Sodic Land Reclamation & Development Project with World Bank Assistance**:** Project proposal on "Uttar Pradesh Land Reclamation and Development Project" at an estimated cost of Rs.2000.0 crore for reclamation and development of 3.1 lakh ha area was proposed for seeking financial assistance from World Bank. Technical and Financial agreement was signed in June, 2009 for development of 1.35 lakh ha of degraded land comprising 1.3 lakh ha of Sodic lands and 5000 ha of Ravine lands at an estimated cost of Rs.1224 crore in 6 years and will come to an and by Dec., 2017.

b) Crop Diversification in Himachal Pradesh with Japan International Cooperation Agency (JICA): Project for implementation of various interventions for Crop Diversification in Himachal Pradesh with JICA assistance at an estimated cost of **Rs.321.0 crore for 7 years was signed on 1st October, 2010.** After detailed deliberations and visit of experts to identified districts of Himachal Pradesh, Overseas Development Assistance (ODA) agreement was signed on 17th February, 2011 and agreed interventions are being undertaken in 5 selected districts namely, Kangra, Hamirpur, Bilaspur, Mandi and Unna. Project is likely to continue upto Dec., 2017.

5. Overall Impact of watershed programmes on different land uses:

Under various watershed development programmes of Government of India, about 82.0 million hectare area has been developed since inception upto March, 2013, which includes area of about 22.8 million hectare developed under watershed programmes of Ministry of Agriculture, Department of Agriculture & Cooperation (DAC). Evaluation Studies have revealed that watershed interventions have been found effective in prevention of soil erosion, land degradation and improving productivity of lands, besides maintaining balance in various types of land uses. Besides, its impact on overall land uses over years can be seen in following ways:-

(a) Net area sown has slightly increased from 140.0 million hectare (1980-81) to 140.8 million hectare (2011-12);
(b) Area under non-agricultural uses has increased from 19.7 million hectare (1980-81) to 26.5 million hectare (2011-12) i.e. an increase of about 6.8 million hectare;
(c) Despite increase in area of about 6.8 million hectare in non-agricultural uses, net area sown has more or less remained same during the same period;
(d) As per Wastelands Atlas of India of Ministry of Rural Development, Government of India, total extent of wastelands has been reduced from 63.97 million hectare to 55.27 million hectare; and
(e) Area under forest has increased by 2.5 million hectare in the said period.

6. Other interventions:

a) Proposed programme of reclamation of problem soils**:** As per available estimates, the area under problem soils is about 24.3 million hectare and presently there is no comprehensive scheme for reclamation and development of such problem soils for enhancing its fertility and productivity, for meeting the ever increasing demands of food grain of the country. "Working Group of Sub-Committee of National Development Council (NDC) on agriculture & related issues on Dryland/ Rainfed Farming System" under the Chairmanship of Chief Minister of Gujarat State recommended for formulation of comprehensive 'Centrally Sponsored Scheme for Reclamation of Problem Soils' for reclamation of problem soils in Projectised approach.

As per recommendation of this Working Group, a dedicated Centrally Sponsored Scheme for Reclamation of Problem Soils has been formulated to tackle the problem soil salinity, alkalinity and acidity across the country. EFC Memo for this scheme for **reclamation of about 8.3 million ha. of problem soils at an estimated cost of Rs. 40,000 crore over a period of 12 years (2015-27) was circulated for seeking comments from various stakeholders. However, due to short left over period of XII Five Year Plan, it has been decided to launch this Scheme for Reclamation of Problem Soil as sub-scheme of RKVY.**

(b) National Policy for Management of Crop Residue (NPMCR): Harvesting of various crops generate large volume of residues both on and off farm. A large portion of crop residue is burnt 'on farm' in order to clean the field for sowing the next crop as time gap between harvesting of kharif crops and sowing of rabi crops is very limited. The burning of crop residues, not only causes air pollution but also damages the soil property and available soil nutrients, besides creating human health problems.

In view of these, a 'National Policy for Management of Crop Residue (NPMCR)' has been formulated and circulated to all the States for implementation and also to ensure prevention of crop residue burning by incentivizing purchase of modern machineries to minimize left over crop residue in the field proportion, multiple uses of crop residue and formulation of fodder pellets as briquettes for gasification.

(c) Policies for prevention of diversion of agricultural land for non-agricultural purposes: As per the Seventh Schedule of the Constitution of India, land falls under the purview of the State Governments and, therefore, it is for the State Governments to bring in suitable Policy / Act / Legislation to prevent the diversion of agricultural land for non-agricultural purposes. However, Government of India, Ministry of Agriculture has formulated National Policy for Farmers, 2007 (NPF, 2007) for preventing diversion of agricultural land for non-agricultural purposes. NPF, 2007 envisages that 'Prime farmland must be conserved for agriculture except under exceptional circumstances, provided that the agencies that are provided with agricultural land for non-agricultural projects should compensate for treatment and full development of equivalent degraded / wastelands elsewhere. For non-agricultural purposes, as far as possible, land with low biological potential for farming would be earmarked and allocated'. State governments have been advised to 'earmark lands with low biological potential such as uncultivable land, land affected by salinity, acidity, etc., for non-agricultural development activities, including industrial and construction activities.' NPF, 2007 has been circulated to the States/Union Territories for implementation.

Government of India, Ministry of Rural Development has also formulated a National Rehabilitation and Resettlement Policy, 2007 (NRRP, 2007) which also emphasizes that 'only the minimum area of land commensurate with the purpose of a project may be acquired. Also, as far as possible, projects may be set up on wasteland, degraded land or un-irrigated land. Acquisition of agricultural land for non-agricultural use in the project may be kept to the minimum; multi-cropped land may be avoided to the extent possible for such purposes and acquisition of irrigated land, if unavoidable, may be kept to the minimum.' This policy has been also circulated to the States/Union Territories for implementation.

These policy measures and other technological interventions have been instrumental in utilization of barren land for non-agricultural purposes, which is evident from decreased in total barren lands area from 17.3 million hectare in 2006-07 to 17.2 million hectare in 2011-12 and Net sown area remain largely unchanged to 141 for last two decades (1981-2011) across the country.

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Annexure-I

State-wise area affected by various kind of land degradation in India

(Area in lakh hectare)

S. No.	Name of States	Extend of area affected by land degradation							Geographical Area
		Water & wind erosion *	Water logged	Alkali/ Sodic Soil	Acid Soil	Saline Soil	Mining/ Industrial waste	Degraded Area	
1.	Andhra Pradesh	88.64	0.36	1.94	0.01	0.60	0.39	91.94	275.05
2.	Arunachal Pradesh	3.80	0.05	0.00	17.69	0.00	0.00	21.54	83.74
3.	Assam	23.66	2.10	0.00	19.95	0.00	0.00	45.71	78.44
4.	Bihar	10.49	1.33	1.06	0.41	0.40	0.02	13.71	94.16
5.	Chhattisgarh	24.22	0.00	0.13	23.42	0.00	0.07	47.84	134.81
6.	Goa	0.01	0.06	0.00	1.03	0.00	0.12	1.22	3.70
7.	Gujarat	10.12	0.01	5.45	0.00	15.59	0.12	31.29	196.03
8.	Haryana	3.03	0.04	1.84	0.02	0.46	0.12	5.51	44.21
9.	Himachal Pradesh	9.84	0.04	0.00	0.76	0.00	0.01	10.65	55.67
10.	Jammu & Kashmir	20.01	0.14	0.00	0.78	0.00	0.01	20.94	222.24
11.	Jharkhand	31.81	0.06	0.00	7.35	0.00	0.21	39.43	79.72
12.	Karnataka	77.99	0.03	1.45	0.93	0.02	0.51	80.93	191.79
13.	Kerala	1.17	0.44	0.00	24.26	0.21	0.01	26.09	38.86
14.	Madhya Pradesh	134.64	0.01	1.24	4.82	0.00	0.24	140.95	308.64
15.	Maharashtra	88.22	0.27	4.21	2.69	1.71	0.16	97.26	307.71
16.	Manipur	1.50	0.21	0.00	15.97	0.00	0.00	17.68	22.33
17.	Meghalaya	7.06	0.03	0.00	10.23	0.00	0.00	17.32	22.43
18.	Mizoram	0.00	0.00	0.00	11.63	0.00	0.00	11.63	21.08
19.	Nagaland	0.31	0.03	0.00	15.16	0.00	0.00	15.50	16.58
20.	Odisha	33.28	0.52	0.00	2.03	1.31	0.08	37.22	155.71
21.	Punjab	3.02	0.34	1.52	0.00	0.00	0.06	4.94	50.36
22.	Rajasthan	201.91	0.00	1.52	0.00	0.82	0.00	204.25	342.24
23.	Sikkim	0.02	0.00	0.00	0.58	0.00	0.00	0.60	7.10
24.	Tamil Nadu	21.34	0.39	3.52	4.27	0.11	0.34	29.97	130.06
25.	Tripura	0.74	0.25	0.00	7.09	0.00	0.00	8.08	10.49
26.	Uttarakhand	10.09	0.25	0.00	4.00	0.00	0.01	14.35	55.84
27.	Uttar Pradesh	128.84	1.76	13.20	0.00	0.22	0.03	144.05	238.57
28.	West Bengal	12.64	0.43	0.00	4.18	4.08	0.07	21.40	88.75
29.	A & N Islands	0.00	0.00	0.00	0.00	0.71	0.00	0.71	8.25
30.	Delhi	0.28	0.00	0.00	0.00	0.00	0.00	0.28	1.48
31.	Chandigarh	0.00	0.00	0.00	0.00	1.05	0.00	1.05	0.11
32.	D & N Haveli	0.00	0.00	0.00	0.00		0.00		0.49
33.	Daman & Diu	0.00	0.00	0.00	0.00		0.00		0.11
34.	Lakshadweep	0.00	0.00	0.00	0.00		0.00		0.03
35.	Pondicherry	0.00	0.00	0.00	0.00		0.00		0.48
Total (Lakh ha.)		948.68	9.15	37.08	179.26	27.29	2.58	1204.04	3287.26
Total (Million ha.)		**94.87**	**0.91**	**3.70**	**17.93**	**2.73**	**0.26**	**120.40**	**328.73**

*Includes area affected by wind erosion of 115.60 lakh ha (Gujarat-0.01 lakh ha. & Rajasthan-115.59 lakh ha.).

Source: Degraded and Wastelands of India-Status and Spatial Distribution published by ICAR (2010).

Annexure –II

Degraded Lands Developed under various watershed programmes, since inception upto X Plan, during XI Plan & since inception upto March, 2013.

(Area in Lakh hectare and Expenditure in Rs. Crore)

S. No.	Name of Ministry/Scheme and year of start	Progress upto X Plan		Progress during XI Plan (2007-2012)		Progress since inception upto March, 2013	
		Area	Expr.	Area	Expr.	Area	Expr.
(A) Department of Agriculture & Cooperation, Ministry of Agriculture							
1.	NWDPRA (1990-91)#	94.02	3034.66	14.61	1286.12	110.31	4499.86
2.	RVP & FPR(1961-62)#	65.31	2263.07	12.29	1167.61	79.05	3581.66
3.	WDPSCA (1992-93)#	3.92	294.18	1.99	211.62	5.93	505.80
4.	RADAS (1985-86)#	7.37	118.51	1.48	64.97	9.05	195.12
5.	WDF (1999-00)	0.59	26.02	5.41	547.28	6.00	573.30
6.	EAPs	18.15	3778.22	0.00	0.00	18.15	3778.22
Sub Total (A)		**189.36**	**9514.66**	**35.78**	**3277.60**	**228.49**	**13133.96**
(B) Department of Rural Development, Ministry of Rural Development							
1.	DPAP(1973-74)	137.27	4842.50	15.38*	1701.58	152.65	6544.08
2.	DDP(1977-78)	78.73	1949.88	11.35*	1332.23	90.08	3282.11
3.	IWDP(1988-89)	99.56	2438.15	2.48*	2020.88	102.04	4459.03
4.	EAPs	5.00	292.67	0.00	0.00	5.00	292.67
5.	IWMP(2009-10)	DPAP, DDP & IWDP are merged under IWMP in 2009-10		242.10*	3864.23	242.10	3864.23
Sub Total (B)		**320.56**	**9523.20**	**271.31***	**8918.92**	**591.87**	**18442.12**
Total (A+B)		**509.92**	**19037.86**	**307.09**	**12196.52**	**820.36**	**31576.08**

* Includes targeted area of 35.84 lakh hectare of 7167 number of projects (each project comprises of area of 500 hectare) being developed under watersheds programmes of MoRD.

As per decision of Planning Commission, programmes have been closed w.e.f. 1st April, 2013

Abbreviations:

NWDPRA	-	National Watershed Development Project for Rainfed Areas
RVP & FPR	-	River Valley Project & Flood Prone River
WDPSCA	-	Watershed Development Project in Shifting Cultivation Areas
RADAS	-	Reclamation and Development of Alkali & Acid Soils
WDF	-	Watershed Development Fund
EAPs	-	Externally Aided Projects
DPAP	-	Drought Prone Area Programme
DDP	-	Desert Development Programme
IWDP	-	Integrated Wasteland Development Project
IWMP	-	Integrated Watershed Management Programme

Source: Ministry of Agriculture (MOA) and Ministry of Rural Development (MORD)

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