
Introduction

Land is a finite resource and put to many competing uses. It comprises soils, minerals, water and biota. In India land is a source of livelihood for 60 % of the population through agriculture and related activities. Population growth and the consequent demand for land, water and biological resources has put tremendous pressure on land.

Agenda 21 recognizes the need to allocate land for sustainable uses and promote the integrated planning and management of land resources. This chapter reviews the progress made and problems in implementing the integrated planning and management of land resources envisaged in Chapter 10 of Agenda 21. This chapter will examine trends in land use and the condition of land resources in India, along with policies, programmes and technologies adopted.

Forest and biodiversity-related land management issues are addressed in the chapters on forests and biodiversity and agricultural related land management issues are addressed in the chapter on agriculture.

Overview of the sector

Institutional set-up

Land is a subject within the legislative and administrative jurisdiction of the states as per the VIIth Schedule of the Constitution, empowering the states to develop policies and enact laws. In India, the three Ministries responsible for the conservation and management of land resources are the Ministry of Rural Development, Ministry of Agriculture, and Ministry of Environment and Forests. At the national level, the Department of Land Resources under Ministry of Rural Development is the nodal agency for coordinating different land resource development and management programmes.

Land use

Of India's reporting area for land use statistics, about 46.6% is under agriculture, 22.6% is forested, and 13.6 % is not available for cultivation (Table 13.1). Roughly 41 million hectares of land are considered totally unfit (snow cover, desert) or not available (urban use, rivers) for vegetation. The per capita

availability of land declined from 0.89 hectare in 1951 to 0.3 hectares in 2001; the per capita availability of agricultured land declined from 0.48 hectare in 1951 to 0.14 hectares in 2001. Besides the pressure of human population, there are about 500 million cattle and other livestock living off the biomass from the land (Bali, 2000).

Table 13.1 Land use classification - All-India

Classification	1990-91		1997/98 (P)	
	Million	(%)	Million	(%)
	hectares		hectares	
Geographical area	328.73		328.73	
Reporting area for land	304.86		304.92	
utilization statistics (1 to 5)				
1. Forests	67.80	22.	68.85	22.
		2		6
2. Not available for cultivation (A+B)				
(A) Area under non agricultural uses	21.09	6.9	22.53	7.4
(B) Barren and uncultivable land	19.39	6.4	19.03	6.2
3. Other uncultivated land excluding fallow land (A+B+C)				
(A) Permanent pastures and other grazing lands	11.40	3.7	10.91	3.6
(B) Land under miscellaneous tree crops and groves not included in net area sown	3.82	1.3	3.57	1.2
(C) Culturable wasteland	15.00	4.9	13.88	4.5
4. Fallow lands (A+B)				
(A) Fallow land other than current fallow	9.66	3.2	9.76	3.2
(B) Current fallows	13.70	4.5	14.36	4.7
5. Net area sown (6-7)	143.00	46.	142.02	46.
		9		6
6. Total cropped area (gross cropped area)	185.74		190.76	
7. Area sown more than once	42.74		48.74	

(P) - (Provisional)

Source. Ministry of Agriculture (2000c)

Land degradation

It is estimated that about 174 million hectares of land (53%) suffers from different types and varying degrees of degradation (Table 13.2). About 800 hectare of arable land are lost annually due to ingress of ravines (MoA, 2000a).

It is estimated that more than 5000 million tonnes of topsoil are eroded every year (Seghal and Abrol, 1994). All this has a direct bearing on food production and the livelihood of the people.

Table 13.2 Extent of soil degradation (human-induced) under the different degradation types

Degradation type	Area affected (m ha)	
	Total	Percent
Water erosion	148.9	45.3
Wind erosion	13.5	4.1
Chemical deterioration	13.8	4.2
Physical deterioration	11.6	3.5
Land not fit for agriculture	18.2	5.5
Soils with little/no degradation problem	90.5	27.5
Stable terrain (under natural condition)	32.2	9.8
Total geographical area	328.7	100.0

Source. Seghal and Abrol (1994)

Wasteland

According to the wastelands atlas published by Department of Land Resources (2000), about 20% of the reported area is categorized as wasteland in one form or the other (Table 13.3).

Table 13.3 Category-wise wastelands of India

Category	Area (sq km)	% of total geographical area covered
Gullied and/ or ravinous land	20553.35	0.65
Land with or without scrub	194014.2	6.13
Waterlogged and marshy land	16568.45	0.52
Land affected by salinity/alkalinity-coastal/inland	20477.38	0.65
Shifting cultivation area	35142.20	1.11
Under-utilized/degraded	140652.3	4.44

notified forest land	1	
Degraded pastures/grazing land	25978.91	0.82
Degraded land under plantation crop	5828.09	0.18
Sands-Inland/coastal	50021.65	1.58
Mining/industrial wasteland	1252.13	0.04
Barren rocky/stony waste/sheet rock area	64584.77	2.04
Steep sloping area	7656.29	0.24
Snow covered and/or glacial area	55788.49	1.76
Total wasteland area	638518.3	20.17
	1	

Note: 1,20,849 sq km in Jammu & Kashmir is not mapped and hence not considered for calculating the percentage.

Source. Department of Land Resources (2000)

Common property land resources

Common property land resources that are under collective management are often subject to degradation due to lack of clearly defined ownership rights. In India approximately 77 million hectares are common property land resources (Table 13.4). The per capita availability of common property land resource is 0.09 hectares (Laxmi and Parikh, 1997).

Table 13.4 Common property land resources in India (1990/91) ('000 ha)

Categories	Area
Non-forest area	
Private land with common access	16951
Permanent pasture and grazing land	11804
Cultivable wasteland	15014
Other than current fallow	9590
Total non-forest CPLR	52764
Forest area	
Protected + unclassed	24692
Total (thousand ha)	77456
Per capita (ha)	.09

Source. Laxmi and Parikh (1997)

Land resources and Agenda 21

The concerns related to the management of land resources are addressed in Chapters 10, 11, 12, 13 and 14 of Agenda 21. In the present report, these issues are covered under Chapter 9 on Forests, Chapter 12 on Mountain ecosystems and Chapter 14 on Agriculture. The following specific concerns were raised in Agenda 21 for the sustainable management of land resources.

Integrated approach to planning and management

Chapter 10 of Agenda 21 envisages an integrated approach to planning and management of land resources to facilitate allocation of land that ensures its greatest sustainable use with due consideration for social, economic and environmental issues. This integrated approach aims to:

- Review and develop policies to support the best possible use of land and sustainable management of land resources not later than 1996
- Improve and strengthen planning, management and evaluation systems and institutions for land and land resources not later than 2000

Land-use change

Land-use change through industrialization, expansion of agricultural land, urban growth, and development of transportation networks will accelerate the process of land degradation. Recognizing this problem, Agenda 21 seeks to promote appropriate environmentally-sound physical planning and land-use practices that contribute to conservation and sustainable use of natural resources. Agenda 21 also recommends the preparation of a national land resources management plan.

Combating land degradation and desertification

Agenda 21 recognizes the need to combat land degradation and desertification. It emphasizes preventive measures in vulnerable and slightly-affected areas and rehabilitation of moderate-to-severely-affected areas. This would involve introduction of:

- Improved land-use policies
- Appropriate environmentally sound and economically feasible technologies
- Improved land, water and crop management measures
- Participatory management of natural resources

Stakeholder participation and awareness creation

It is imperative to ensure active stakeholder – land users, government, executing agencies, NGO's – participation in planning and implementing land

development programmes and creating awareness about the implications of land degradation and desertification. The role of local communities and their initiatives should be recognized. This would require:

- Administrative restructuring for decentralized planning, decision-making, and implementation
- Introduction of legislative, institutional and financial measures to secure land-user involvement
- Policies for private-public participation
- Design of appropriate programmes

Strengthening knowledge base and developing information and monitoring systems

Agenda 21 stresses the need for an integrated information system on land resources for systematic observation of the dynamics of land degradation, desertification and drought processes. It also calls for strengthening of the systematic observation networks to monitor desertification and land degradation and to develop national information systems.

Review and analysis of legislation, policies, programmes and other initiatives for management of land resources

Highlights of legislation, policies, programmes and other initiatives

The Constitution of India enables the Central Government and the states to enact laws for the preservation and conservation of natural resources. Article 39(b) and (c) of the Directive Principles of State Policy lays down as the duty of the state and the Centre to develop natural resources for common good. There is a constitutional provision for the involvement and participation of the people at local level for participatory planning and decision-making. The Eleventh schedule (Article 243-G) of the constitution lists matters pertaining to land improvement, implementation of land reforms, land consolidation, soil conservation, and watershed development and management under powers, authority and responsibilities of *panchayats* (rural local bodies). The Twelfth schedule (243-W) lists urban planning and regulation of land-use under the powers, authority and responsibilities of municipalities (urban local bodies).

Besides the above constitutional provisions, there are many policies and programmes in India that promote sustainable development and management of land resources. The following table presents the important policies formulated, programmes implemented and the institutional framework adopted in India for the best possible use of land as well as sustainable and integrated management of land resources.

Table 13.5 Policies, acts, and programmes that have a bearing on land resources

Year	Initiatives	Salient features
Developments pre-1992		
	National Land Reforms Policy	<ul style="list-style-type: none"> ▪ Abolition of intermediary tenures ▪ Tenancy reforms ▪ Ceiling on agricultural holdings and redistribution of surplus land ▪ Updating and maintenance of land records ▪ Consolidation of land holdings ▪ Distribution of government wasteland
1972-73	Drought-prone Areas Programme (DPAP)	<ul style="list-style-type: none"> ▪ Minimize adverse effects of droughts on the productivity of land, water and human resources ▪ Promote overall economic development and improve the socio-economic condition of poor and disadvantaged sections inhabiting the programme areas ▪ Capacity building and empowerment of village community, ensuring participation of <i>Panchayati Raj</i> Institutions and NGOs in programme implementation at grassroots level and transfer of funds as well as decision-making power to the local people ▪ Since 1995-96, a watershed development based approach has been adopted
1977-78	Desert Development Programme (DDP)	<ul style="list-style-type: none"> ▪ Mitigate adverse effects of desertification and adverse climatic conditions on crops, human and livestock population ▪ Restoration of ecological balance by harnessing, conserving and developing natural resources, i.e. land, water, vegetative cover, and raise land productivity ▪ Capacity building and empowerment of village community, ensuring participation of <i>Panchayati Raj</i> Institutions and NGOs

Year	Initiatives	Salient features
		in programme implementation at grassroots level and transfer of funds as well as decision-making power to the local people
1980-81	Integrated Watershed Management in the Catchment of Flood-prone Rivers	<ul style="list-style-type: none"> ▪ Enhance the productivity of degraded lands ▪ Moderation of menace of floods
1985	National Land Use and Wastelands Development Council	<ul style="list-style-type: none"> ▪ Highest policy planning and coordinating agency for all issues concerning the health and scientific management of the country's land resources ▪ Development of wasteland
1985	National Land Use and Conservation Board	<ul style="list-style-type: none"> ▪ Formulate a national policy and perspective plan for conservation, management and development of land resources of the country ▪ Review of the progress of implementation of ongoing schemes and programmes connected with conservation and development of land resources and soils ▪ Take measures to restrict the conversion of good agricultural land to non-agricultural uses ▪ Co-ordinate the work of State Land Use Boards
1985	National Wastelands Development Board (NWDB)	<ul style="list-style-type: none"> ▪ Formulate perspective plan and programmes for the management and development of wastelands in the country ▪ Identify the wastelands in the country ▪ Review the progress of implementation of programmes and schemes for the development of wasteland ▪ Create a reliable data base and documentation centre on related aspects of wasteland development
1985-86	National Watershed Development Projects for Rainfed Areas (NWDPRAs)	<ul style="list-style-type: none"> ▪ Area approach to watershed development ▪ Improve crop productivity ▪ Restore ecological balance
1988	National Land Use Policy	<ul style="list-style-type: none"> ▪ To install an efficient and effective administrative structure for prescribing and regulating land by all concerned and revitalize the land-use boards in this

Year	Initiatives	Salient features
		<ul style="list-style-type: none"> respect ▪ Prevent further deterioration of land resources ▪ Restore the productivity of degraded lands ▪ Allocate land for different uses based upon land capability, land productivity, and national production goals ▪ Complete the inventory of land resources based on the prescribed land-use
1989-90	Integrated Wastelands Development Project (IWDP)	<ul style="list-style-type: none"> ▪ Adopt soil and moisture conservation measures such as terracing, bunding, trenching, vegetative barriers, etc ▪ Encourage natural regeneration ▪ Enhance people's participation in wasteland development programmes at all stages resulting in equitable sharing of benefits ▪ Employment generation, poverty alleviation, community empowerment and development of human and other economic resources of the village. ▪ Training, extension and creation of awareness among the participants
1992	Policy Statement of Abatement of Pollution	<ul style="list-style-type: none"> ▪ Advocate the use of a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements and information campaigns for the prevention, control and abatement of environmental pollution
Developments post-1992		
1992	Constitution (Seventy Third Amendment) Act, 1992	<ul style="list-style-type: none"> ▪ Gives land related subject to the <i>Panchayat Raj</i> Institutions (local self governments) at the village, block and district levels to ensure participatory planning, decision making, and monitoring of programmes by the local self governments
1992	Constitution (Seventy Fourth Amendment) Act, 1992	<ul style="list-style-type: none"> ▪ Regulation of land use and urban planning were brought under the functional domain of urban self-governing bodies
1992	Department of	<ul style="list-style-type: none"> ▪ Promote development of non-forest

Year	Initiatives	Salient features
	Wastelands	wasteland
	Development in the Ministry of Rural Development	<ul style="list-style-type: none"> ▪ Watershed approach in area development programmes
1994-95	Investment Promotional Scheme (IPS)	<ul style="list-style-type: none"> ▪ Facilitate/attract/mobilize resources from financial institutions, banks, corporate bodies and individuals for development of wasteland in non-forest areas.
1995	Watershed approach in area development programmes	<ul style="list-style-type: none"> ▪ Integrated ridge to valley development approach ▪ Community participation
1999	Department of Land Resources	<ul style="list-style-type: none"> ▪ Coordination of land administration in India ▪ Formulation of integrated land resources management policies ▪ Implementation of land based development programmes

In addition to the above, policies, acts, and programmes adopted in other sectors also have a direct and indirect bearing on land resources management. Those programmes/acts are discussed in other chapters. A number of programmes and projects have also been initiated by bilateral donors and international funding agencies to restore productivity as well as better management of land.

International cooperation

The United Nations Convention to Combat Desertification (UNCCD) had formulated a Regional Action Programme (RAP) for the Asian countries to strengthen the existing capacity and network with other member countries to take suitable measures for combating desertification. The programme is aimed at helping the member parties strengthen their existing infrastructure for tackling desertification and identifying gaps in knowledge and existing data. Six thematic networks have been identified for regional cooperation. These are:

- Desertification monitoring and assessment
- Agro-forestry management and soil conservation in arid, semi-arid and dry subhumid areas
- Range and pasture management in arid areas with particular emphasis on controlling shifting sand dunes

- Water resources management for agriculture in arid, semi-arid and dry subhumid areas
- Drought preparedness and mitigation in the context of climate change
- Strengthening planning capacities for drought management and controlling desertification

India hosts an 'Agroforestry and Soil Conservation' network and also participates actively in the other thematic areas.

Achievements

Drawing on Table 13.5, the section below analyzes measures adopted by Government of India to achieve the objectives laid out in Agenda 21 for the sustainable management of land resources.

Integrated approach and institutional restructuring

Integrated planning and management of land resources is an integral part of the planning process in India. In the 90s, land resource management and area development programmes were restructured to allow for greater flexibility in choice of technology, decentralization of procedures, and active participation of beneficiaries in planning and execution. Several steps have been taken overtime – many before 1992 – towards institutional restructuring and better management of land resources. During the Sixth Plan (period 1980-85), a separate Department of Environment (DoEF) was constituted to focus on the environment and natural resources (including land). Subsequently, the DoEF was upgraded to a ministry- the Ministry of Environment and Forests. The National Wastelands Development Board (NWDB), under MoEF, was constituted in 1985 to develop and increase the productivity of wastelands in India. In 1992, the NWDB was bifurcated to National Afforestation and Eco-development Board (NAEB) and NWDB. NAEB, retained under the purview of MoEF, is responsible for development of degraded forestlands (refer chapter on forest). NWDB, brought under the purview of a new department –the Department of Wastelands Development (DoWD) in the Ministry of Rural Development, is responsible for management and development of wastelands. Department of Land Resources (DoLR) was formed in April, 1999, under the Ministry of Rural Development by changing the nomenclature of DoWD . The mandate of the department includes land reforms and land administration, besides implementing all the land based programmes (DPAP, DDP, IWDP etc.), earlier with different departments of the MRD. All the area development

schemes are being implemented through the watershed development approach to increase agricultural production and to improve the quality of life of the poor while arresting degradation. To integrate watershed development programmes of different departments, a single national initiative - a national movement of watershed development-was mooted through the budget speech of Union Finance Minister in 1999-2000.

The 73rd and 74th, Amendment Acts (1992) of the constitution brought the land use, conservation, management and related issues under the purview of local bodies in both rural and urban areas.

A national policy on the management of land resources is being formulated by the Department of Land Resources. There is a paradigm shift from 'use' of land to 'management' in this proposed policy (Kanda, 2000).

The initiatives taken by other Ministries also have a bearing on the prevention of degradation of lands. Some of these are:

- Improved policy framework for natural resource management
- Improved data on land resource degradation and its management
- Draft grazing and livestock management policy, 1994
- Draft national policy for common property resource lands (CPRLs) (under formulation)

Land reforms

The Ministry of Rural Development plays an advisory and coordinating role in implementing land reforms. Reforms implemented since 1950's by the Central and state governments helped to abolish intermediary tenures. Legislative provisions have been provided for conferment of ownership rights on tenants or allowing cultivating tenants to acquire ownership rights on payment of a reasonable compensation to the landlords. About 12.42 million cultivators have been conferred ownership rights on 6.33 million hectares of land. Under various ceiling laws, until September 2000, 2.97 million hectares of land had been declared as surplus of which 2.14 million hectares have been distributed to 5.51 million beneficiaries mostly belonging to the weaker sections. In addition, about 0.88 million hectare of *Bhoodar^a* land and 5.97 million hectares of government wasteland have also been distributed. Legislative provisions have been made for consolidation of holdings and 66.10 million hectares of land have been consolidated so far (MoRD, 2001).

^a Surplus land surrendered to government by landlords.

A major initiative has already been taken to ensure transparency in land records management. In the Ninth Five-Year Plan period (1997-2002) an important focus of the Ministry of Rural Development has been on land reforms including new strategies such as the promotion of women's land rights to benefit socially excluded groups and issuing *pattadar* passbooks to land owners.

Land-use change

Recognizing the need for optimal land use planning, a National Land Use and Conservation Board (NLCB) was established in 1983 (restructured in 1985) with the objective of formulating national land-use policies and preparing a perspective plan for optimum utilization of land resources. To coordinate similar activities in the states, a State Land Use Board (SLUB) was also formed in almost all states. A National Land-use Policy Outline, with a 19-Point action programme was adopted in 1988. The policy outline projected land-use for the year 2000 keeping in view the growth in population. A few states have already prepared the state-level land-use policy and a perspective plan. A scheme for strengthening the SLUB was launched in 1986 in all states and union territories with 100% Central assistance.

In addition, the Town and Country Planning Organization (TCPO) was set up by the Government of India to advise the state governments, local bodies and State Town Planning Departments in matters of urban and regional planning.

Combating land degradation and desertification

Land degradation issues received special attention with the setting up of the National Wastelands Development Board (NWDB). Conscious efforts have been made to increase the area under various programmes since the formation of the DoLR. Area development programmes are in place to arrest and reverse land degradation and desertification in India. Some of these are as under.

The Desert Development Programme (DDP)

Until 1995, this programme covered 36.2 million hectares of land. At present, the programme is under implementation in 234 blocks of 40 districts in 7 states covering an area of 45.8 million hectare (MoRD, 2002a). The MoEF has prepared a *National Action Programme to Combat Desertification* in the context of United Nations Convention to Combat Desertification (UNCCD). The report reviewed the policies and programmes adopted by India to mitigate the desertification and suggested programmes of action.

Drought Prone Areas Programme (DPAP)

Since inception in 1972-73 until 1994-95, 5.71 million hectares of land have been successfully treated at a cost of Rs 17420 million. In terms of coverage, 10% of the total geographical area, identified as drought prone, has been treated. Since 1 April 1995, this programme has been implemented on a watershed basis. At present, 971 blocks of 183 districts in 16 states are covered under this programme which covers an area of 74.6 million hectare (MoRD, 2002b).

Wasteland development

Wastelands in India were assessed in 2000 and an atlas was prepared for their management. Out of the 63.8 million hectares of wasteland identified about 50 million hectares are treatable. An integrated wasteland development project has been under implementation on a watershed basis since 1989-90. Upto March 2002, 423 IWDP projects were sanctioned in 27 states with a total outlay of Rs 18688 million to treat a total project area of 3.72 million hectare (MoRD, 2002a). Besides, about 10 million hectare of wastelands in the common property regime have been greened by NGO's and the people's efforts (Bali, 2000).

Soil conservation in the catchment of river valley projects (RVP) and flood-prone rivers (FPR)

This Centrally-sponsored scheme for enhancing the productivity of degraded lands is being implemented in 45 catchments with a treatable area of 25.58 million ha out of the total catchment area of 91.18 million ha. Since inception in the Third Five-Year Plan up to the end of the Eighth Plan an area of 4.23 million ha, at an expense of Rs 9386.2 million, was treated. In the first 3 years of the Ninth Plan an area of 0.81 million ha has been treated at a total cost of Rs 3508.9 million (MoA, 2001a).

Reclamation of alkaline soils

This scheme was launched in the Seventh Five-Year Plan (period 1985-1990) in the states of Haryana, Punjab and Utter Pradesh and extended, in the Ninth Plan (period 1997-2002), to all other states where the alkalinity problem exists. During the first 3 years of the Ninth Plan 0.06 million ha of alkaline soils were reclaimed at a cost of Rs 87.6 million.

Other programmes

Until 2000 5.9 million hectares of area were treated at a cost of Rs 15334.3 million. Under the NWDPRRA Soil and water conservation measures were implemented (until 2001) in 4.7 million hectares of land at an expense of Rs 12900.9 million.

Externally-aided projects

In addition to the above Centrally-sponsored projects, there are many externally-founded projects, such as the Indo-German bilateral project on watershed management, Uttar Pradesh Sodic Land Reclamation Project with World Bank assistance, Haryana Operational Pilot Project for Reclamation of Waterlogged and Saline land with assistance from the Netherlands government, DIFD-assisted Watershed Basis Livelihood Programme in the states of Orissa and Andhra Pradesh, and the North Bengal Terai Development Project with Dutch assistance that are in different phases of implementation.

Stakeholder participation and awareness-creation

The Environment (Protection) Act 1986, sets out the parameters within which the Ministry of Environment and Forests formulates and carries out environmental policy at the national level. Underlying the policy statements is a recognition of the principle that effective management and control of natural resources requires the support and participation of the people. To ensure stakeholder participation, public hearing is made mandatory on all projects that require environmental impact assessment (EIA) as per the EIA notification of the MoEF. The revised guidelines for watershed development assigned greater role for *panchayati raj* institutions, NGO, women, and financial institutions while implementing area development programmes.

The 73rd and 74th amendments of the Constitution ensured a definite role for local bodies in the management of natural resources including land, water and forests. Consequent upon this amendment almost all states and union territories have enacted their legislations to give local self-governing bodies these powers. Thus, *panchayats* at village, intermediate and district levels were constituted in many states ensuring stakeholder participation in planning decision-making and implementation. The provisions of the *Panchayats (Extension to the Scheduled Areas) Act, 1996* intends to enable tribal societies to effectively contribute to preservation and conservation of their traditional rights over natural resources. Since 1995, area development programmes have been implemented with the people's participation.

Strengthening knowledge base and developing information and monitoring systems

Knowledge base

The Government of India has augmented research efforts in land resource planning and management by setting up and strengthening area-specific research institutions.

Technological support is important for the success of land-based programmes. A number of technologies to combat the process of land degradation have been developed by research and academic institutions in the country. This includes technologies for the conservation of soil, water and vegetation; control, management and reclamation of degraded land; combating desertification and mitigating the effects of drought.

Realizing the importance of the above a separate Technology Development, Extension and Training Scheme was launched and implemented through the ICAR, state agricultural universities and government organizations to demonstrate cost effective and proven technologies for the development of various categories of wastelands. A national committee on watershed training was set up to build capacity among the stakeholders of watershed development programmes.

Information systems

The Centrally-sponsored scheme for computerization of land records is being implemented in 582 districts of the country. Only districts with no land records were left out (MoRD, 2002b). For preparation, maintenance and up-dating of land records, the accent has been on induction of modern technology. With this objective, the Central government is financially supporting states/UTs for purchase of equipment, strengthening of training infrastructure, etc. under the Centrally-sponsored scheme, Strengthening of Revenue Administration & Updating of Land Records (SRA & ULR).

All India Soil and Land-use survey (AISLUS) under the Department of Agriculture and Cooperation initiated land degradation mapping during the Eighth Five-Year Plan allowing for the development of district information systems for degraded lands. The AISLUS has so far covered an area of 24 million in 30 districts distributed in different agro-climatic zones (MoA, 2000). Besides, AISLUS has partially completed the development of a digital watershed atlas of India, a map library of river valley project catchments, and development of soil information system.

Concerns

The existing land-use policy failed to provide right results for lack of a cohesive approach to different components of agriculture such as land, soil and water. The proposed land resource management policy and approach to be finalized by the Ministry of Rural Development addresses some of these issues. The new integrated policy intends to have dynamic conservation, sustainable development and equitable access to the benefits of intervention as its thrust.

Integrated approach and institutional restructuring

- Many land development programmes, such as DDP, DPAP, IWDP, etc. co-exist and operate in an area. Several departments of the Government of India, often with different norms and guidelines are implementing area/watershed development programmes. The GoI recognized the need for a coordinated initiative and a separate department has been set up to coordinate the area development and income generation programme. Similar efforts are also necessary at the state level and performance should be the focus of the department (Approach Paper to Tenth Plan).
- The government had initiated steps to formulate national policies such as a draft grazing and livestock management policy, a draft national policy for common property resource lands, and an improved policy framework for natural resource management. These policies and programmes have not been given final shape so far.
- Most schemes follow a blue print and top-down approach, with little flexibility given to field staff. Any change in the scheme requires approval from the GoI which is time-consuming. There is a need to adopt a bottom-up approach. Lessons learned from *people's planning* adopted in Kerala during the Ninth Plan period could be used as guidelines.

Land-use change

- There is no long-term perspective plan for land use in India. There is a need to have a detailed perspective plan for next 20-25 years keeping in view of the increased demand for food, fodder and fuel, industrial needs etc.
- The National Land-use Policy Outline projected the land use for the year 2000. There is a considerable departure from the actual data from the projected land-use (Table 13.6). There is a need to bridge the gap.
- Even though constitutional amendments were made to empower local bodies to manage land related issues, these need to be strengthened.

Table 13.6 Actual and projected land-use

Land type	1980-81	2000 (projected)	1997-98
Net sown area	140	150	140.0
Rainfed area	101	40	87.5
Irrigated area	39	110	54.6
Forest area	67.4	115	68.8
Pasture/grass land	12	22	11
Urbanization	19.4	25.5	22.5
Others	90.1	16.5	84.7
Total geographic area	329	329	329

Source. Ministry of Agriculture (2000)

Combating land degradation and desertification

- People's role in formulation, initiation, and implementation of programmes is limited
- Monitoring of progress needs to be improved
- Programmes need to be better designed to meet the basic needs of the beneficiaries

Stakeholder participation and awareness creation

- Most of centrally-sponsored land development programmes are subsidy-driven or carried out with 100% assistance. Hence, there was only minimal involvement of the beneficiaries and a sense of ownership among them was lacking.

Strengthening knowledge base and developing information and monitoring systems

- Traditional knowledge in land resource management needs to be given requisite importance.
- There is a need of systematic scientific generation of databases for land resources (including the quality of soil etc.).

Strategies for sustainable land management

The Approach Paper to the Tenth Five-Year Plan assigns high priorities to area-specific programmes such as watersheds, river valleys, arid areas, wastelands. Even though the watershed approach has been adopted for area development

programmes, it is still essential to coordinate the activities of all line departments and adopt an integrated approach. At the institutional level, it is essential to establish the horizontal linkages between various agencies that are involved in land resource management.

It is imperative to ensure the full participation of and a sense of ownership amongst the beneficiaries of land development programmes in order to make these sustainable. There is a need to involve the stakeholders from the planning stage onwards and address other socio-economic and poverty issues in land development programmes.

The government would take the lead role in capacity building at the grassroot level by planning, implementing and monitoring integrated land resources management programmes. There is an urgent need to build and augment capacities in State soil and land use departments to develop information systems and forge linkage between the information and production systems.

Sustenance of the development programmes beyond the life of the project is an important factor contributing to the success/failure of many area development programmes. The Approach Paper to Tenth Plan also highlights the need for a paradigm shift from physical and economic targets, to sustainability in land development programmes. This shift needs to be translated into reality while planning any land development programme.

The land resource accounting is not properly incorporated in the present national income accounts. Under the present accounting system land and land resources are treated as free and the cost attached to the use of land is not accounted for, especially when land quality deteriorates or the ecosystems functions change. Natural resource accounting is yet another area, which the government intends to take forward.

From the Tenth Plan every effort would be made to bring land currently uncultivated into productive use, whether in agriculture or in forestry. For this, it will be essential to evolve a comprehensive land-use policy which will lay out the contours of ownership and institutional framework that will encourage the productive utilization of such lands.

The Tenth Plan will also focus on increasing work opportunities and the productivity of women farmers. Increasing women's access to productive land by regularizing leasing and sharecropping of uncultivated agricultural land by women's groups, encouraging collective efforts in bringing wastelands under cultivation and providing policy incentives to women in low-input subsistence

agriculture, will have immediate benefits for women's empowerment and household food security.

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