3.2.2 Endemic Species

Endemism of Indian biodiversity is significant. About 4,900 species of flowering plants or 33% of the recorded flora are endemic to the country. These are distributed over 141 genera belonging to 47 families. These are concentrated in the floristically rich areas of North-East India, the Western Ghats, North-West Himalaya and the Andaman & Nicobar Islands.

The Western Ghats and the Eastern Himalaya are reported to have 1,600 and 3,500 endemic species of flowering plants, respectively. These areas constitute two of the 18 hot spots identified in the world. It is estimated that 62% of the known amphibian species are endemic to India of which a majority occur in Western Ghats. Nearly 50% of the lizards found in India are endemic, with a large number being found also in Western Ghats. The distribution of endemic animals and plants in respective groups are tabulated in Tables 7 and 8.

3.2.3 Cultivated Plants

India is an acknowledged centre of crop diversity. It is considered to be the homeland of 167 important cultivated plant species and 320 species of their wild relatives. India is considered to be the centre of origin of 30,000-50,000 varieties of rice, pigeonpea, mango, turmeric, ginger, pepper, banana, bitter gourd, okra, coconut, cardamom, jack fruit, sugarcane, bamboo, taro, indigo, sunhemp, amaranths, gooseberries etc. The gene bank of National Bureau of Plant Genetic Resources (NBPGR) has a collection of over 1,59,080 varieties. The details of the active germplasm holdings and base collections of NBPGR are given in Table 9.

Table 7 : Endemic species of animals

Group	No. of species
Mollusca	
Land	878
Freshwater	89
Insects	16,214
Amphibia	110
Reptilia	214
Aves	69
Mammalia	38

Table 8 : Endemic species of plants

Group	No. of species
Pteridophyta	200
Angiosperms	4950

Table 9 : Active Germplasm Holdings and Base Collections at NBPGR.			
	Crop Groups	Active germplasm	Base collections holdings
1.	Cereals	12,086	43,409
2.	Pulses	38,695	22,269
3.	Millets & minor millets	10,349	14,488
4.	Oilseeds	19,808	14,278
5.	Vegetables	12,146	5,681
6.	Medicinal & aromatic plants	870	942
7.	Pseudocereals	4,739	736
8.	Tuber Crops/Spices	2,053	-
9.	Forage Crops	4,060	-
10.	Horticultural/Ornamentals	2,2212	-
11.	Fibre Crops	-	3,212
12.	Released crop varieties	-	904
13.	Reference samples (Medium Term)	-	53,161
	Total	1,07,018	1,59,080

3.3 GENETIC DIVERSITY

Genetic diversity is defined as variation in the genetic composition of individuals within or among species. India being one of the 12 megabiodiversity countries possesses rich genetic diversity. Studies in genetic diversity are not as yet very widespread and sharply focussed. However, studies in genetic diversity of wild crop relatives and domesticated animals have been carried out.

3.3.1 Wild relatives of crops

There are several hundred species of wild crop relatives distributed all over the country. A major centre for wild rice is the Eastern Peninsular India, i.e. West Bengal, Orissa and Andhra Pradesh. the North-Eastern hills and the Tamil Nadu hills are rich in wild relatives of millets. Wild relatives of wheat and barley have been located in the Western and North-Eastern Himalaya. Table 10 gives the statement of wild relatives of crops recorded so far.

Table 10 : Wild relatives of crops	
Crop	No. of wild relatives
Millets	51
Fruits	104
Spices and condiments	27
Vegetables and pulses	55
Fibre crops	24
Oil seeds, tea, coffee, tobacco and sugarcane	12
Medicinal plants	3000

3.3.2 Breeds of Domesticated Animals

India's domesticated animals comprise diverse livestock, poultry and other animal breeds. India's eight breeds of buffaloes represent the entire range of the genetic of the genetic diversity of buffaloes in the world. Table 11 gives the statement of breeds of domesticated animals.

Table 11 : Breeds of domesticated animals

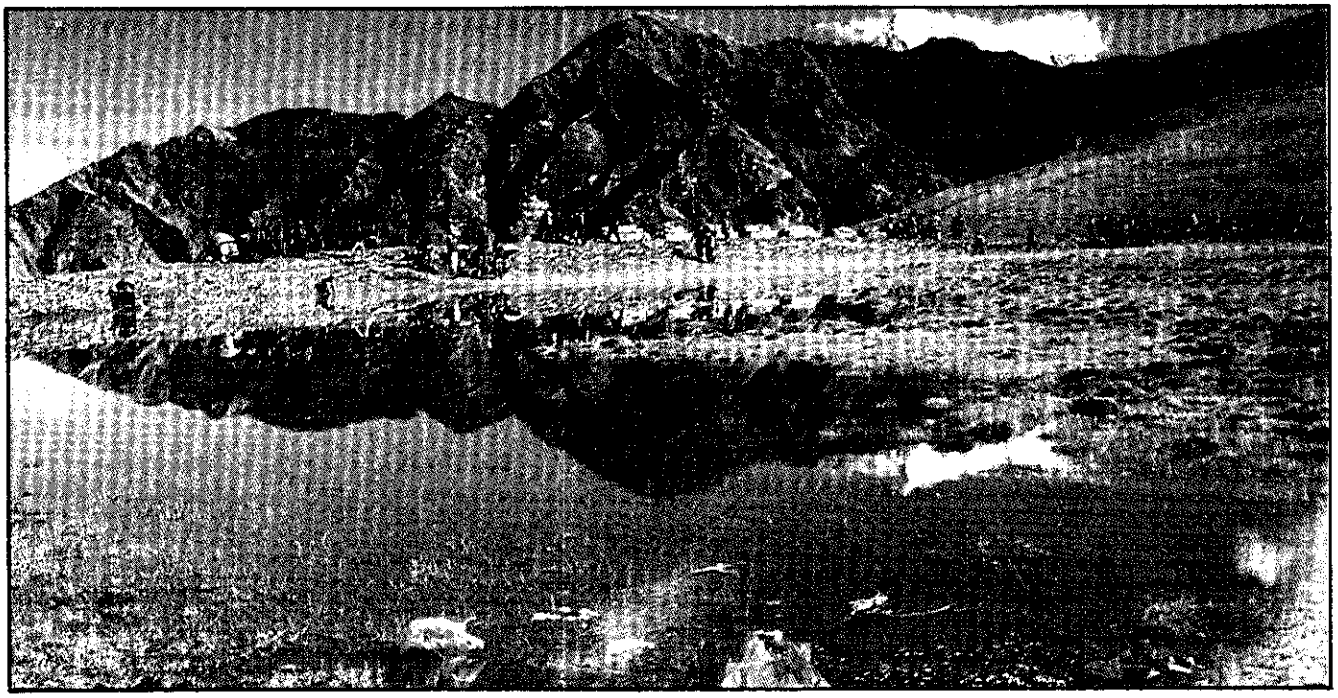
Group	No.
Cattle	27
Sheep	40
Goats	22
Camels	8
Horses	6
Donkeys	2
Poultry	18
Buffalo	8

3.4 THREATS TO BIODIVERSITY

The biodiversity in India's forests, grasslands, wetlands and mountains, deserts and marine ecosystems takes many pressures. One of the major causes for the loss of biological diversity in India has been the depletion of vegetative cover in order to expand agriculture. Since most of the biodiversity rich forests also contain the maximum mineral wealth, and are also the best sites for water impoundment, mining and development projects in such areas have often led to destruction of habitats. Poaching and illegal trade of wildlife products too have adversely affected biological diversity.

3.4.1 Threats to Ecosystem

Mountain ecosystems take the major negative impact of unplanned development, opening of roads, degradition of catchment areas and resultant landslides and erosion. Mountain ecosystems in Himalaya, Western Ghats and Eastern Ghats have been considered as fragile and have attracted special attention. Of the 6,33,970 million hectares of forests existing in 1997 (19.27% of India's geographical area), only a little more than half had dense forest cover with crown density of over 40%. Though the exact extent of loss of forest cover is difficult to assess, the major threats faced by the forest ecosystems in India are : commercial clear felling and selective clear felling; conversion for agriculture, settlements, roads; inundation for development projects like multipurpose river valley projects; shifting cultivation; conversion to



monoculture; army operations; grazing; mining; firewood collection; introduction of exotics; fire and pollution.

Grasslands are one of the most threatened ecosystems in India. Apart from commercial pressures, they come under pressure from grazing, fire, pollution, development projects, conversion for agriculture, tree plantations, and introduction and spread of exotics.

The lakes, marshes, river systems and other wetlands in the country are threatened mainly by domestic pollution from untreated sewage, industrial pollutants and toxic effluents, agricultural run-offs containing residues of pesticides and chemical fertiliser, and excessive siltation from degraded catchments. Excessive withdrawal of water from the water bodies for industry, irrigation or domestic use, dredging and reclamation of water bodies, excessive fishing, building of dams. jetties and canals are other factors adversely affecting the Indian wetlands. A number of wetlands are reported to be seriously threatened. These include : Wular, Dal, Harike, Chilka, Loktak and Kolleru lakes, Gulf of Khambat, estuaries of Karnataka coast, backwaters of Cochin and wetlands in the Andaman & Nicobar islands.

Mangroves of the country are subjected to serious threats due to their reclamation for urban development, e.g., near Mumbai, Cochin, and Port Blair, waste disposals, oil spillage etc.

Coral reef ecosystems are threatened because of mining, blasting, dredging, collection of reef biota, coastal clearance for development, sewage disposal, discharge of effluents from industries and thermal power plants, chemical pollution and oil spillage.

The sand desert of Western India, being one of the most densely populated of the world's deserts with a high livestock population faces heavy biotic pressure. Besides, expansion of mining, urbanisation and industrialisation also pose threat to this ecosystem. The salt desert of Gujarat is not thickly populated because it is inhospitable. However, the expanding salt extraction has resulted in widespread disturbance.

In the Indian cold desert, a major destructive factor is road construction which in turn leads to landslides and soil erosion. Other threats are overgrazing and excessive collection of fuelwood.

Desertification and land degradation *per se* pose potential threat to biodiversity.

3.4.2 Threats to species and genetic diversity

The major factors threatening the species and genetic diversity found in India are similar to those elsewhere in the world. Threats to species and genetic diversity are directly linked to threats to the ecosystem. In addition, habitat destruction, over exploitation, poisoning by pollutants, introduction of exotics, imbalances in community structure, epidemics, floods, droughts and cyclones affect species and genetic diversity. The diversity of indigenous varieties of livestock, crops and other cultivated plants face many threats from introduction of exotic and high-yielding hybrid varieties.

In this century itself, the Indian cheetah, Lesser Indian rhino, the Pink-headed duck, the Forest owlet and the Himalayan mountain quail are reported to have become extinct. 39 species of mammals, 72 birds, 17 reptiles, 3 amphibians, 2 fish and a large number of butterflies, moths and beetles, besides 1,336 plant species are considered vulnerable and

endangered. About 20 species of higher plants are categorised as "possibly extinct", as these species have not been sighted during the last 6-10 decades.

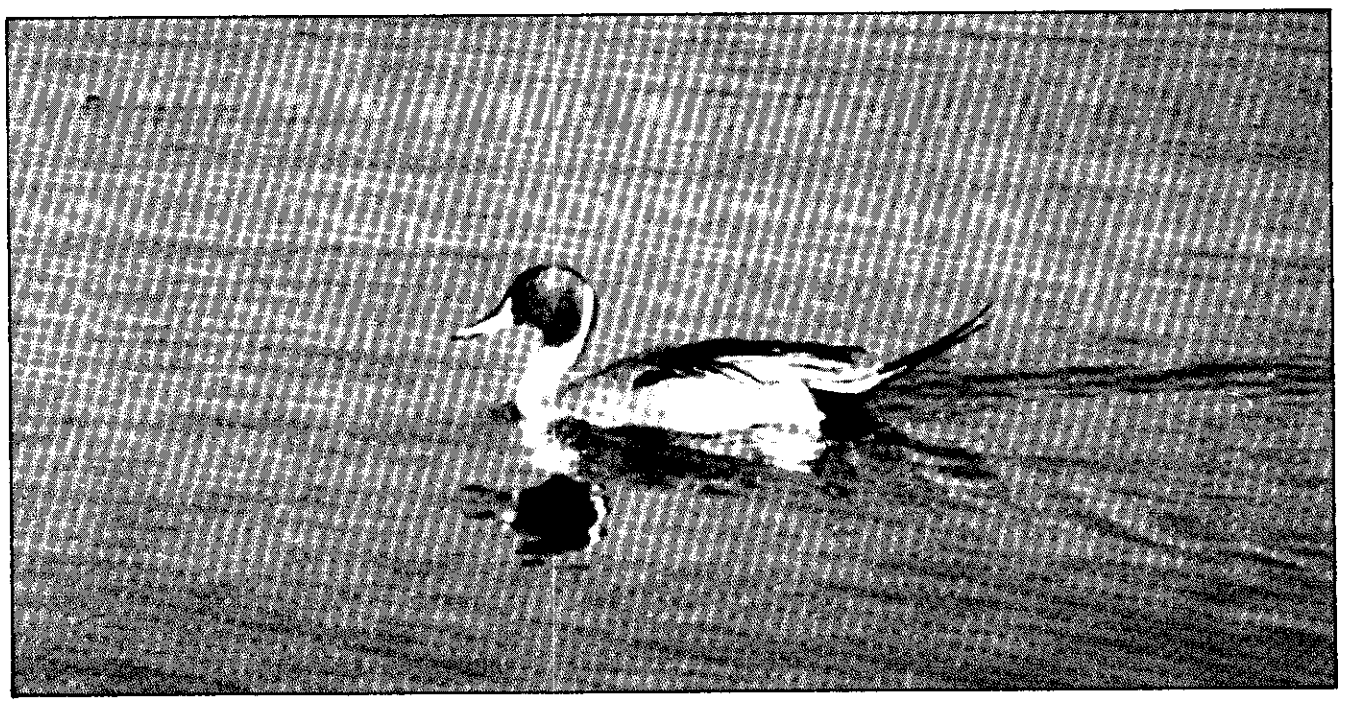
CHAPTER 4

Article 48-A and Article 51-A(G) of the Directive Principles of State Policy in the Constitution of India state that 'the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country', and 'to protect and improve the national environment including forests, lakes, rivers and wildlife, and to have compassion for the living creatures'. A focussed articulation of these concerns in programmes and policies began to be seen in the wake of 1972 Stockholm Conference which got further sharpened after 1992 Rio conference. Between the Stockholm Conference and the Rio Summit, India has been able to develop a stable organisational structure for environment protection in the country. Legislation, policies and programmes were evolved during this period which were geared towards this objective. Numerous and wide ranging policies, programmes and projects were initiated which directly or indirectly serve to protect, conserve and sustainably use the country's biological resources. Some of such actions emanating from the Articles of the Convention are enumerated in Box No. 3

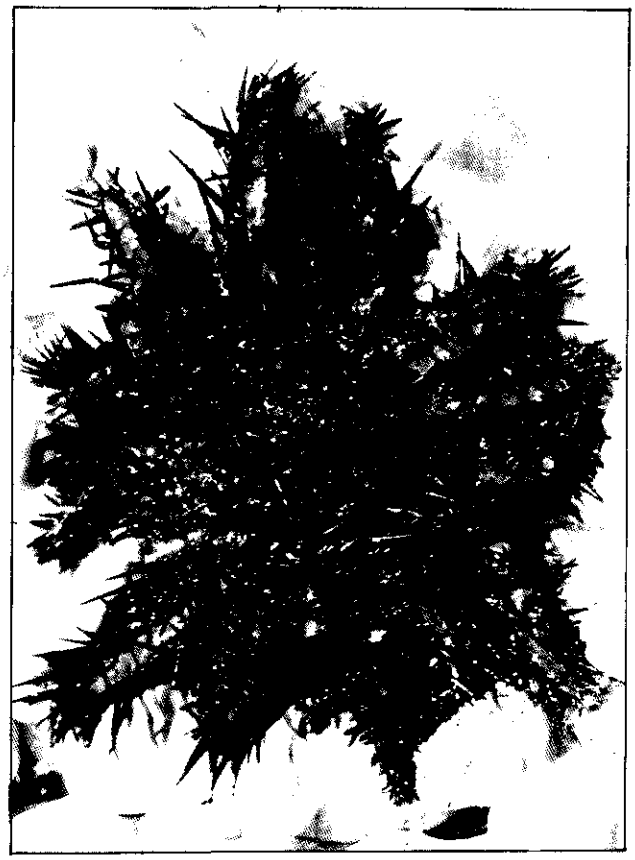
Box No. 3 Actions emanating from the Convention on Biological Diversity

Articles 1-5	Deal with objectives, use of terms, principle, scope and co operation.
Article 6	Preparation of country study/status report. Review of policy, legislation and institutional framework through widespread consultations, so as to ensure strengthening of ongoing activities of conservation and sustainable use and their integration with sectoral and cross-sectoral plans and programmes.
Article 7	Identification of gaps in survey, identification, monitoring and characterisation of floral and faunal resources presently being done, and accordingly strengthen these efforts.
	Build a comprehensive ecosystem specific data base.
Article 8	Examination of issues related to selection, establishment and management of protected area in order to identify the gaps *in situ* conservation and taking up of measures to plug these gaps.
	Expansion of ecodevelopment activities.
	In order to control the adverse impacts of introduction of alien species, the existing quarantine measures for screening of biomaterials entering the country to be reviewed and revised, if necessary.
	Harmonise present uses of other natural resources specially land and water to make them compatible with biodiversity conservation, through wideranging consultations at the Central and State levels.
	Need to respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities and encourage the equitable sharing of benefits arising from the use of such knowledge, innovations and practices.
	Develop or maintain necessary legislation and other regulatory provisions for protection of threatened species.
	Intensification of *in situ* conservation measures through adequate financial support.
Article 9	Strengthen programmes for *ex situ* conservation especially of threatened species, through technical/ scientific and financial inputs.
Article 10	Interactions with agencies concerned to internalise the various action points for ensuring sustainable use of biological resources to ensure proper integration into national and state level decision making.
Article 11	Identify further incentives for conservation and sustainable use of biodiversity.
Article 12	Review and strengthen research and training and identifying thrust areas for the same.
Article 13	Review and strengthen ongoing activities for promoting education and awareness.

	Cooperate with other States, regional networks for development of educational and public awareness programmes.
Article 14	Ensure implementation of safeguards suggested in impact assessments for minimising threats to biodiversity.
Article 15	Facilitate access to genetic resources and ensure benefits to the country as the country of origin.
Article 16	Cooperate with other Parties to work out operational modalities for transfer of technologies.
	In accordance with the national legislation and international law, take measures to ensure that IPRs are supportive of the Convention.
Article 17	Cooperate with other Parties for exchange of information.
Article 18	Work out priorities for technical and scientific cooperation with other Parties.
Article 19	Ensure safe handling, use, storage and transfer of living modified organisms



In the following sections under different subject heads, the current conservation efforts, followed by identification of some significant gaps in the present efforts are described. Following from the lacunae identified are enumerated various action points. The action points are certainly not exhaustive and are intended to facilitate the process of conservation of biodiversity in the country. This is an iterative and dynamic process which will continue to evolve on its own with experience.



4.1 LEGISLATIVE AND POLICY FRAME WORK

4.1.1 Current Status

Subject relating to the environment and forests figure in the Concurrent List of the Constitution of India. Both the Central Government and the State Government legislate and formulate policies and programmes on the subject. At present, the major Central Acts having direct bearing on biodiversity issues are the following :

- the Indian Forest Act 1927
- the Forest (Conservation) Act 1980
- the Wildlife (Protection) Act 1972
- the Environment (Protection) Act 1986.

This legal framework has been able to control to some extent the growing trend of deforestation, pollution etc. For example, with the passage of the Forest Conservation Act 1980, the annual rate of diversion of forest land for non-forestry purposes has come down to 16,000 ha. annually as compared to 1,50,000 ha. in the pre-1980 period. In addition to these, there are several other Central Acts which have relevance to biodiversity. The important Acts are given in Box No. 4

Box 4 : Important Central Acts having relevance to biodiversity

- Fisheries Act, 1897.
- Destructive Insects and Pests Act, 1914.
- The Indian Forest Act, 1927.
- Indian Coffee Act, 1942
- Agricultural Produce (Grading and Marketing) Act, 1937.
- Import and Export (Control) Act, 1947.
- Rubber (Production and Marketing) Act, 1947.
- Tea Act, 1953.
- Prevention of Cruelty to Animals Act, 1960.
- Customs Act, 1962.
- Cardamon Act, 1965.
- Seeds Act, 1966.
- Wildlife (Protection) Act, 1972 and Wildlife (Protection) Amendment Act, 1991.
- Marine Products Export Development Authority Act, 1972.
- Water (Prevention and Control of Pollution) Act, 1974.
- Tobacco Board Act, 1975.
- Territorial Water, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976.
- Water (Prevention and Control of Pollution) Cess Act, 1977.
- Coconut Development Board Act, 1979.
- Maritime Zones of India (Regulation and Fishing by Foreign Vessels) Act. 1980.
- Forest (Conservation) Act, 1980.
- Air (Prevention and Control of Pollution) Act, 1981.
- National Oilseeds and Vegetable Oils Development Board, 1983.
- Agricultural and Processed Food Products Export Development Authority Act, 1985/ 1986.
- Environment (Protection) Act, 1986.
- Spices Board Act, 1986.
- National Dairy Development Board, 1987.
- New Seed Development Policy, 1988.
- Foreign Trade (Development and Regulation) Act, 1992.

The various Central Acts are supported by a number of State laws and statutes concerning forest and other natural resources.

The 73rd Amendment Act 1992 of the Constitution of India on Panchayats, which adds as Eleventh Schedule in the Contitution, has eight entries (viz. 2, 3, 6, 7, 11, 12, 15 and 29) which are linked to environmental protection and conservation.Similarly entry 8 of the 12th Schedule added to the Constitution by the 74th Amendment Act 1992 for constitution of Urban and local bodies assigns the function of 'Protection of environment and promotion of ecological effects' to these bodies.

India's Environmental Action Plan (EAP, 1993) identifies conservation and sustainable utilisation of biodiversity in selected ecosystems as one of the top seven priorities for future action. The National Conservation Strategy and Policy Statement on Environment and Sustainable Development (1992) outlines the cross sectoral policies and actions required to give greater attention to conservation of biodiversity. The National Forest Policy, as amended in 1988, stresses the sustainable use of forests, and the need for greater attention to ecologically fragile but biologically rich mountain and island ecosystems. The National Wildlife Action Plan (1973) identifies broad goals of establishing a network of representative protected areas developing appropriate management systems for them with due regard for the needs of local people or the ecosystems ensuring their support and involvement, and extending conservation effort beyond protected areas.

One of the major consideration in the environment impact assessment of development projects carried out by the Ministry of Environment & Forests is the protection of habitats and valuable ecosystems. The National Afforestation and Ecodevelopment Board of the Ministry undertakes large scale rehabilitation of degraded forest lands in the country.

India has ratified, and is a strong and active participant in the following International Conventions and agreements relevant to biodiver-sity: the Convention on International Trade in Wild Species of Endangered Fauna and Flora (CITES); the Ramsar Convention on Wetlands of International Importance especially as Water fowl Habitat; the World Heritage Convention; the Bonn Convention on Conservation of Migratory Species of Wild Animals; the FAO Commission on Plant Genetic Resources; and the UN Law of the Seas (UNCLOS).

4.1.2 Gaps

In general, the existing legal framework covers, though not fully, the various aspects related to wild components of biodiversity. However, the domesticated floral and faunal components are either not covered at all or are only partially covered through the existing legislation. Further, even for wild species, very few acts relate to their *ex situ* protection.

A glaring gap in the existing legislation relevant to biodiversity *vis-a-vis* the Convention is that most of these acts pertain mainly to use/exploitation of biological resources, than their conservation. Moreover, even specific acts such as the Wildlife (Protection) Act 1972 have focus on protection

rather than conservation. Even this protection is largely directed towards large animal species rather than the large spectrum of fauna and flora. Conservation includes not only protection, but also preservation, development, regeneration, propagation and sustainable use.

Based on the analysis of the existing legislation, a need for a comprehensive legislation on biodiversity conservation and use had been identified particularly to facilitate access to genetic resources while ensuring accrual of benefits to the country as the country of origin, ensuring due rewards and compensations to local communities and people for their contributions to conservation, knowledge systems, practices and innovations, to ensure suitable access to and acquisition of technologies including biotechnologies and to create a general positive environment for biodiversity conservation.

In addition, there is a need to criticially examine the existing laws relevant to biodiversity, in order

to bring them in tune with the provision of the Convention and to reflect the current understanding of biodiversity conservation.

Another major identified gap is the inadequate enforcement of existing laws.

Enunciation of basic principles of the policy relating to biodiversity has been done in Chapter 1.

4.1.3 Action Points

- Formulate a comprehensive legislation on biodiversity conservation and use, identify its elements, and enact the legislation
- Review and if need be revise regulations that govern the ownership, access and management of natural resources, in line with the provisions of the Convention.
- Consider enabling policies to prevent the transfer of prime agricultural land to non-agricultural purposes.
- Review the existing regulatory framework to ensure the safe handling, use, transfer and storage of genetically modified organisms.
- Formulate policies for protection of Wetlands, grasslands, sacred groves and other areas significant from the point of view of biodiversity.

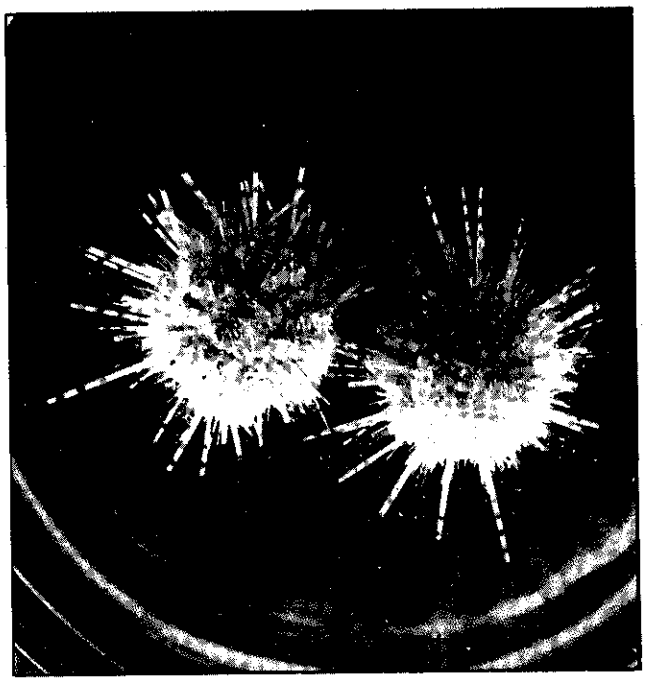
4.2 SURVEY OF BIODIVERSITY AND NATIONAL DATABASE

4.2.1 Current Status

Survey and inventorisation of the floral and faunal resources are carried out by the Botanical Survey of India established in 1890, and the Zoological Survey of India established in 1916. The Forest Survey of India established in 1981 assesses the forest cover, with a view to develop an accurate database for planning and monitoring purposes. The Wildlife Institute of India undertakes studies of endangered species of animals and critical ecosystems.

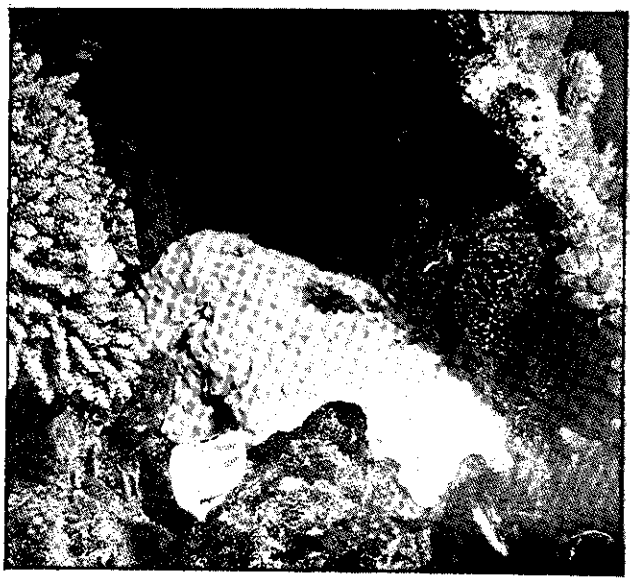
The Survey organisations have published over the years, documents on flora and fauna at country, state, and in some cases district levels and for selected ecosystems. Besides, extensive reports on inventories of resources indicating level of biodiversity in selected areas have also been brought out. The Surveys have also published Red Data Books on endangered species. The voucher specimens are preserved in Central National Herbarium (CNH) of BSI and National Zoological Collection (NZC) of ZSI.

The Forest Survey of India publishes every three years, a State of Forest in India report based on remote sensing and ground truth data.



The Fishery Survey of India is engaged in estimating and monitoring commercially exploitable coastal and marine fish species.

The survey and collection of genetic meterial from wild races and cultivars is vested with National Bureau of Plant Genetic Resources (NBPGR), an institute of Indian Council of Agricultural Research (ICAR).

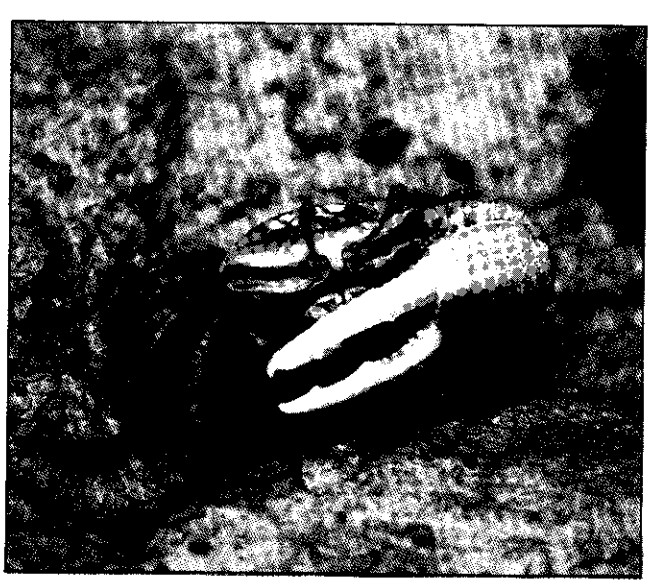


Monitoring of coastal and marine biodiversity is being done by organisations such as National Institute of Oceanography (NIO) and Central Marine Fisheries Research Institute (CMFRI). Other organisations such as Bombay Nutural History Society (BNHS), Salim Ali Centre for Ornithology and Natural History (SACON), Universities and other centres are producing information on biodiversity from time to time.

4.2.2 Gaps

The baseline data on species and genetic diversity, particularly intra-specific diversity, and their macro-and micro-habitats is inadequate. The BSI and the ZSI have been able to survey 70% of the total geographical area of the country. The areas not yet surveyed include the inaccessible Himalayan areas, Andaman and Nicobar Islands and Exclusive Economic Zone. These areas are supposedly rich repositories of endemic and other species and their survey may add species far more than the number recorded in rest of the 70% area. These areas need to be surveyed in order to develop a complete national database which would include listing of all species with their location, distribution, description, status, and their local uses, if any. For this purpose, the Survey organisations could network with other agencies, particularly universities and colleges, with a positive support from national funding agencies in terms of policy planning and funding.

In order to understand and monitor the trends in the changes in biodiversity over a period of time, there is a need to periodically repeat the surveys in the areas already surveyed. This would help in understanding the causes behind depletion of populations and thereby suggesting remedial measures. This would also enable in forecasting of changes in habitats, and their likely impact on



composition of flora and fauna. Surveys are also advocated keeping in view the fact that varieties with high landrace or wild relative contents have largely contributed to higher yields and therefore the option of strategic incorporation of more landraces in breeding programmes should not be lost. For many domesticated animals, the breed-wise census data is not available.

Certain groups of invertebrates amongst the fauna, namely nematodes, mites, insects, some lower groups of plants such as algae, fungi, bryophytes and lichens, and microorganisms are some of the poorly understood taxa, which merit attention on a priority basis.

Since the conservation of the entire range of species is neither practical nor possible, the Survey organisations may identify the keystone and umbrella species. Conserving such species ensures protection of all related species as well. Similarly, there is a need to develop models/packages for the conservation of endemic species. The process of preparation of red data books on endangered species of flora and fauna needs to be speeded up, and validated using the internationally recognised revised guidelines.

There is no uniformity in collection techniques storing, retrieving and dissemination of information, Another gap area which needs to be addressed is the decline in taxonomic expertise. Moreover, taxonomists are largely working in isolation, and hence networking among taxonomists is required.

4.2.3 Action Points

- Develop a national database of biodiversity with distributed information network.
- Review and restructure data formats.
- Intensification of survey, identification and inventorisation activities; involve other agencies, particularly universities and college in survey of flora and fauna.
- Undertake surveys on a priority basis, of islands, Himalayan region, marine and coastal areas.
- Undertake surveys of land races traditional cultivars of crops, wild relatives of crop plants and breeds of domesticated animals.
- Repeat the surveys periodically including in protected areas to monitor changes in populations and to identify threats, through remote sensing and other techniques.
- Develop dichotomous keys for type collections.
- Modernisation and strengthening of existing Survey and other organisations.
- Use modern taxonomic methods for describing/ identification of species.
- Prepare a directory of taxonomists in the country,
- Strengthen and build capacity for taxonomy and biosystematics, particularly for groups of plants, animals and microorganisms which are as yet inadequately understood.
- Study existing systems of documenting traditional knowledge, innovations and practices and create a viable documentation system.
- Complete the enlisting of endangered species of flora and fauna on priority using the revised internationally accepted criteria and to regularly update the lists.
- Identify keystone, umbrella and endemic species which need to be conserved on a priority basis, and develop models/packages for their conservation.
- Undertake the listing of sacred groves, sacred ponds etc and inventorise the components of biodiversity in these areas.

- Establish a national resources centre for D N A finger-printing.

4.3 *IN SITU* CONSERVATION

4.3.1 Current status

Approximately 4.2% of the total geographical area of the country has been earmarked for extensive *in situ* conservation of habitats and ecosystems. A protected area network of 85 National Parks and 448 Wildlife Sanctuaries has been created. The results of this network have been significant in restoring viable populations of large mammals such as tiger, lion, rhinoceros, crocodiles, elephants etc. Table 12 gives the state-wise details of these protected areas.

The Indian Council of Forestry Research and Education (ICFRE) has identified 309 forest preservation plots of representative forest types for conservation of viable and representative areas of biodiversity. 187 of these plots are in natural forests and 112 in plantations, covering a total area of 8,500 hectares.

A programme entitled "Ecodevelopment" for *in situ* conservation of biological diversity involving local communities has been initiated in recent years. The concept of ecodevelopment integrates the ecological and economic parameters for sustained conservation of ecosystems by involving the local communities with the maintenance of earmarked regions surrounding protected areas. The economic needs of the local communities are taken care of under this programme through provision of alternative sources of income and a steady availability of forest and related produce.

To conserve the representative ecosystems, a Biosphere Reserve programme is being implemented. Ten biodiversity rich areas of the country have been designated as Biosphere Reserves applying the UNESCO/MAB criteria. Details on these Biosphere Reserves are tabulated in Table 13. These reserves aim at conserving the biological diversity and genetic integrity of plants, animals and microorganisms in their totality as part of the natural ecosystems, so as to ensure their self-perpetuation and unhindered evolution of the living resources.

Programmes have also been launched for scientific management and wise use of fragile ecosystems. Specific programmes for management and conservation of wetlands, mangroves, and coral reef systems are also being implemented. National and sub-national level committees oversee and guide these programmes to ensure strong policy and strategic support.

Table 12 : Wildlife Sanctuaries and National Parks

State/Union Territory	Sanctuaries		National parks	
	Total No.	Area (sq. km.)	Total No.	Area (sq.km.)
Andaman & Nicobar Islands	94	455.56	8	1153.34
Andhra Pradesh	21	11832.54	4	372.23
Arunachal Pradesh	9	6177.45	2	2468.23
Assam	8	990.58	2	930.00
Bihar	19	3881.75	2	567.32
Goa	4	355.78	1	107.00
Gujarat	21	16970.16	4	479.67
Haryana	10	342.65	1	1.43
Himachal Pradesh	30	4702.87	2	1295.0
Jammu & Kashmir	15	10157.67	4	3900.07
Karnataka	20	4238.21	5	2471.98
Kerala	12	2143.36	3	536.52
Madhya Pradesh	32	10567.05	11	6485.72
Maharashtra	25	13995.49	5	958.45
Manipur	1	184.85	2	81.00
Meghalaya	3	34.21	2	267.48
Mizoram	3	560.00	2	250.00
Nagaland	3	24.41	1	202.02
Orissa	18	6214.96	2	1212.70
Punjab	6	294.82	0	
Rajasthan	22	5662.87	4	3856.53
Sikkim	4	92.1	1	850.00
Tamil Nadu	17	2671.03	5	401.63
Tripura	4	603.62	0	
Uttar Pradesh	29	8107.52	7	5429.83
West Bengal	15	1055.55	5	1692.65
Daman & Diu	1	2.18		
Delhi	1	13.20		
Chandigarh	1	25.42		
Dadra & Nagar Haveli				
Lakshadweep				
Pondichery				
Total	448	112,357.86	85	36,171.60

Six internationally significant wetlands of India have been declared as "Ramsar Sites" under the Ramsar Convention. Additionally, eleven wetlands of national importance have been identified for intensive conservation and management, the details of these are given in Table 14. The number can be enlarged based on need assessment.

Table 13 : Biosphere Reserves

Biogeographic Region	Name of the Biosphere Reserve & State/Union Territory	Area in sq. km.	Date of set up
Western Himalaya	Nanda Devi (Uttar Pradesh)	2236.74	18.1.88
North East India	Nokrek (Meghalaya)	80.00	1.9.88
	Manas (Assam)	600.00	14.3.89
	Dibru Saikowa (Assam)	765.00	28.7.97
	Dehang Dibang (Arunachal Pradesh)		
Gangetic Plains	Sunderbans (West Bengal)	9630.00	29.3.89
Coastal	Gulf of Mannar (Tamil Nadu)	10500.00	18.2.89
Western Ghats	Nilgiri (Karnataka, Kerala & Tamil Nadu)	5520.00	1.8.86
Islands	Great Nicobar (Andaman & Nicobar Islands)	885.00	6.1.89
Deccan Peninsula	Similipal (Orissa)	2750.00	21.6.94

Table 14 : Wetlands of National and International Importance

Wetland	State	Area (in ha)
*Chilka	Orissa	114,000
*Harike	Punjab	4,100
*Keoladeo Ghana	Rajasthan	2,873
*Loktak	Manipur	27,600
*Sambhar	Rajasthan	7,200
*Wular	Jammu & Kashmir	18,900
Ashtamudi	Kerala	3,200
Bhoj	Madhya Pradesh	33,000
Kabar	Bihar	6,738
Kanji	Punjab	3,000
Kolleru	Andhra Pradesh	90,000
Nalsarovar	Gujarat	18,400
Pichola	Rajasthan	1,000
Renuka	Himachal Pradesh	670
Sasthamkotta	Kerala	375
Sukhana	Chandigarh	170
Ujni	Maharashtra	35,700

*Ramsar sites

Under the World Heritage Convention, five natural sites have been declared as "World Heritage Sites", the names of which are given in Box 5.

The Tura Range in Garo Hills of Meghalaya is a gene sanctuary for preserving the rich native diversity of wild Citrus and Musa species. Sanctuaries for rhododendrons and orchids have been established in Sikkim. Large mammal species targetted projects based on the perception of threat to them have been under implementation (Box 6).

Box 5 : World Heritage sites

Site	Location
Kaziranga National Park	Assam
Keoladeo Ghana National Park	Rajasthan
Manas Wildlife Sanctuary	Assam
Nanda Devi National Park	Uttar Pradesh
Sunderban National Park	West Bengal

Box 6 : Specific animal species conservation projects

— Projects Hangul, 1970.
— Project Tiger, 1973.
— Manipur Brow-antlered Deer Conservation project, 1973.
— Crocodile Breeding Project, 1975.
— Project Elephant, 1991.