

CHAPTER 5.3

DEVELOPMENT OF WASTELANDS AND DEGRADED LANDS

5.3.1 Land, a non-renewable resource, is central to all primary production systems. Over the years, the country's landmass has suffered from different types of degradations. Degradation of land is caused by biotic and abiotic pressures. An ever-increasing population places enormous demands on land resources. This is particularly acute in India, which has only 2.4 per cent of the world's geographical area but supports over 16 per cent of the world's population. It has 0.5 per cent of the world's grazing area but has over 18 per cent of world's cattle population. These pressures have led to drastic changes in the proportion of land utilised for agricultural activities, urbanisation and industrial development.

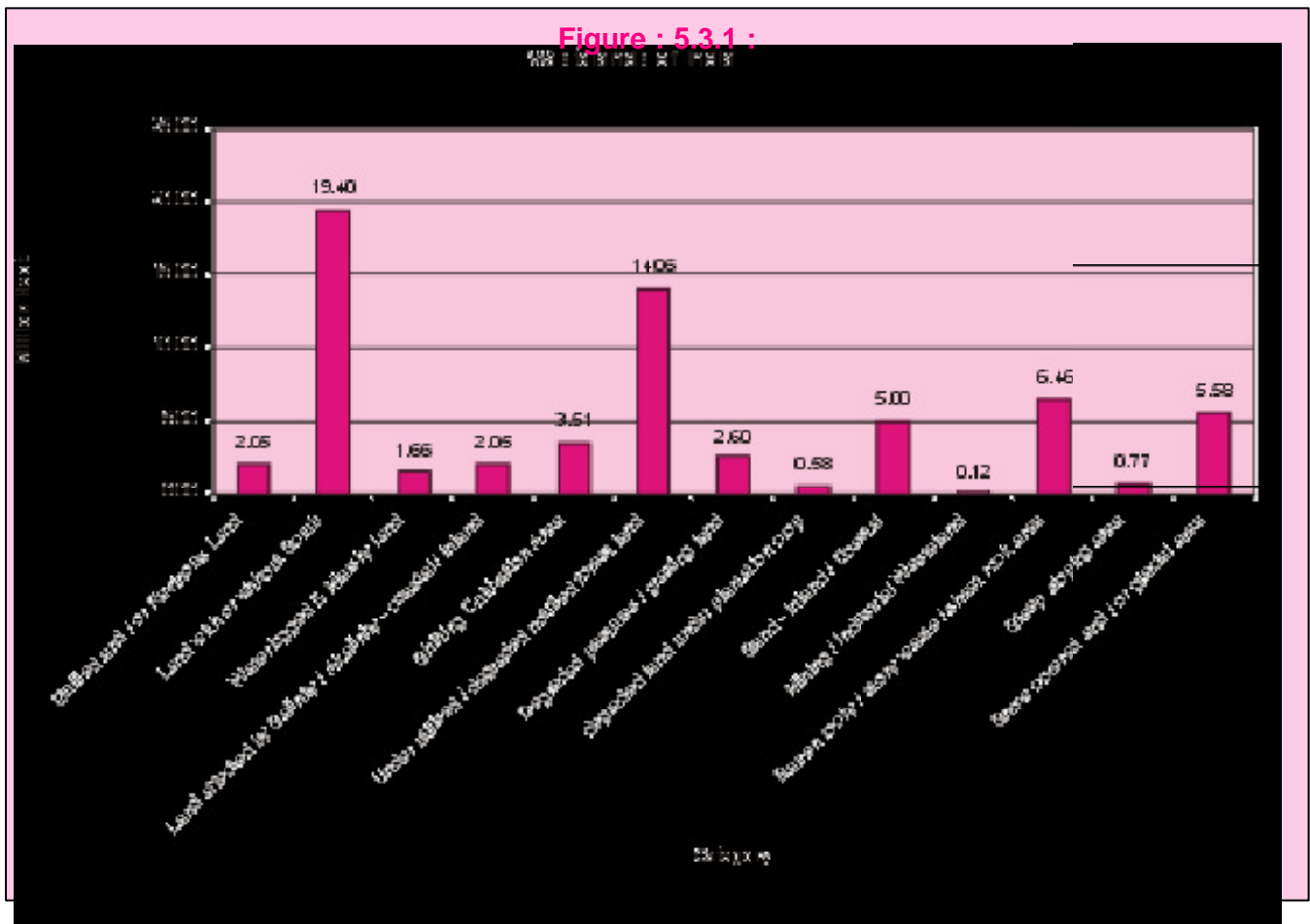
5.3.2 Intensive agricultural practices that rely heavily on water, chemical fertilisers and pesticides have caused waterlogging and salinity in many parts of the country. The expansion of the irrigation system without adequate steps for treatment of the catchment areas has exacerbated this. The quest for increased agricultural productivity has led to intensive cultivation of marginal lands causing their degradation. These pressures on land are compounded by the fact that over 69 per cent of our geographical area falls within dry zone as per the Thornwaite classification. Land degradation has a direct bearing on the productivity of soil, its vulnerability to rainfall variations, scarcity of drinking water, fodder and fuel wood. Given the interlinkages of crop production, livestock economy and environment, land degradation has a major impact on the livelihoods of the people, especially in rural areas.

5.3.3 Estimates of degraded land vary considerably and the extent of land degradation is yet to be determined precisely. Estimates of

wasteland differ considerably due to definitional and coverage inconsistencies. According to the land use statistics for 2002 published by Department of Agriculture, the current estimates of culturable wasteland are 13.9 million hectares (m ha). However, the information on the land use statistics does not clearly indicate the extent of wasteland and degraded land, which could be restored with some interventions.

5.3.4 National Remote Sensing Agency (NRSA) carried out a district-wise mapping of a wastelands on 1:50,000 scale using satellite data. The wastelands in the country were placed at 63.85 mh. They occur in different agro climatic and soil zones of the country. Figure 5.3.1 below depicts categories of wastelands. These wastelands form the core of degraded lands in India. They are in urgent need of attention and have to be accorded the highest priority for treatment under watershed programmes.

5.3.5 Some of the most degraded lands in the country are the common property resources (CPRs). CPRs are resources on which people have an equal right of use. These resources include community pastures, community forests, wastelands and common dumping and threshing grounds. In spite of concerted efforts to check deforestation and the various afforestation schemes taken up during successive Plan periods, large tracks of forest continue to be classified as degraded. The 1999 Forest Survey of India placed the actual forest cover at only 19.39 per cent of the total geographical area as against the recorded forest area of 23 per cent. Of the total forest area, 31 m ha suffers from some form of degradation and 14.06 m ha of forests suffer from extreme degradation and are part of 63.85 m ha of wastelands reported by the NRSA.



5.3.6 In addition to the wastelands identified by the NRSA, other areas such as deserts, drought-prone, flood-prone and tribal areas have been subjected to severe forms of degradation. The capacity of these lands is limited due to environmental factors. Pressures of human and livestock population have further compromised them. Table 5.3.1 provides estimates of degraded land on the basis of the factors that caused the degradation.

5.3.7 These areas co-relate very strongly with the incidence of poverty in the country. The prevention of land degradation and the augmentation of the carrying capacity of land to provide food, fuel and fodder requirements have, therefore, been a primary concern of the Government. Special Area Development Programmes have been funded to mitigate the

harsh living conditions of people through better land management, water harvesting and conservation practices on a watershed basis.

5.3.8 Watershed is a geo-hydrological area that drains at a common point. The watershed approach is a project-based development plan that follows a ridge to valley approach for water harvesting, water conservation and other related economic and social activities that seek to enhance the production potential of an area on a sustainable basis. The watershed programmes implemented by different ministries usually take up a micro watershed of about 500 hectares each. However, the actual project area could vary depending on the local conditions. An indicative list of activities that could be taken up under watershed development programmes are listed in Box 5.3.1:

Table-5.3.1 :
Causes of Land Degradation

Causes of Degradation	Area (million hectares)	Percentage of total area
Water erosion	107.12	61.7
Wind erosion	17.79	10.24
Ravines	3.97	2.28
Salt-affected	7.61	4.38
Waterlogging	8.52	4.90
Mines & quarry wastes	-	-
Degraded land due to shifting cultivation	4.91	2.82
Degraded forest lands	19.49	11.22
Special problems	2.73	1.57
Coastal sandy areas	1.46	0.84
TOTAL	173.64	100.0

Source : Ministry of Agriculture, Government of India (1985)

Box 5.3.1
Watershed Components

- Land development including in situ soil and moisture conservation measures like contour and graded bunds fortified by plantation, bench terracing in hilly terrain; and nurseries for fodder, timber, fuel wood, horticulture and non-timber - forest produce
- Afforestation including block plantations, agro-forestry and horticultural development. Shelter-belt plantations, sand dune stabilisation, etc.
- Drainage line treatment with a combination of vegetative and engineering structures.
- Development of small water harvesting structures such as low-cost farm ponds, nalla bunds, check-dams and percolation tanks and ground water recharge measures.
- Renovation and augmentation of water resources, desiltation of tanks for drinking water and irrigation.
- Pasture development either by itself or in conjunction with plantations.
- Repair, restoration and upgrading of existing common property assets and structures in the watershed to obtain optimum and sustained benefits from previous public investments.
- Crop demonstrations for popularising new crops and crop varieties or innovative crop management practices.
- Promotion and propagation of non-conventional energy saving devices and energy conservation measures.

Source: Guidelines for Watershed Development (Revised 2001) Department of Land Resources, Ministry of Rural Development

Watershed Development Programmes in the Ninth Plan

5.3.9 Introduced in 1973-74, the Drought Prone Area Programme (DPAP) was the first major programme aimed at soil and moisture conservation in drought prone areas. Currently, it is being implemented in 971 blocks across 16 states. The Programme is designed to combat the adverse effects of drought on crop production, livestock and land productivity. The primary objective of the programme is promotion of overall economic development and mainstreaming of marginalised and vulnerable sections.

5.3.10 The Desert Development Programme (DDP), which was introduced in 1977-78, is being implemented in 7 states and covers 234 blocks in 40 districts, including the cold desert areas of Jammu & Kashmir and Himachal Pradesh. The major objectives of the Programme are to restore the ecological balance, conservation of soil and water and to arrest the formation of deserts through shelter belt plantation. The Integrated Wasteland Development Programme (IWDP) started in 1989-90 seeks to develop government wastelands and CPRs, based on village/micro watershed plans. The IWDP is aimed at overall economic development and improving the economic conditions of the resource poor population.

5.3.11 The allocation of funds for the DPAP, DDP and IWDP was stepped up substantially during the Ninth Plan. The cost norms and funding pattern were also streamlined to improve the efficacy of the programmes.

5.3.12 The Technology Development Extension and Training (TDET) scheme, launched in 1993-94, has also been in operation during the Ninth Plan. Hundred per cent Central grant is provided for projects relating to the demonstration of technologies for development of wastelands. The Investment Promotion Scheme (IPS) was launched in 1994-95 to promote participation of the corporate sector and financial institutions in the development of non-forest wastelands. The scheme was restructured during the Ninth Plan and the thrust was on the development of degraded lands belonging to small and marginal farmers including scheduled castes and scheduled tribes (SC/STs).

However, the performance under TDET and IPS during the Ninth Plan period was not satisfactory and only a small area was covered.

5.3.13 The National Watershed Development Project for Rainfed Areas (NWDPA), initiated in 1990-91 has the twin objectives of improving agricultural production in rainfed areas and to restore ecological balance. With the deceleration in agricultural production in the Green Revolution areas in recent years, the country's food security would critically depend on the ability of rainfed agriculture to increase production. Returns on additional unit of investment in rainfed areas are greater than returns on investment in irrigated areas in the present context. However, the area covered under the programme during the Ninth Plan was less than 2.5 m ha. This is clearly inadequate given the need to treat over 70 m ha of rainfed agricultural land.

5.3.14 In order to channelise greater resources for rainfed areas, the Watershed Development Fund (WDF) was set up in 2000-01 at the National Bank for Agriculture and Rural Development (NABARD) with a corpus of Rs. 200 crore. The fund is to be used for integrated watershed development in 100 priority districts across 14 states in a phased manner through a participatory approach. Six states, -- Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Orissa and Uttar Pradesh--would be covered in the first phase. In the second phase, the programme would be extended to Bihar, Kerala, Rajasthan, Tamil Nadu, Jammu and Kashmir, West Bengal, Himachal Pradesh and Haryana.

5.3.15 In the Ninth Plan, special attention was given to the control of shifting cultivation in the north-east both by the Ministry of Agriculture and by the Department of Land Resources (DoLR). These initiatives were underpinned by the Government's resolve to allocate 10 per cent of the Plan resources for the development of the north-eastern states. The Watershed Development Programme in Shifting Cultivation Areas (WDPSCA), first launched during the Fifth Plan as a pilot project, was revived in 1994-95 for the north-eastern states, including Sikkim. The programme seeks to control shifting cultivation practices and settle the jhumia families on a permanent basis. The DoLR gave special attention to the development of degraded lands under the IWDP in the north-east and 81 projects

were sanctioned for treatment of 6.87 lakh hectares. A sum of Rs. 93.75 crore was released during the Plan period for these projects.

5.3.16 Two centrally sponsored schemes for soil conservation and integrated watershed management in the catchments of flood-prone regions are being implemented. The schemes were aimed at enhancing productivity of degraded lands, minimising siltation of reservoirs and chances of floods in flood-prone rivers. During the Ninth Plan, both schemes were merged into a new one -- 'Soil Conservation for Enhancing Productivity of Degraded Lands in the Catchment of River Valley Projects and Flood Prone Rivers'. The scheme is being implemented in 45 catchments spread over 20 states. The scheme for reclamation of alkali soil was extended to all states in the Ninth Plan. The scheme relates to treatment of land affected by alkalinity. It attempts to improve land and crop productivity by taking up production of crops suitable to the soil conditions, with farmers being encouraged to take up horticulture, fuel wood plantation and fodder species.

5.3.17 The fragile eco-system of the Western Ghats and other hills is a cause for concern. The Western Ghats Development Project (WGDP) and the Hill Area Development Programme (HADP) are aimed at restoration and preservation of the ecology of identified hill areas. Sustainable use of resources in these areas and preservation of their bio-diversity is a prime consideration. The programmes seek to provide livelihood to the people of the hill areas without disturbing the ecology of the region. Hence projects for the development of minor irrigation, dairy development, animal husbandry, agricultural development, afforestation, non-conventional energy sources and other activities for generation of employment and enhancing incomes are taken up.

5.3.18 The programmes for the development of degraded and wastelands got a major boost during the Ninth Plan period. Table 5.3.2 provides information on the physical and financial performance under different programmes that promote development of degraded and wastelands.

Table: 5.3.2
Area Treated/Reclaimed under Watershed Development Programmes

Sl.No.	Scheme	Year of Start of Scheme	Up to Eighth Plan		During first four years of the Ninth Plan (1997-98 to 2000-01)	
			Area Treated (Lakh ha)	Total Investment (Rs. crore)	Area Treated (Lakh ha)	Total Investment (Rs. crore)
1	2	3	4	5	6	7
I DEPARTMENT OF AGRICULTURE & COOPERATION						
(i)	NWDPRA	1990-91	42.33	967.93	21.19	792.15
(ii)	RVP & FPR	1962 & 1981	38.89	819.95	8.17	470.14
(iii)	WDPSA	1974-75	0.74	93.73	1.30	63.40
(iv)	Alkali Soil	1985-86	4.84	62.29	1.00	13.75
(v)	EAPs		10.00	646.00	5.00*	1,425.00*
	Sub Total	96.70	2,589.90	36.66	2,764.44	
II DEPARTMENT OF LAND RESOURCES#						
(i)	DPAP	1973-74	68.60	1,109.95	44.94	657.31
(ii)	DDP	1977-78	8.48	722.79	24.77	518.67
(iii)	IWDP	1989-90	2.84	216.16	35.65	496.32
(iv)	Sub Total		79.92	2048.90	105.36	1672.30
III MINISTRY OF ENVIRONMENT & FORESTS						
(i)	IAEPS	1989-90	2.98	203.12	1.23	141.54

* Likely achievement during the Ninth Plan,; DAC, DOLR and MoE&F

Figures for DOLR given under column 6 & 7 are for Ninth Plan Period (1997-98 to 2001-02)

Box 5.3.2: Assessment of Watershed Development Programme in Gujarat

Assessment of Watershed Development Programme in Gujarat was conducted in four watersheds, of which two were in plain / non-tribal district of Panchmahal and two were in the district of Dahod dominated by the tribals.

The study assessed the impact of watershed projects on rehabilitating the natural resource base of the project area and impact on availability of food, fodder / fuel, income and employment of the inhabitants, especially the poorer and disadvantaged groups.

The study reveals that activities like land leveling / bunding, water resource development, drainage line treatment and tree plantations significantly improved the soil moisture, and led to increase in crop area and improvement in crop yield in all four watersheds.

The increase in crop productivity / yield is evident from the following tables:

(Percentage of all farmers / cultivators)

Sl.	Crop yield information	Watershed Numbers				All WS
		I	I	III	IV	
1	Increased yield reported	83.9	100.0	85.2	100.0	92.8
2	Extent of yield increase					
(a)	Upto 5%	0.0	80.6	8.7	0.0	23.3
(b)	6-10%	15.4	12.9	30.4	0.0	12.9
(c)	11-25%	73.1	6.5	52.2	0.0	28.4
(d)	26-50%	11.5	0.0	8.7	2.8	5.2
(e)	51-100%	0.0	0.0	0.0	75.0	23.3
(f)	Above 100%	0.0	0.0	0.0	22.2	6.9

Sl.	Crop yield of cereal and pulses	Watershed Numbers			
		I	I	III	IV
1	Before Project				
(a)	Cereal (maize): kg/acre	800	1000	750	600
(b)	Pulses (gram): kg/acre	250	300	200	180
2	After Project (1998-99)				
(a)	Cereal (maize): kg/acre	1000	1100	1000	1000
(b)	Pulses (gram): kg/acre	350	350	300	300
3	% increase in yield				
(a)	Cereal (maize)	25	10	33	67
(b)	Pulses (gram)	40	17	50	67

The programme had a significant positive impact on creation of employment opportunities for the villagers, both landless as well as landowners. The overall perception of sample households consisting of both landless and landowner was that increased employment benefit is the most favourable impact of the watershed programme followed by improvement in ground water table.

However about 90 per cent of the development activities / expenditure are confined to private crop land and major benefits flow to land owning class. Absence of non-farm development activities has an adverse effect on the socio-economic condition of poor. Exclusion of poor from benefits also affects the maintenance of watershed structures and other assets adversely as they have no stake in sustaining these structures.

Source : Policy and Development Initiatives, Vadodra, Gujarat

5.3.19 Programmes of wasteland development have been evaluated for their impact on the project area and the findings present a mixed picture. Increase in crop productivity and bio-mass production, have been reported in successful projects. Box 5.3.2 summarises the findings of one of the evaluation studies and this scheme can be replicated elsewhere.

5.3.20 It is widely accepted that successful watershed projects make a significant difference to the quality of life in rural areas. However, there are major weaknesses in the implementation of these programmes. The Mid-term Appraisal of the Ninth Plan highlighted some of the major concerns in this field (Box 5.3.3).

Box 5.3.3:

Watershed Programmes : Key concerns

- Lack of people's participation.
- Field staff unfamiliar with participatory approaches.
- Insecurity about fund availability at the grass root level.
- Limited time for preparatory activities.
- Little emphasis on cohesive group formation.
- Lack of transparent criteria for selecting areas and villages.
- Limited human resource capabilities.
- Lack of involvement of senior government functionaries and line agencies.
- Weak horizontal linkages among various agencies at the district level.
- No exist protocol for withdrawal after project completion.
- Plethora of watershed development programmes with different guidelines and cost norms

Source : Mid Term Appraisal of Ninth Five Year Plan

5.3.21 Given the findings of the Mid-Term Appraisal, there was a rethinking on the structure of watershed programmes in the last two years of the Ninth Plan period. The Central ministries evolved a common guideline, which clearly

delineates the specific responsibility of the ministries. Box 5.3.4 highlights the important elements of the common approach.

Box 5.3.4

Common Approach to Watershed Development

- Convergence on selected programme components/activities with commonality in approach.
- Rationalisation of unit cost norms depending on the nature of programme content, work items and institutional arrangements.
- Feasibility of territorial delineation to be decided in terms of eligibility criteria, ministerial mandate, programme focus and development objectives.
- Scope for enlarging the process of capacity building involving local bodies, non governmental organisations (NGOs), community groups and extension functionaries.
- Broad basing of financial resources through inter-institutional credit linkages.
- Unified approach supporting programme measures and building suitable institutional framework for ensuring long-term sustainability.

Source : Common Approach to Watershed Development: Ministry of Agriculture, March 2002.

5.3.22 Area Development Programmes have emerged as one of the major anti-poverty programmes during the Ninth Plan. However, the vast physical spread of degraded lands indicates that greater efforts would have to be made to bring all the degraded lands under treatment.

TENTH PLAN STRATEGY

5.3.23 The Planning Commission had set up a committee in February 1997 to prepare a 25-year perspective plan for the development of rainfed areas. The committee submitted its report in April 1997. It highlighted the resource base and development potential of rainfed areas in different agro-climatic zones and the major constraints in

realising it. It examined past approaches to development of rainfed areas and suggested a perspective plan for the treatment of degraded and rainfed areas in the country over 25 years. The main objective of the plan was elimination of poverty and unemployment and realisation of the full growth and development potential. The plan made a strong plea for a participatory approach to watershed development and the use of appropriate technologies in micro watersheds. It recommended that people be empowered to select technologies in view of their experiences. In addition to giving detailed guidelines on agriculture diversification in different zones, the plan also emphasised the need for a coordinated approach to the development of degraded lands in the country.

5.3.24 During the Ninth Plan, programmes for wasteland development were revamped to incorporate the major recommendations of the '25-year Perspective Plan for the development of rainfed areas'. Convergence of programme components and a common approach with clearly delineated responsibilities were accomplished during the Plan period. Warasa-Jan Sahbhagita guidelines for NWDPR, issued by Ministry of Agriculture and Guidelines for Watershed Development (Revised-2001) issued by Ministry of Rural Development internalise the new approach. The Tenth Plan would carry this process forward with greater allocation of physical and financial resources. Watershed Development Programmes would be an important part of the anti-poverty strategy. The development of the wastelands, degraded lands and rainfed areas would be implemented in an integrated manner. These lands would be used for food crops, horticulture, agro-forestry and social forestry depending on the soil characteristics. Concerns regarding restoration of ecological balance and augmentation of biomass production would drive the programmes.

5.3.25 The watershed programmes are important for bringing land area under tree cover. The Tenth Plan has set an ambitious target for afforestation. Even with the afforestation of degraded forestland to be taken up during the

Plan period, the forest cover would fall short of the target. Close to 30 million hectares of nonforest land would have to be brought under tree cover to achieve the afforestation programme. It is necessary to create an environment that encourages people to grow trees on their farmland. Marginal lands are not suitable for crop production but they could be brought under tree crops with technical inputs.

5.3.26 Promotion of farm-forestry and agroforestry on marginal lands has to be encouraged. The marginal lands and lands with slopes of more than one degree are ideally suited for tree crops. However, the food requirements of the farmers force them to put these lands under crop production. Crop production on such lands is not only inefficient but it also contributes to the degradation. To encourage the farmers to put their marginal lands under tree crops, the country's abundant food grain stocks could be leveraged to provide assured food supply to the farmers. It is essential to disseminate innovative technologies in the rural areas along with the provision of quality planting material, credit and marketing infrastructure. States would be persuaded to explore these possibilities in the Tenth Plan.

5.3.27 Watershed programmes would require significant upscaling during the Tenth Plan to prevent further land degradation and for the restoration of the carrying capacity of lands that are classified as degraded. The Working Group on Watershed Development, Rainfed Farming and Natural Resource Management for the Tenth Plan had projected that 107 m ha of land in the country are subject to degradation. A total of 27.5 m ha was expected to be treated under different programmes by the end of the Ninth Plan. In addition, uplands in low rainfall areas also require water and soil conservation measures. It is estimated that 88.5 m ha would have to be treated under watershed programmes in the Tenth and subsequent Plan periods. These estimates also include the forest areas that need afforestation. The 20-year Perspective Plan envisaged by the Working Group for treatment of degraded lands during the Tenth to Thirteenth Plan is presented in Table 5.3.3:

Table 5.3.3
Watershed Development Programme during the Five Year Plans

(Rs. crore)

Five Year Plan	Area covered (million ha)	Estimated Cost of development (Rs./ha)	Total Cost	Cost sharing Ratio*	By Centre	By States	By People
Tenth Plan (2002-07)	15.0	5,000-7,000	9000	50:25:25	4,500	2,250	2,250
Eleventh Plan (2007-12)	20.0	6,000-8,000	14000	40:30:30	5,600	4,200	4,200
Twelfth Plan (2012-17)	25.0	7,500-9,500	21250	30:30:40	6,375	6,375	8,500
Thirteenth Plan (2017-22)	28.5	9,000-11,000	28500	25:25:50	7,125	7,125	14,250
Total	88.5		72,750		23,600	19,950	29,200

*Cost-sharing ratio between Centre, States and people/community

5.3.28 The Perspective Plan emphasizes the fact that the watershed development programme would have to become a people's movement in order to succeed. The people have to grow out of the culture of dependence on government funds in the form of grants, loans and subsidies. The cost of development has to be shared between the Centre, states and the community.

5.3.29 The Mid-term Appraisal of the Ninth Plan had highlighted the characteristics of successful watershed projects (Box 5.3.5).

5.3.30 The factors that make for a watershed project successful have been incorporated in the 'Watershed Plus' approach to watershed development. In the Tenth Plan, the watershed programme would be implemented on this basis. Box 5.3.6 highlights the new paradigm of Watershed Plus development.

5.3.31 The basic objective of the watershed programmes would be "holistic development seeking sustainable livelihood security system for all life forms in the area". There is no conflict between production systems and the need for conservation measures. The conservation

Box : 5.3.5

Successful Watershed Projects

- They devote significant resources to social issues.
- A high proportion of staff members have experience and skills in social mobilisation.
- Project leaders are fully committed to participation and, in most cases; donors or senior officials apply pressure to ensure participatory approaches.
- Project monitoring explicitly checks whether local organisations of users have been formed.
- Staff members have an incentive to undertake participation.
- Communities, being organised, have capacity to influence how the field staff work.

Source : Mid Term Appraisal of Ninth Five Year Plan

measures and production systems would have to be conceptualised in the relationship of means and ends, i.e. conservation measures as means and production systems as ends. The conservation

Box 5.3.6 :
Watershed Plus

Watershed programmes have been implemented in the country under schemes initiated by the Central Government. Many states have taken up development of degraded areas under the watershed approach on a mission mode. NGOs have played a major role in the regeneration of degraded lands in order to increase the carrying capacity of the land and water resources for ensuring sustainable livelihood opportunities and food security for the rural poor. A paradigm shift in the approach to watershed development came in 1995-96 with the adoption of revised guidelines in line with the Technical Committee Report headed by Dr. C.H.H Hanumantha Rao. The new paradigm of Watershed Plus recognises the need to involve the community as a necessary condition for the sustainability of a watershed programme. Watershed development is not just a technical project but encompasses a social programme as well. The inclusion of women and vulnerable groups and a strong focus on equity is what distinguishes the Watershed Plus approach from previous watershed programmes. The programme seeks to ensure convergence of all other programmes that promote economic activities and generate increased employment opportunities. Conscious efforts to promote non-farm employment and increased land access for the landless as well as promotion of self-help groups form a part of the new approach.

The revised programme guidelines seeking to operationalise the Watershed Plus philosophy issued by the Department of Land Resources, Ministry of Rural Development, in 2001 provide for:

- A programme-specific and focused project approach.
- Greater flexibility in implementation.
- Well-defined role for state, district and village level institutions.
- Removal of overlaps.
- A provision for keeping the watershed development projects on probation
- An exit protocol for the project implementing agencies (PIAs)
- A twin track approach that provides for short term and long term benefits in the implementation of projects
- A combination of government organisations/NGOs as PIA
- A greater role for women
- An effective role for the panchayati raj institutions (PRIs)
- Bringing self-help groups comprising rural poor, especially those belonging to SC/ST categories to the forefront
- Establishing a credit facility from financial institutions
- Transparency in implementation
- Effective use of remote sensing data furnished by the National Remote Sensing Agency.

Source : Department of Land Resources, Ministry of Rural Development, Government of India

measures would have to be integrated in a framework that enhances the production of people's basic needs. Conservation practices that compromise on people's requirements would be unsustainable in the long run. Improved land management and sustainable production through good land harnessing techniques would be encouraged.

5.3.32 Rainwater harvesting and conservation would be the focus of development planning in this context. Use of indigenous technology and local materials would be promoted. Construction of check-dams in the lower reaches of water sources is expensive and its benefits are restricted. A series of small structures for water harvesting in the watershed area would be undertaken to reduce costs and maximise of benefits from watershed projects. The existing village ponds and tanks that have got silted over the years would be desilted on a priority basis during the Plan period. Rainwater management should also take into consideration multiple uses of water such as drinking, domestic use, livestock and irrigation requirements. Equitable distribution of water should be a part of the water management policy.

5.3.33 The technical specifications of watershed projects vary from one region to the other. Hence no single model for watershed could be specified. Evaluation studies have shown that the watershed structures were damaged within a short time of their construction, as the technical parameters of these structures were unsound. Weirs and other structures did not conform to the contour lines of the area and in many cases, topographic factors were ignored. Robust technical design and execution of the projects should therefore receive priority. There is no contradiction between the need for technical excellence and people's participation. This aspect would have to be reinforced to ensure the sustainability of the structures that are created in the watershed. Training programmes to educate people in this regard will have to be undertaken in collaboration with technical institutions and NGOs, which have the requisite expertise in this field.

5.3.34 Adoption of water conservation technologies for irrigation in watershed areas of low or scanty rainfall have to be promoted. Investments

in drip irrigation, sprinkler irrigation and in research for crop varieties and irrigation systems specific to different agro-climatic regions are important and would receive greater attention at the planning stage. Indigenous cropping systems in the rainfed areas were developed keeping in mind the availability of water and quality of soils in these areas. Many of the crop varieties that were suitable in these areas have been ignored with the advent of new agricultural technologies. The emphasis on cereal production has also seen a disruption in the complex interaction between food and non-food crops in these areas. There is a need for greater investment in research for augmenting production potential of the indigenous crop varieties suited for rainfed areas.

5.3.35 Resource-poor areas support activities that provide low-wage refuge employment. In an agriculturally prosperous area, on the other hand, though the proportion of income from non-farm employment is low, the level of non-farm income is higher as people are engaged in activities that service a dynamic agriculture. With the successful completion of a watershed project, farmers adopt intensive agricultural practices and it, therefore, becomes necessary to equip people with technical skills so that they can cope with the requirements of a growing agricultural sector. Training needs, credit facilities, and creation of agro-processing infrastructure for value-addition must be provided. Banking and insurance facilities, veterinary services and other related services would be provided to the underdeveloped regions for the expected benefits of watershed development to materialise. Though the guidelines on watershed projects mention the need for ensuring these linkages, the progress has not been satisfactory. The convergence of other programmes in a watershed area would be given priority in the Tenth Plan.

5.3.36 Direct gains from a watershed project accrue largely to the landholders. Marginal farmers and agricultural labourers benefit from the increased agricultural activity that expands employment opportunities. If benefits from the watershed project are not specifically channelised to these groups, in terms of greater access to CPRs and fodder for their cattle and fuel requirements, there is little incentive for them to cooperate in the rejuvenation

of the CPRs through social fencing or any other method that the community might choose. The issue of equitable distribution of gains, therefore, is crucial to the long-term sustainability of the project. Providing access to land to the marginal farmers and landless agricultural labourers through rights on harvested water could be one way of accomplishing this. A mandatory sharing of water by all residents could also be one of the preconditions for selecting a village for a watershed development project.

5.3.37 Water, fodder and fuel have always been the responsibility of women in the rural areas. Even those watershed projects that do not address the concerns of women in terms of their role in the decision-making and employment opportunities make their life easier by increasing the availability of water, fuel and fodder in the vicinity of the villages. This reduces the burden of domestic chores on women, giving them more free time. It is, therefore, necessary to provide creative employment opportunities for women. Training programmes that impart skills, improve access to credit and marketing facilities and other support service would have to be arranged for them.

5.3.38 Watershed Committees handle the day-to-day management of the project. However, panchayat members have no designated role in project implementation. Given the scale of financial assistance for a watershed project, money becomes a bone of contention between panchayats and the Watershed Committee members. This issue would have to be resolved. Similarly, NGOs have played a major role in regeneration of degraded lands in a number of states. In fact, most of the successful watershed projects have been implemented by the NGOs. Annasaheb Hazare's experiments in Ralegaon Siddhi, Tarun Bharat Sangh's work in Rajasthan, MYRADA in Karnataka, Sadguru Foundation in Gujarat are a few shining examples of the excellent work done by the NGOs. These need to be enlarged in the Tenth Plan in order to bring more land under watershed projects. NGOs would, therefore, do well to forge a partnership with the PRIs in order to carry this programme further.

5.3.39 Since the extent of degradation of land and area under wasteland in the country is a matter of

conjecture, a complete census of degraded or wasteland -- its location, extent of area, ownership, the vegetative cover currently available and the chemical properties of land - needs to be done in order to formulate an appropriate treatment plan. Similarly, in spite of a number of schemes for the development of wasteland/degraded lands, there is a lack of authentic information on the extent of land treated under different schemes. A Management Information System (MIS) with clearly defined benchmarks indicating the type of structures created, the area of land treatment, increase in water table and other relevant parameters needs to be designed to get a realistic picture of the progress achieved and the tasks ahead. The creation of a National Management Information System for natural resource management would be given priority during the Plan.

5.3.40 The allocation for Tenth Plan for various centrally sponsored and central sector schemes operated by the Department of Land Resources is given in the Appendix. Allocation for watershed schemes operated by the Department of Agriculture & Cooperation is not shown separately as these schemes have been subsumed under macro management.

THE PATH AHEAD

- A National Policy on Land Resources Management would be formulated for optimum management of land resources to meet socio-economic demands. The policy would also promote an institutional framework that would encourage the productive utilisation of land.
- Programmes relating to conservation, development and management of land resources are handled by different Central Ministries and Departments. In order to bring about an effective administrative mechanism to manage land resources in the country, all the land programmes/schemes would be brought under the umbrella of one coordinating agency.
- To tackle the rapidly declining water table and prevalence of dry conditions in many parts of

the country, traditional methods of harvesting and conservation of water will be encouraged. During the Tenth Plan, existing village ponds, tank other harvesting structures would be restored in a campaign mode by involving PRIs, NGOs and Self-Help Groups (SHG).

- Land and forest regeneration programmes need to be appropriately planned on a micro-watershed basis. The size of the watershed should be such that local communities can relate to it. An adequate preparatory period would be provided to ensure proper planning. The financial, economic and social needs of the stakeholders must be taken into account.
- The corporate sector would be involved in restoring wastelands and reclaiming degraded lands. Sharing arrangements would need to be worked out on public lands while farm forestry would be encouraged on private wastelands. A new initiative on wasteland development would be launched to channelise greater resources to this area through the involvement of financial institutions. Projects in forest and community wastelands would be taken for development under the new initiative.
- Capacity building is needed for Government and user communities through training programmes and awareness campaigns. Government officials would be sensitized to

involve the local population in regeneration programmes.

- A comprehensive regional land use database would be created and made accessible. The land use data would be generated using new technologies, such as remote sensing, and in consultation with the local people who are familiar with the ground realities.
- In collaboration with the NRSA, the DoLR has released a Wasteland Atlas of India in March 2000. The Atlas presents district level information on 13 categories of wastelands. During the Tenth Plan it is proposed to undertake periodical updation of the Wasteland Atlas and Annual Status of Land Records.
- In setting priorities for land use planning and management, it may be useful to identify and assess 'hot spots' of land degradation so that they get maximum benefits from the limited resources available. A focus on critical problems, on areas where population pressure is causing land degradation and conflict, and on 'critical interfaces' or boundaries between different land uses, is essential to avoid irreversible damage to the eco-system as it may lead major socio-economic problems. These key concerns would form the basic thrust of wasteland development during the Tenth Plan.

