

# Annual Report 1992-93



सत्यमेव जयते

**MINISTRY OF ENVIRONMENT AND FORESTS  
GOVERNMENT OF INDIA**

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Palm Avenue in Indian Botanic Garden, Howrah



# 1. INTRODUCTION AND THE YEAR UNDER REVIEW

## 1.1 ROLE AND ORGANISATION

The Ministry of Environment and Forests is the nodal agency in the administrative structure of the Central Government for the planning, promotion and co-ordination of environmental and forestry programmes. Within the overall framework of its mandate, the main activities of the Ministry are conservation and survey of flora, fauna, forests and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas and protection of environment. These tasks are sought to be fulfilled through environmental impact assessment; eco-regeneration; assistance to organisations implementing environmental and forestry programmes; enactment of environmental legislation; formulation of environmental policies; promotion of environmental and forestry research, extension, education and training to augment the requisite man power; dissemination of environmental information; international cooperation and creation of environmental awareness among all sectors of the country's population.

### 1.1.1 Allocation of Business

The Ministry of Environment and Forests has been allocated the following items of work:

- Environment and Ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas;
- Botanical Survey of India and Botanical Gardens;
- Zoological Survey of India;
- National Museum of Natural History;
- The Water (Prevention and Control of Pollution) Act, 1974;
- The Water (Prevention and Control of Pollution) Cess Act, 1977
- The Air (Prevention and Control of Pollution) Act, 1981;
- The Indian Forests Act, 1927;
- The Prevention of Cruelty to Animal, Act, 1960;
- The Wildlife (Protection) Act, 1972;
- The Forest (Conservation) Act, 1980;
- The Environmental (Protection) Act, 1986;
- The Public Liability Insurance Act, 1991;
- Biosphere Reserve Programme;
- National Forest Policy and Forestry Development in the country, including social forestry;

- Forest policy and all matters relating to forests and forest administration in so far as the Andaman and Nicobar Islands are concerned;
- Indian Forest Service;
- Wildlife Preservation and Protection of Wild birds and animals;
- Prevention of cruelty to animals;
- Central Zoo Authority;
- Fundamental research including co-ordination thereof and higher education in forestry;
- Padmaja Naidu Himalayan Zoological Park;
- National Assistance to Forestry Development;
- National Afforestation and Eco-development Board;
- Central Ganga Authority; and
- Indian Plywood Industries Research Institute, Bangalore.

### 1.1.2 Organisation

The organisational structure of the Ministry indicating various divisions, associated and autonomous offices/agencies is given in Annexure I.

## 1.2 AN OVERVIEW OF THE ACTIVITIES DURING THE YEAR

### 1.2.1 Survey of Natural Resources

#### Flora

- Intensive floral surveys in priority areas of Assam, Aurnachal Pradesh, Andaman and Nicobar Islands, Mizoram, Nagland, Sikkim, Madhya Pradesh and South Western Ghats were undertaken by the Botanical Survey of India (BSI) and critical study and description of about 3212 species collected from such surveys were completed.
- Data/information on 95 species of rare and endangered plants were compiled for inclusion in the Red Data Book of Indian Plants, volume IV.
- Manuscripts on the Mangroves of Andaman and Nicobar Islands, Godavari Delta, Pichavaram and Vembanad lake have been completed.
- Activities relating to identification, nomenclature taxonomic description and enumeration of various species, belonging to several families for State Flora of Assam, Arunachal Pradesh, Nagaland, Mizoram, Sikkim, Andaman & Nicobar Islands, South Western Ghats, Jammu and Kashmir and Madhya Pradesh were completed.

## Fauna

- A total no. of 37 surveys covering 72 districts falling under different eco-systems from various states of the country were conducted by the Zoological Survey of India (ZSI).
- The National Zoological collections were enriched by the addition of 20,688 identified specimen pertaining to 2884 species including 124 new species.
- The first three volumes out of 12 volumes of the fauna of West Bengal have been published.
- Draft manuscripts on the fauna of Sunderban and Simlipal Tiger Reserves have been completed.
- An ENVIS (Environmental Information System) Centre on 'Animal Ecology' has been set up at ZSI.
- Several Environmental Impact Assessment (EIA) studies relating to ecology and wildlife were undertaken by ZSI during the year.

## Forest Survey

- The 3rd cycle assessment of forest cover has been completed and the State of Forest Report 1991 has been published by the Forest Survey of India (FSI) reporting the forest cover of the country as 63.92 million ha. showing an annual increase of 28,000 ha. in the forest cover.
- Thematic maps covering 1616 topographic sheets corresponding to an area of about 9,26,000 kms in the States of Bihar, Madhya Pradesh, Manipur, Orissa, Kerala, Rajasthan, Nagaland, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Himachal Pradesh, Meghalaya, Punjab, Assam, Arunachal Pradesh, Uttar Pradesh, West Bengal and U.T. of Delhi have been covered by FSI so far.
- The inventory of forest resources in Nagaland, Meghalaya, Mizoram, Manipur, Assam, Arunachal Pradesh and Tripura has been completed.

### 1.2.2 Conservation of Natural Resources

#### National Conservation Strategy and Policy Statement on Environment and Development

The National Conservation Strategy and Policy Statement on Environment and Development covering various aspects of environmental concern and action points has been adopted by the Government of India in June, 1992, and the document has been circulated to all the State Governments and concerned Central Departments/Ministries for taking appropriate actions, specially for re-orientation of policies and programmes in conformity with the strategy.

## Biosphere Reserves

A National Committee on Biosphere Reserves has been constituted in place of the existing management councils and Research Committees for individual Biosphere Reserves, to oversee the implementation and monitoring of the Biosphere Reserves Programme.

## Wetlands, Mangroves and Coral Reefs

- A National Committee on Conservation of Wetlands, Mangroves & Corals and a Research Sub-Committee to scrutinise proposals related to Wetlands, Mangroves & Corals have been constituted during the year.
- Management Action Plans for three wetlands viz., Bhoj, Kabar and Kanjli have been sanctioned during the year.
- Six wetlands viz., Chilka, Keoladeo-Ghana National Park, Harike, Loktak, Sambhar and Wular continued to be designated as Wetlands of International importance under 'Ramsar Convention'.
- Out of the 15 identified Mangrove areas, Management Action Plans were sanctioned for four mangrove areas, viz. Goa, Achra/Ratnagiri, Sundarbans and Coondapur.
- Committees have been constituted in the concerned States/UTs for preparation of Action Plans for the conservation of the coral reefs in four areas of the country viz., Gulf of Mannar, Gulf of Kutch, Andaman & Nicobar Islands and Lakshadweep Islands.
- A booklet on India's Wetlands, Mangroves and Coral reefs has been prepared in collaboration with WWF - India.

## Bio-diversity Conservation

- India is now a signatory to the Convention on Biological Diversity which the Government had signed along with 155 other nations during UNCED Earth Summit, held at Brazil.
- A Core Group has been constituted to initiate, guide and supervise all activities related to conservation of Bio-diversity.
- Action has been initiated to prepare a comprehensive status report covering various facets of bio-diversity.

## Assistance to Botanic Gardens and Field Centres

Financial assistance was provided to four Botanic Gardens located in different phyto-geographic regions during the year for augmenting their activities in conservation and protection of plant genetic resources.

## Forest Conservation

- The Forest (Conservation) Rules, 1981, have been

amended to further decentralise and streamline the examination of proposals received from State Government and project authorities.

- The Regional Chief Conservator of Forests have been delegated with powers to decide proposals involving forest land upto 5 ha., while proposals involving 5-20 ha. of forest land are to be processed by the Regional Chief Conservator in consultation with the State Advisory Group. Proposals involving more than 20 ha. of forest land will be decided by the Central Government.
- Out of 5104 proposals received for forest clearance, 2591 have been approved.
- With a view to amend the Indian Forest Act, 1927, a draft of the revised legislation has been prepared and circulated among the State Governments for obtaining their views.
- As a follow-up of Government of India guidelines to the State Governments to involve village communities and voluntary organisations in protection and regeneration of degraded forests on the basis of sharing of forest produce, 11 States have issued usufruct sharing orders.
- A new scheme to associate Scheduled Tribes and Rural poor in regeneration of degraded forests on usufruct sharing basis, has been launched and is being implemented through the State Forest Departments.
- Under National Forestry Action Programme, an integrated perspective programme for the long and medium term development of forestry sector at National and State level is being prepared.
- Under the Modern Forest Fire Control Methods project, 11 States have been selected for providing assistance for major items like use of hand tools, wireless communication sets, watch towers, fire resisting clothing etc.

#### Wildlife Conservation

- The network of protected areas in the country now comprises 75 National Parks and 421 Wildlife Sanctuaries covering an area of 1,40,675.46 Sq. Kms.
- Consequent to the amendment of the Wildlife (Protection) Act, 1972, a Central Zoo Authority has been established to support, oversee, monitor and co-ordinate the management of Zoos in the country.
- The Zoo Authority has finalised and notified the Rules for recognition of the Zoos which also stipulates the standards for upkeep, maintenance and veterinary care of the Zoo animals.
- As per the decision of the National Development Council, the Centrally Sponsored Scheme "Control of poaching and

illegal trade in wildlife" has been transferred to the States.

- With the inclusion of the Pench National Park, Madhya Pradesh as a Tiger Reserve, the number of Tiger Reserves in the country has gone up to 19 covering over 29,716 Sq. Kms of forest area.
- To commemorate the completion of 20 years of 'Project Tiger' programme an International Symposium on Tiger was arranged and activities like seminars, photographic exhibition etc. were arranged around tiger reserves to educate the people in wildlife conservation and dissemination of the message of Project Tiger.
- Assistance has been provided to the State Governments for initiating monitoring and evaluation of seven Tiger Reserves by independent agencies.
- Nature Interpretation Centres are being developed at Ranthambore, Kalakkad, Buxar, Palamau and Sariska Tiger Reserves.
- A Steering Committee under the Chairmanship of the Minister for Environment and Forests has been constituted for supervising and guiding the implementation of the Project Elephant which has taken of this year.
- Activities relating to conservation of rare and endangered species by captive breeding were continued by National Zoological Park, New Delhi.
- Fifteen States have notified the formation of State Advisory Boards and 26 States/UTs have appointed nodal officers for animal welfare activities under the Prevention of Cruelty to Animals Act, 1960.

#### 1.2.3 Environmental Impact Assessment

- A notification on Aravalli range covering Gurgaon and Alwar Districts of Haryana and Rajasthan, has been gazetted on 7th May, 1992, to regulate developmental activities in specific areas of the two districts.
- A revised draft notification has been issued in January, 1993 indicating the Governments' intention to make environmental impact assessment a statutory requirement for all projects both in the public and private sectors.
- Out of 247 projects appraised during the year in various sectors, 101 projects were granted environmental clearance, 29 projects were rejected and additional information has been sought for the remaining projects.
- An independent review of the Sardar Sarovar Project commissioned by the World Bank has recommended that detailed assessments of social, human and environmental impacts need to be carried out for the project.
- A Task Force has been constituted to examine the coastal zone management plan prepared by some of the

States/UTs as per the Coastal Regulation Zones guidelines, notified by the Ministry.

- Studies on carrying capacity of Doon Valley, Damodar Basin and the National Capital Region to be implemented by a network of institutions have been sponsored.

#### 1.2.4 Control of Pollution

##### Control of Water, Air and Noise Pollution

- A notification making environmental audit mandatory has been issued during the year. This requires all industries applying for environmental clearance to submit an annual environmental audit report to the concerned State Pollution Control Board.
- Environmental audits of 56 industrial units belonging to the 17 heavily polluting industrial sectors have been completed by the Central Pollution Control Board (CPCB) and 90 more units have been identified for such studies.
- Action has been initiated to produce a computerised map of the critically polluted areas through digitisation to provide thematic information on pollution status particularly for air and water.
- The Water (Prevention and Control of Pollution) Cess Amendment Act, 1991, was brought into effect from January 1992, whereby Cess charges on water consumption have been increased to encourage conservation.
- Under the scheme of 'Labelling of Environment Friendly Products', 16 items of house-hold and other consumer products have been identified and final notifications on soaps and detergents, papers & paints have been notified. Ten more draft notifications have been prepared for inviting public comments/suggestions. An eco-logo, an 'Earthen Pot' has also been notified.
- A scheme on 'Adoption of Clean Technology' to the small scale industries and to extend necessary technical support has been approved by the Ministry.
- The consent format which used to be prescribed separately in the Water and Air Act earlier, has been merged and a new format for the consent application and for authorisation required under the Environment (Protection) Act, 1986, has been developed and notified during the year.
- The network of 480 stations continued to monitor the quality of water of the aquatic resources of the country under Global Environmental Monitoring Systems (GEMS), Monitoring of Indian National Aquatic Resources (MINARS) and Ganga Action Plan (GAP) programmes.
- Four Automatic Water Quality Monitoring Stations one

in Kannauj, 2 in Kanpur and one in Patna have been installed and made operational to monitor the quality of the river Ganga continuously.

- A total of 590 highly polluting industries have been identified in the Ganga basin including its tributaries to control pollution of the river water.
- The progress in abatement of pollution in the 19 critically polluted areas identified earlier was reviewed during the year and an interim report for nine areas has been prepared.
- Action Plans have been prepared in consultation with the State Governments for control of pollution in the identified 17 categories of heavily polluting industries.
- Environmental standards for six industrial categories viz., dairies, tanneries, natural rubber processing, bagasse fired boilers and ceramic were notified during the year.
- Silence Zones have been declared in metropolitan cities to check noise pollution and noise standards for various machinery and house-hold equipments have also been notified. In case of automobiles, these standards are effective for vehicles manufactured after 31/12/92.

##### Management of Hazardous Substances

- A centrally sponsored scheme is being implemented with the objective of creating infrastructure in the State Pollution Control Boards to regulate the management of hazardous substances handled by hazardous industries.
- Off-site plans are being prepared for nine selected districts for analysing hazards and to plan mitigative measures. A manual on Emergency Preparedness Plan for chemical hazards has also been published by the Ministry.
- A publication titled "A guide to Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 was released and two guides one on 'Vulnerability Analysis of Eight Extremely Hazardous Substances' and the other on 'Safe Road Transport of Hazardous Chemicals' have been finalised.
- A scheme to establish Emergency Response Centres (ERC) for major industrial processes in selected states has been finalised and three such ERCs are being considered to be set up in Bhopal (MP), Thane-Belapur (Maharashtra) and Manali (Tamil Nadu).
- Basel Convention for Trans-boundary Movement of Hazardous Wastes and other Wastes was ratified during the year.
- Amendment to Hazardous Waste (Management and Handling) Rules, 1989, have been prepared to reflect the



views of the implementing agencies and the provisions of the Basel Convention.

- An Approach Paper on National Register of Potentially Toxic Chemicals (NRPTC) has been prepared with a view to set up the basic infrastructure for implementing the London Guidelines for the exchange of information on chemicals in international trade including the procedure for Prior Informed Consent. A training workshop was also held in this regard in February, 1993.
- The National Waste Management Council has been reconstituted during the year under the chairmanship of the Minister for Environment and Forests. A workshop on waste management in urban areas was held with various agencies including municipalities.
- Final summary report of the project sponsored by the Scientific Commission for continuing studies on the "Effect of Bhopal Gas Leakage on Life System and Environment" has been prepared and circulated to the concerned Ministry for comments.
- Certain specified major accident hazardous installations were visited to gauge the status of implementation of the Rules notified by the Ministry.
- A survey of site for disposal of hazardous waste was undertaken during the year and 10 sites in different states have been identified for preparation of secured land fills for disposal of hazardous waste.

### 1.2.5 Regeneration and Development

#### Ganga Action Plan

- Out of a total of 261 schemes sanctioned under Phase I of the Ganga Action Plan, 192 schemes have been completed so far of which 80 are in Uttar Pradesh, 35 in Bihar and 77 in West Bengal.
- Infrastructure capable of intercepting and diverting 485 mld of domestic sewage and treating 223 mld of municipal sewage has been created so far under Phase I of the Ganga Action Plan.
- Out of 264 polluting industries which discharge their effluents into the river Ganga and its tributaries, 68 grossly polluting units have been monitored for installation of effluent treatment plants. At present 43 units have set up Effluent Treatment Plants (ETPs), Seven are in the process of installation, 10 have been closed down and prosecution has been launched against 8 units.
- The Second Phase of Ganga Action Plan has been approved under which pollution abatement of Yamuna and Gomti rivers will be taken up.

- An Approach Paper with tentative cost estimates has been prepared on the National River Action Plan for taking up pollution abatement activities in other grossly polluted stretches of the major rivers of the country.

#### Afforestation and Eco-development

- A "National Afforestation and Eco-development Board (NAEB)" has been constituted in the Ministry for promoting afforestation, tree-planting, eco-restoration and eco-development activities in the country.
- The erstwhile National Wastelands Development Board has been transferred to the Ministry of Rural Development.
- Various centrally sponsored schemes to promote afforestation, wastelands development, fuelwood and fodder production, conservation of minor forest produce, aerial seeding etc., were continued.
- Seven Regional Centres set up by the Board under National Social Forestry Project continued to provide support to the State Governments in preparing projects for afforestation and eco-development with people's participation.
- Nine fellowships were awarded to journalists during the year to publicise success stories of Indira Priyadarshini Vrikshamitra Awardees.
- With the setting up of the NAEB, the National Fund for Afforestation and Wastelands Development has been redesignated as the National Fund for Afforestation and Eco-development. The Fund is managed by a committee headed by the Minister for Environment & Forests.
- During the year, processing of satellite data, ground truth verification and preparation of master copies of the Wastelands maps for 84 selected districts were completed.
- The pilot phase of the Geographical Information System (GIS) project taken up earlier to promote the use of GIS technology for land use management and wastelands development has been completed.
- Computerised reports containing detailed district/taluk wise information on afforestation/ tree-planting activities for 24 States have been published by the Board.

#### Other Activities on Eco-regeneration

- The three Eco-Task Forces of ex-servicemen deployed in the states of Uttar Pradesh, Rajasthan and Jammu & Kashmir continued their activities related to afforestation, pasture development, soil and water conservation and eco-regeneration in selected environmentally degraded areas.

## 1.2.6 Research

### Environmental Research

- During the year, 50 new projects were sanctioned and 18 projects were completed under the three major research schemes viz., Man and Biosphere Programme, Environmental Research Scheme, and the Integrated Action Oriented Research Demonstration and Extension Programmes on Eastern and Western Ghats.
- The Co-ordinated project on National Methane Campaign in which nearly 15 institutions of the country participated has been completed.
- All reports from 29 different sub-projects under the Integrated Action Oriented Programme on River Kaveri have been received and the final technical Report of the project is under finalisation.
- The G.B. Pant Institute of Himalayan Environment and Development continued its research and development activities aimed at promoting ecologically sound development actions in the Himalayan region.
- A unit of the Institute has been set up in Kullu to facilitate R&D activities in the Western Himalayan Region.
- A comprehensive document titled "Action Plan for the Himalayas" has been brought out by the Institute during the year.

### Research on Wetlands, Mangroves and Biosphere Reserves

- The Ministry continued to sanction research projects to selected nodal institutions/universities to provide scientific inputs for the conservation and management of wetlands, mangroves and biosphere reserves of the country.
- The Research Sub-committee under the National Committee on Conservation of Wetlands, Mangroves and Coral Reefs recommended three research projects on mangroves during the year.

### Forestry Research

- The Indian Council of Forestry Research and Education (ICFRE) continued to undertake, promote and co-ordinate research, education and extension programmes in forestry and its associated fields.
- All the eight research institution and centres under the ICFRE continued to cater to the research needs of the different eco-climatic zones in which they are located.
- A new centre viz "Advanced Centre for Forest & Environment" has been set up during the year at Allhabad by the ICFRE.

- The Indian Plywood Industries Research Institute (IPIRI) also continued its 42 on-going research projects relating to plywood. A Bamboo Mat Board was developed by the Institute to replace plywood and other wood-based panels.

### Wildlife Research

- The Wildlife Institute of India (WII) continued its 16 on-going research projects dealing with the biology, ecology and management of endangered species, management of montane grasslands, strengthening of national wildlife data base etc.
- Five new research projects in developing wildlife techniques and behavioural ecology of some species have been approved during the year and three studies on ecology of swamp deer, conservation of Malabar civet and crop damage problems by nilgai have been completed by the Institute.
- A computerised data base containing information on the network of protected areas, status of threatened species and bibliography of wildlife literature has been developed by the WII.
- The Salim Ali Centre for Ornithology and Natural History, an autonomous organisation of the Ministry, initiated 12 research projects in the fields of Ornithology and Natural History in different parts of the country.

### National Natural Resource Management System (NNRMS)

- Out of 13 projects sanctioned under the NNRMS programme, eight projects have so far been completed. Four more new projects have also been recommended by the Standing Committee on Bio-resources and Environment under the programme.

### Research in the Ganga Action Plan

- Several research projects and studies on various topics such as water quality and pollution monitoring, resource recovery, bio-monitoring & conservation, rehabilitation of turtles, bio-diversity, conservation of Gangetic dolphins etc., were continued and new ones were also initiated during the year under the Ganga Action Plan Research programme.
- Three new and unconventional technologies for treating sewage through plantation, vermiculture and aquaculture are being studied, with a view to finding alternatives for sewage treatment plants.

## 1.2.7 Education and Information

### Forestry Education and Training

- The Indian Council of Forestry Research and Education

(ICFRE), the focal point for forestry research, education and extension, besides carrying out these activities directly, continued to provide financial assistance to State Universities and Research Organisations to undertake activities related to forestry education and research.

- The Forest Research Institute (FRI), Dehradun, registered 40 research scholars for doctoral degree and admitted 21 students for one year Post-Graduate diplomas in Plantation, Wood Science and Paper Technology.
- The Indian Plywood Industries Research Institute, Bangalore, conducted eight short-term courses in wood processing and a certificate course in mechanical wood industries' technology.
- The Indian Institute of Forest Management (IIFM), Bhopal, organised 14 Management Development Programmes and undertook 14 research projects on various ecological and socio-economic issues. The Institute also conducted Post-Graduate Diploma courses in Forest Management.
- The Indira Gandhi National Forest Academy (IGNFA), Dehra Dun, continued to impart initial inservice training to IFS probationers.
- The three State Forest Service Colleges located at Dehradun, Burnihat and Coimbatore continued to impart the 2-year inservice training to officers of the State Forest Services (SFS).
- The Directorate of Forest Education organised 10 inservice 2-week training courses and a six-months special Diploma Course in Social Forestry for SFS Officers at different SFS colleges at Dehradun, Coimbatore and Burnihat.
- In addition to 44 one-week programmes, 13 three-week compulsory training orientation programmes were organised during the year by the Ministry for IFS Officers at various places throughout the country, covering almost 60% of the total IFS Cadre strength.
- The first All India Forest Sports & Games Meet was held in Hyderabad in February 1993, the focus being on fitness of the personnel.

### Wildlife Education and Training

- The Wildlife Institute of India (WII), Dehradun, organised several capsule, certificate and diploma courses on various themes related to Wildlife management for forest officers, field directors, Chief Wildlife Wardens, etc.
- The Institute also organised workshops and seminars on Strategic Planning on Wildlife Management, Park Area Management, Field Research Methods for Park Area Managers, etc. during the year.

### Non-formal Environmental Education

#### National Environment Awareness Campaign

- The National Environment Awareness Campaign-1992 was organised with "Biodiversity" as its main theme and around 1200 organisations comprising of NGOs, schools and colleges, universities, research organisations, women and youth organisations, etc. from almost all states and universities were supported to organise various activities aimed at creating environmental awareness among different target groups of the country's population.
- The Centre for Environment Education (CEE), Ahmedabad, continued its programme of teacher training and strengthening of school and NGO clusters under the NEAC.
- Besides conducting several orientation programmes for school children and teachers, the CPR Environmental Education Centre, Madras organised a mobile exhibition in a video van which travelled to various villages of Tamil Nadu and Pondicherry spreading the message of environmental conservation during the campaign.
- The National Museum of Natural History (NMNH) organised Teacher Orientation Workshops and a number of environmental educational programmes under the NEAC. The NMNH also organised a National Contest entitled "Care for the Environment" which attracted more than 2 lakh entries in six categories in 14 major Indian languages and English from all over the country. Prizes were awarded to the winners in two categories under the contest during the year.
- Seven documentary films on environmental themes were completed and about 60 films were supported for production during the year by the Ministry.
- Two sets of 10 cinema slides on environmental themes in different languages have been prepared and forwarded to the Governments of all States/Union Territories for displaying in cinema halls, video parlours, etc.
- A project for spreading environmental awareness through publicity on environment slogans on bus panels of 1000 buses of M.P. State Road Corporation was undertaken.

#### Paryavaran Vahini Scheme

- A new scheme entitled "Paryavaran Vahini" has been launched during the year with a view to involve students, youth and the general public in activities related to environmental conservation and protection. Such Vahinis have been constituted in 100 districts identified on the basis of high incidence of pollution, and density of tribal and forest population. Each Vahini consisting of 20

members from students, youth, individuals and NGOs are functioning under the charge of District Collectors of the States/UTs concerned.

### Centres of Excellence

- The two Centres of Excellence on environment education viz, Centre for Environment Education (CEE), Ahmedabad and the C.P.R. Environmental Education Centre (CPREEC), Madras continued their activities relating to the development of environmental educational resource materials, organisation of training and interpretation programmes, exhibitions and creation of environmental awarenees among all sections of the society.
- The country paper for the United Nations Conference on Environment and Development titled "Environment and Development: Traditions, Concerns and Efforts in India" was prepared by the CEE, Ahmedabad.
- A soil testing kit and a low cost biological treatment of tannery effluents have been developed by the CPR EEC, Madras.
- The Ecological Research and Training Centre (ERTC), Bangalore, continued to focus on research work related to ecology and environment of Western Ghats. Besides, the Centre also organised workshops/training programmes on relevant subjects and published books, technical papers and popular articles on various aspects of Western Ghats.
- The Centre for Mining Environment, Dhanbad, continued its M.Tech. Programme with revised syllabus. Besides, the Centre also coordinated several research projects on various environmental aspects in mining.
- The Salim Ali Centre for Ornithology and Natural History has initiated about 11 research projects on several aspects of ornithology and natural history of other life-forms in different parts of the country.

### National Museum of Natural History

- The National Museum of Natural History (NMNH), New Delhi organised an exhibition on "Environment and Development" at the Teen Murti Lawns to commemorate the 103rd Birth Anniversary of Pt. Jawaharlal Nehru, in which several Government Departments, institutes, museums and NGOs also participated. The Museum also organised an exhibition on Tiger in collaboration with Project Tiger Directorate to commemorate 20 years of Project Tiger.
- During the year, the NMNH continued its regular educational activities, summer programmes, poster, paintings and modelling contests, special museum programmes for handicapped children and teacher

orientation workshops. In addition, the museum also conducted the nation-wide 'Care for Environment Contest' launched by the Ministry during the year.

- Academic collaboration with the Delhi University and the National Museum by conducting lectures and practical classes on environment and museum related subjects was also continued by the NMNH.
- Construction and development of a museum complex at Mysore has been completed. Land for two more Regional Museums - one at Bhubaneswar and the other at Bhopal has been acquired.
- During the year, the Pitambar Pant Environment Fellowship for the years 1990, 1991 and 1992 were awarded to Dr. C.J. Saldanha, Dr. (Mrs.) P. Mohanty Hejmadi and Dr. T.N. Ananthakrishnan respectively in recognition of their valuable contributions in the field of environmental sciences.
- Work relating to the selection of awardees for the Indira Gandhi Paryavaran Puraskar, Indira Priyadarshini Vrikshamitra Awards, National Award for Prevention and Control of Pollution and Desert Ecology Fellowship is in progress.

### Environmental Information

- Environmental Information System (ENVIS) continued its activities relating to collection, collation, storage, retrieval and dissemination of environmental information to all concerned.
- With the setting up of four more ENVIS Centres in the areas of "Himalayan Ecology", "Animal Ecology", "Solid Wastes Disposal" and "Environmental Problems of Mining", the ENVIS network has been expanded and consists of 17 subject oriented centres as network partners.
- The existing documentation continued to be enriched by the procurement of several documents on various environmental themes by the focal point at the Ministry as well as through the documentation support provided by the ENVIS network partners.
- A total of around 4984 environmental queries were responded to by the ENVIS focal point and its network partners during the year, out of which 4382 were national, while 602 were international queries.
- The quarterly journal "Paryavaran Abstracts" reporting environmental research in the Indian context continued to be published by the ENVIS Focal Point and four such issues containing about 1200 abstracts were published during the year.
- ENVIS focal point continued to function as a National Focal Point (NFP) and a Regional Service Centre (RSC) for

the South Asia Sub-region countries of INFOTERRA network of United Nations Environment Programme (UNEP). During the year, ENVIS also organised a Regional INFOTERRA workshop in which officials from the NFPs of Sub-region countries and INFOTERRA/PAC participated.

### 1.2.8 Legislation and Institutional Support

- The Public Liability Insurance (PLI) Act, 1991 has been amended to limit the liability of the insurer and to provide for creation of an Environmental Relief Fund. Powers under Sections 13 and 18 of the PLI Act are being delegated through a Gazette Notification.
- The Rules for the manufacture, use, import, export and storage of hazardous micro-organisms, genetically modified organisms of cells, 1989 have been revised.
- A new format for the consent application has been developed and notified on 31st March, 1992.
- As per a Notification issued on 12th February, 1992 under the Environment (Protection) Act, 1986, all polluting units are required to meet the prescribed standards within a given time frame.
- The general effluent standards notified in September, 1988 has been amended and a notification has been issued on 1st October, 1992 under the Environment (Protection) Act, 1986.
- A Notification making environmental audit mandatory for all industries has been issued.
- A Bill has been introduced in the Parliament in August, 1992 for setting up National Environment Tribunals and expeditious disposal of cases regarding compensation to accident victims of hazardous substances.
- A Notification has been gazetted for the districts of Gurgaon in Haryana and Alwar in Rajasthan for regulating the developmental activities in the Aravalli Range.
- A Notification making environmental impact assessment a statutory requirement for all projects both in the public and private sector has been issued on 28th January, 1993.
- Out of 5630 cases filed by the State Pollution Control Boards under the Water and Air Acts, 1942 have been decided, 209 were dismissed and 3479 cases are pending in various courts.
- The scheme of assistance to State Pollution Control Boards and State/UT Departments of Environment for strengthening their manpower and procurement of equipments was continued.

### 1.2.9 International Co-operation

- The Ministry continued to function as the nodal agency in the country for UNEP, SACEP, ICIMOD and IUCN and participated in several international agreements and conventions related to environmental protection.
- The Indian delegation, led by the Minister of Environment and Forests participated actively in the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in June, 1992.
- India has signed the framework convention on climate change and the convention on Conservation of Biological Diversity during the Rio conference.
- India has also acceded to the Montreal Protocol on substances that deplete the ozone layer. The provisions of the Montreal Protocol as amended in London, are effective for India w.e.f. 17.9.92. During the Fourth Meeting of the Parties to the Montreal Protocol held at Copenhagen in Nov. 92, the Minister for Environment and Forests has been elected as the Chairman of the Conference of the Parties to the Protocol.
- The Ministry and its agencies have undertaken several projects under bilateral and multi-lateral agreements of cooperation with the World Bank, FAO, UNDP, WHO, EEC, SAARC, UNEP, Canada, USA, Denmark, Sweden, Norway, U.K. FRG, etc.
- A MOU has been signed between Canada and India for two projects- 'Eco-restoration of Chilka Lake' and the 'Tree Growers Cooperative Projects'.
- Four Projects, two each in the States of Karnataka and Tamil Nadu, are under active consideration for support under the Indo-Danish bilateral programme.
- Besides supporting two major projects, it has been agreed that German assistance would be expanded to cover new areas such as forest research, clean technologies and industrial pollution control.
- Two afforestation projects one along Indira Gandhi Canal and the other at Aravalli Hills have been taken up under Overseas Economic Cooperation Fund (OECF) assistance.
- A soft loan of Rs. 402 crores has been pledged by the Japanese Government for pollution abatement of the river Yamuna under Yamuna Action Plan.
- A special session was held in Pakistan during the year to give thrust and propose modalities for implementing 13 priority areas of cooperation for SAARC member countries for effective management of environment and natural disasters through mutually agreeable financial and institutional mechanisms.

- Under technical cooperation programme of the FAO, an agro-forestry project has been approved under which FAO would be assisting in introducing Agro-forestry Land Use System in Chindwara district of Madhya Pradesh.

### 1.2.10 Administration, Plan Coordination and Budget

#### Administration

- In accordance with the revised recruitment rules for Group 'A' scientific posts, direct recruitment of four Group 'A' Scientific posts in the Ministry and its associated offices was made.
- Under the Flexible Complementing Scheme, 19 Group 'A' Scientific Officers were promoted to the next higher grade.
- A 15 days full time training course on the "Management of Natural Resources and Environment" for senior officers of Government Departments to familiarise them with the basics of ecology, environment and sustainable development has been finalised to be conducted by the Indian Institute of Public Administration, New Delhi.
- Sixty-eight IFS Officers were appointed during the year.
- One hundred and eighteen vacancies have been identified for the special drive to fill up backlog of SC/ST vacancies for Group 'A', 'B' 'C' and 'D' posts in the Ministry and its associated offices.
- The commencement of working of the Grievance Cell in the Ministry has been widely publicised and its telephone number notified in major newspapers. 330 complaints were dealt with, during the year by the Cell.

- During the year 3 employees passed Hindi Typewriting, one Hindi Stenography and one each in Hindi Prabodh, Praveen and Pragma examination under the Hindi Teaching Scheme.
- Hindi week was organised from 14th to 19th Sept., 1992 during which various competitions in proficiency and use of Hindi were held and prizes distributed to the winners.
- The quarterly journal 'Paryavaran' in Hindi continued to be published by the Ministry.
- The Civil Construction Unit (CCU) of the Ministry has taken up 44 new schemes so far with an estimated cost of Rs. 40 crores.
- Construction of quarters for ICFRE and ZSI at Dehradun, Regional Museum of Natural History at Mysore, and an additional floor of laboratory for ICFRE at Coimbatore were completed by the CCU during the year.
- The Recreation Club continued its activities relating to organisation of sports events, tournaments and Sports Day of the Ministry.
- Various competitions and cultural programmes were organised on the occasion of the Annual Day of the Ministry on 9th January, 1993.

#### Plan Coordination and Budget

- The Budget Estimate (Plan) and Revised Estimate (Plan) of the Ministry during 1992-93 was Rs. 280.00 crores and Rs. 266.44 crores respectively. The Budget allocation (Plan) for 1993-94 of the Ministry has been decided at Rs. 318.00 crores.

## 2. SURVEY OF NATURAL RESOURCES

### 2.1 SURVEY OF FLORA

**2.1.1** The Botanical Survey of India (BSI) was established in 1890 with the objectives of surveying and identifying the plant resources of the country. The Survey has its headquarters at Calcutta and nine circles located in different phytogeographical regions of the country.

**2.1.2** The activities of BSI during the year were as follows:

#### 2.1.2.1 Survey of Floral Resources

The BSI undertook intensive surveys in the priority areas in order to collect, identify and document the plant resources. During the year, the following areas were surveyed:

- Assam
- Arunachal Pradesh
- Andaman & Nicobar Islands
- Mizoram
- Madhya Pradesh
- Jammu & Kashmir
- Nagaland
- Sikkim
- South Western Ghats

During the year, critical study and description of about 3212 species collected from the States of Assam, Arunachal Pradesh, Andaman & Nicobar Islands, Mizoram, Madhya Pradesh, Jammu & Kashmir, Nagaland, Sikkim and Karnataka were completed.

#### 2.1.2.2 Rare and Endangered Species

Compilation of data on 95 species of rare and endangered plants has been completed for inclusion in the Red Data Book of Indian Plants Vol. IV.



Fig. 1 An Ornamental Garden Plant



Fig. 2 *Primula* species in Valley of Flowers

Evaluation of three less known useful plants has also been completed by BSI during the year.

#### 2.1.2.3 Studies on Selected Fragile Eco-systems

Manuscripts on the mangroves of Andaman & Nicobar Islands, Godavari Delta (Andhra Pradesh) Pichavaram at Point Calimer (Tamil Nadu), and Vembanad Lake (Kerala) have been completed and steps are being taken for their publication.

#### 2.1.2.4 National Flora and State Flora-Identification and Taxonomy

##### National Flora

- Revisionary studies of about 100 species belonging to the genera *Tetramelas*, *Pedilanthus*, *Cynadenium* and the families Rhizophoraceae, Hamamelidaceae, Callitricaceae, Droseraceae and Leguminosae (in part) Verbenaceae were completed.
- Introductory chapters of the manuscript on the phytogeography of Andaman & Nicobar Islands and South Western Ghats are being completed. Publication of the History of Botany in India (Exploration-Floristic and Herbal) has been undertaken. In this regard, information for Madhya Pradesh and Bihar have been compiled.

##### State Flora

- Identification of 288 species and description and nomenclature updating of 125 species belonging to



Fig. 3 Cactus in profused bloom



- families Dicapetalaceae, Opiliaceae, Papilionaceae and Ligaceae etc. were completed for the flora of Assam.
- Identification and nomenclature of 1286 species belonging to 60 families - Primulaceae, Podestemmaceae, Myristicaceae, Araceae, Moraceae, Giglandaceae etc. were completed. In all about 2,500 species have been completed in all respects for flora of Arunachal Pradesh. One volume of the proposed State Flora Analysis of Arunachal Pradesh has also been finalised.
- Seventy species of Paaceae have been worked out in all respects; 72 illustrations of different species of different families were drawn and preparation of keys to genera and species for Vol. I has been taken up for the flora of Nagaland.
- Taxonomic description of 269 species belonging to the families Caayophyllaceae, Convulvulaceae, Solanaceae etc. were written for the flora of Mizoram.
- Checklist of 227 species belonging to nine families were prepared; 150 species were studied in all respect, for the flora of Sikkim.

- Work on taxonomic description, nomenclatural citation and keys to the genera and 416 species belonging to the families Menispermaceae, Capparaceae, Caoralpinaceae, Poaceae, Ulmaceae etc. were completed. Identification of about 126 species were completed for the flora of Andaman & Nicobar Islands.
- Identification and enumeration of 725 species were completed for the flora of South Western Ghats.
- Studies on critical identification of 212 species were completed for the flora of Jammu & Kashmir.
- Taxonomic description, key to the genera of species of 135 species were completed for the flora of Madhya Pradesh.

#### 2.1.2.5 Publications

- Bladderworts of India
- Sea grasses of Coromandal Coast, India
- Bulletin of the B.S.I., Vol 31 & 32
- Vanaspativani (Hindi) No.3



Fig. 4 Wild *Pandanas* in Andamans



Fig. 5 The Indian Coral Tree in Flower (*Erythrina indica*)

- Economic plants of India Vol.2
- Annual Reports (Bilingual) 1988-89
- Flora of Bilaspur - Vol.2
- Flora of Rajasthan - Vol.3
- Flora of Taroba National Park
- Flora of Madhya Pradesh Vol. 1
- Flora of Mahabaleshwar Vol. 1
- Flora of Raigad Dist. Maharashtra
- Bi-centenary of the Indian Botanic Garden
- Red Data Book Vol. 4

## 2.2 SURVEY OF FAUNA

**2.2.1** The Zoological Survey of India (ZSI) with its headquarters at Calcutta and 16 regional stations located in different parts of the country was established in 1916 with the main objective of carrying out surveys of the faunal resources of the country. While continuing its survey work all over the country, ZSI emphasized intensive survey of the North-Eastern states during the year in pursuance of national emphasis on 'Conservation of Bio-diversity'.

**2.2.2** The activities of ZSI during the year were as follows:—

### 2.2.2.1 Exploration and Survey of Faunal Resources

- **Ecosystem survey:** A total of 37 surveys covering 72 districts falling under different ecosystems were conducted.
  - **Tropical rain forest ecosystem:** Surveys in parts of Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim were conducted.
  - **Himalayan ecosystem:** Surveys were conducted in Uttar Pradesh (Dehradun, Pauri and Tehri districts), Himachal Pradesh (Kullu, Mandi and Shimla districts) and Sikkim.
  - **Desert ecosystem:** Parts of Gujarat (Ahmedabad, Banskantha, Gandhinagar, Khed, Mehsana, Sabarkantha and Surendranagar) were surveyed.
  - **Estuarine ecosystem:** Mahanadi estuary (Orissa) and parts of Hooghly estuary were surveyed. A document on Rushikuliya Estuary, Orissa, has been published.
  - **Freshwater ecosystem:** Surveys included the exploration of Kolleru Lake (Andhra Pradesh), Ujni Wetland (Maharashtra), Loktak Lake (Manipur) and Renuka Sanctuary and wetland conservation area.

— **Marine ecosystem:** Andaman & Nicobar Islands (Great Nicobar, Little Nicobar and South Andaman) and East Coast (Kakinada to Gopalpur) were surveyed. The Andaman & Nicobar Regional Station continued intensive and extensive survey of the island ecosystem.

#### 2.2.2.2 Status Survey of Endangered Species

Status survey of two species of Non-Human Primates, *Hoolock gibbon* and Capped Langur was conducted in Meghalaya. Reports on the current status of Golden Langur, Phayres Leaf Monkey and Hispid Hare have been finalised.

#### 2.2.2.3 Faunistic Studies

##### State Fauna

- **Fauna of West Bengal:** The first three volumes out of 12 volumes of the fauna of West Bengal have been released during the year.
- **Fauna of Meghalaya:** Studies on Annelida, Insecta (Colembola, Dermaptera, Hemiptera, Coleoptera, and Diptera), Oribatid mites (Acarina) and Crustacea are in progress; information and material on various groups of

animals available in the survey have been sorted out and collated.

- **Fauna of Tripura:** Studies on Insecta (Odonata, Isoptera, Orthoptera and Coleoptera), Oribatid mites and selected vertebrate groups were completed.
- **Fauna of Sikkim:** Studies were conducted on Mollusca, Insecta (Lepidoptera), Acarina (mites), Crustacea (Ostracoda) and Pisces. A wealth of information on the fauna of the State has been collected for inclusion, in the state fauna of Sikkim.
- **Fauna of Madhya Pradesh:** Studies were conducted on Mollusca, Insecta (Lepidoptera), Crustacea (Ostracoda), Acarina (mites) and Pisces on the basis of material collected by various survey teams.
- **Fauna of Tamil Nadu:** Materials on Sipuncula, Annelida, Insecta (Hemiptera, Lepidoptera, Coleoptera, Diptera), Millipede and Amphibia were studied.
- **Fauna of Gujarat:** Studies were conducted on Annelida (Polychaeta), Sipuncula, Echinodermata, Insecta (Orthoptera and Coleoptera), Acarina, Amphibia and Mammalia.



Fig. 6 Wild Mushroom



Fig. 7 Scorpion - Commonly occurring Arachnid

— **Fauna of other States:** The survey of Uttar Pradesh (excluding districts already included under Himalayan ecosystem) covering Badaun, Etawah, Farrukhabad, Hamirpur, Jalaun, Jhansi, Lalitpur and Shahjahanpur was conducted. Scientific investigations and surveys were also conducted in Palamau, Ranchi and Sighbhum areas of Bihar, Nagarjun Sagar in Andhra Pradesh and North Kanara and South Kanara districts of Karnataka.

— **Fauna of Biosphere Reserves:** Identification of Insecta (Odonata, Orthoptera and Diptera) and Crustacea (Cladocera) from Nilgiri Biosphere Reserve was completed and invertebrate collections of Nanda Devi Biosphere Reserve are being studied.

— **Fauna of National Parks and Tiger Reserves:** Draft manuscripts on the fauna of Sunderban and Similipal Tiger Reserves have been completed. Pisces of Dudwa National Park have been studied. Activities for bringing out specific conservation area document for conservation areas viz. Ranthambore, Sariska, Kanha and Hazaribagh are being initiated.

— **Fauna of Estuarine Ecosystem:** Studies were conducted on the Annelida (Polychaeta) and Pisces of Mahanadi estuary. Zooplankton samples collected during Chilka Lake Expedition were also analysed and studied.

— **Fauna of Wetlands:** Limnological studies and investigation on Hyderabad Lake, Ujni Lake, Astamudi Lake, Kabar Lake and Kolleru Lake were carried out. Investigations on wetlands of two districts of West Bengal (Howrah & South 24-Parganas) have also been completed.

— **Fauna of Coastal and Marine Ecosystem:** Pisces collected during survey of coastal areas stretching from Kakinada to Gopalpur were studied.

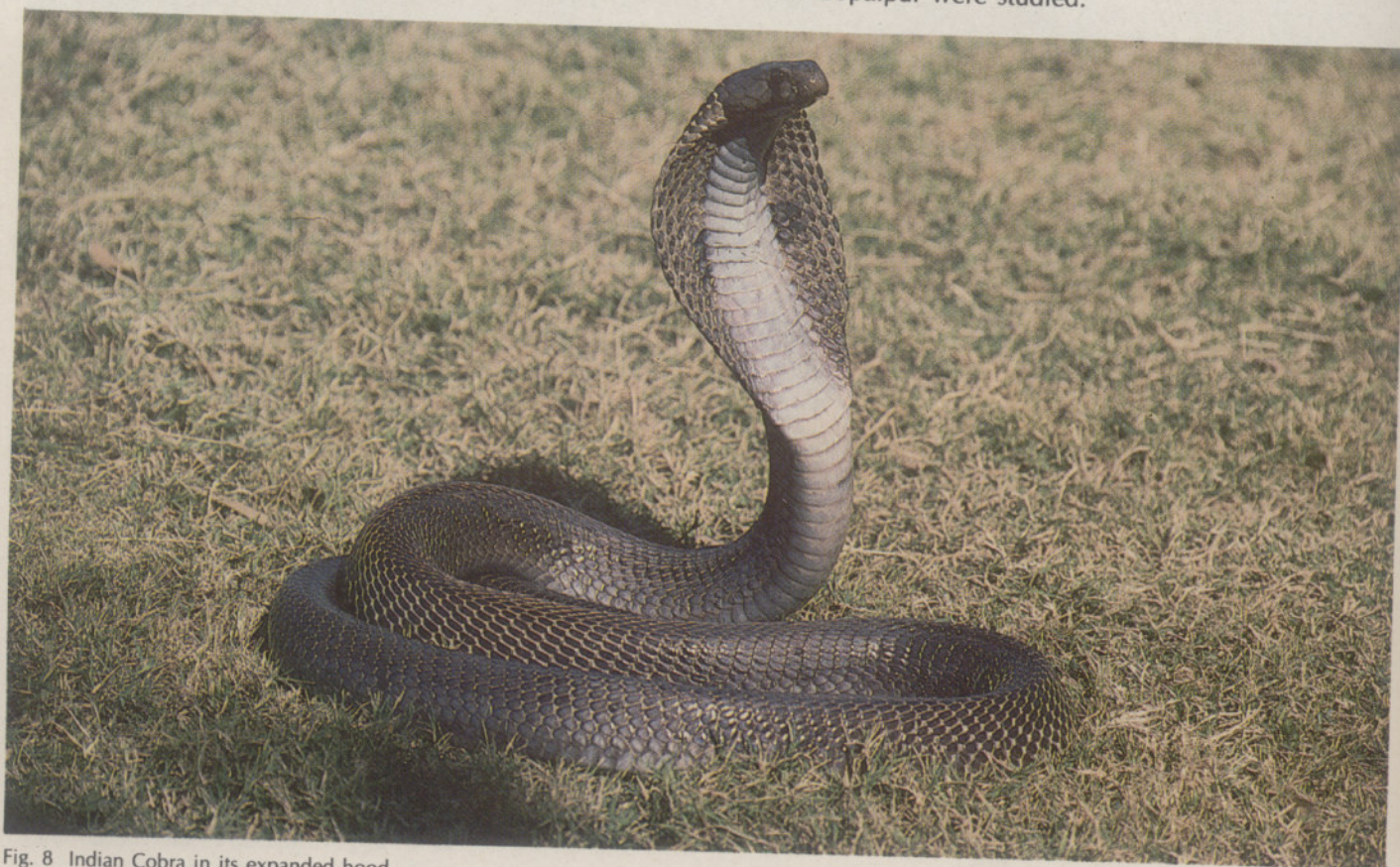


Fig. 8 Indian Cobra in its expanded hood



Fig. 9 Chameleon - An example of environmental adaptation

#### 2.2.2.4 Development of National Zoological Collections

The National Zoological Collections were enriched by the addition of 20,688 identified specimens pertaining to 2,884 species. These include 124 new species, two new additions to collection, one new to tribe and seven new genera. Altogether 183 species have been reported for the first time from India of which six are from Andaman & Nicobar Islands, six from Gujarat, 60 from Lakshadweep, 68 from Meghalaya, twenty two from Orissa, four from West Bengal and nine from Tripura.

#### 2.2.2.5 Identification and Advisory Services

Zoological Survey of India continued to render identification and advisory services to various research and teaching institutions in India and abroad, different Central and State Government Department and individuals. During the year, 588 zoological specimens pertaining to 104 species were identified.

#### 2.2.2.6 Other activities

— Several Environmental Impact Assessment (EIA) studies relating to ecology and wildlife were undertaken by ZSI during the year. Three surveys were conducted during which several groups of animals were collected and studies were carried out on Insecta (Hymenoptera), Pisces

and Amphibia in connection with EIA of Tehri Dam Project. The appraisal study on Narmada Project Wildlife Rehabilitation Plan was carried out and advisory services were offered to Eastern Coalfields on restoration of wastelands in mine area. Impact Assessment Surveys were also conducted at Aliyar Dam Mini H.E.P., Amaravathy Dam Mini H.E.P., Mukruthy Mini H.E.P., Siruvani Micro H.E.P., Combined Gas Turbine Project and Ullar Reserve Scheme, P.W.D., Tamil Nadu.

- An ENVIS Centre on 'Animal Ecology' has been set up at ZSI during the year.
- A training course in Field Ornithology was organised at Calcutta during which the participants were taken to the Ballarpur Sanctuary, Santiniketan. Training on bird watching at night, recording of field notes etc. were given and certificates were also awarded to the trainees on completion of the course.
- In connection with the celebration of 'Wildlife Week' an interschool Quiz Contest on Wildlife Conservation was organised by ZSI at Calcutta.

#### 2.2.2.7 Publications

- Occ. Paper No. 116 Census Survey and Population ecology of Bonnet macaque, *Macaca radiata* (E. Geoffroy) in South India.



Fig. 10 Bengal Monitor *Veranus bengalensis*

- Occ. Paper No. 139. A check list of scale insects and mealy bugs of South Asia, Part I
- Occ. Paper No. 128. Nematodes associated with Citrus from Sikkim, India (contribution to the Fauna of Sikkim)
- Occ. Paper No. 143. Birds of Goa.
- Occ. Paper No. 114. Carabidae (Coleoptera: Insecta) of Calcutta (July, 1992) -Pp 1-63
- State Fauna Series 2: Fauna of Lakshadweep.
- Fauna of India: Larval Trematodes of India Part II
- Estuarine Ecosystem Series - Part I
- State Fauna Series 3: Fauna of West Bengal - Part I., Part 2 and Part 3.

## 2.3 FOREST SURVEY

### 2.3.1 Forest Survey of India (FSI)

The Forest Survey of India with its headquarters at Dehradun and four zonal offices located at Shimla, Calcutta, Nagpur and Bangalore has been set up with a mandate to survey national forest resources and to provide information about existing and potential forest resources as well as broad description of land use.

#### 2.3.1.1 The objectives of FSI are as follows:

- To assess the extent of forest cover and monitor on a 2 year cycle the broad changes in forest vegetation cover of the country by using multi-satellite data on 1:2,50,000 scale.
- To prepare thematic maps through use of remote sensing data with maximum essential ground truth verification on a ten year cycle. (Most ground truth verification would be done by respective States).
- To collect, store and retrieve necessary forestry and forestry related data for national and state level planning and to create a computer based National Basic Forest Inventory System (NBFIS)
- To design methodologies relating to forest surveys and subsequent updating which include:



Fig. 11 White eyed Buzzard Eagle *Butastur feesa*, uncommon Hawk from Sariska Tiger Reserve

- Vegetation mapping including thematic maps through the use of satellite imageries/aerial photographs.
- Ground truth verification.
- Growing stock and volume assessment.
- To undertake forest inventory work in selected areas.
- To impart training in application of remote sensing techniques in modern forest survey techniques.
- To keep abreast of the achievements in remote sensing technology and also build up a strong research and development base in remote sensing in the field of forestry along with development of new algorithms and software for both image processing and general applications.
- To support and oversee techniques/inventory work undertaken by State/UT Forest Departments.



Fig. 12 White breasted King Fisher: *Halcyon smyrnensis*



Fig. 13 A family of monkeys - *Macaca mullata*

Fig. 14 *Cassia fistula* - Commonly planted on roadside





### 2.3.2 The details of the activities of FSI during the year are as follows:

#### 2.3.2.1 State of Forest Report

The FSI uses remote sensing technology for obtaining information about the forest cover of the country and prepares the "State of Forest Report" every two years based on visual interpretation of satellite imageries. The third cycle assessment of forest cover has been completed and the State of Forest Report 1991 has been brought out. The Report puts the forest cover of the country at 63.92 million hectares corresponding to 19.44% of the total geographic area of the country, showing thereby an annual increase of 28,000 hectares in the forest cover. It also provides district-wise estimates of the forest cover of the entire country.

#### 2.3.2.2 Thematic Mapping

The FSI is preparing maps on 1:50,000 scale by interpreting the details on aerial photographs and these maps are termed as Thematic Maps. Black & White aerial photographs on

1:50,000 scale procured from Survey of India are interpreted using stereoscope for various forest types and species composition and land-uses. The crown-density of the forest cover is also determined. These maps are being prepared for the entire country on a 10 year cycle. The first cycle of mapping began in 1986-87 and since then it has covered 1,616 topographic sheets corresponding to an area of about 9,26,000 sq. kms in the states of Madhya Pradesh, Orissa, Bihar, Kerala, Rajasthan, Manipur, Nagaland, Tamil Nadu, Karnataka, West Bengal, Maharashtra, Gujarat, Himachal Pradesh, Meghalaya, Punjab, Delhi, Uttar Pradesh, Assam and Arunachal Pradesh.

#### 2.3.2.3 Vegetation Mapping

The Forest Survey of India is using remote sensing technology for obtaining information about the forest cover of the country. The first attempt to assess the forest cover of the country by visual interpretation of satellite imageries was made in 1984-85 when a National Vegetation Map on 1:1 million scale of the country was prepared. The exercise



Fig. 15 A Deodar Forest

resulted in indicating the forest cover of the country at 64.2 million ha, which works out to 19.52% of geographical area as against the recorded forest area of 22.8%.

The Forest Survey of India has been assigned the task of preparing forest vegetation maps on 1:2,50,000 scale for the entire country on a two year cycle, with a view to know the exact situation of the forest cover in the country and to monitor changes that have taken place. The country as a whole is covered by 363 sheets on 1:2,50,000 scale. The yearly target for two year cycle works out to 181/182 sheets and FSI has covered about 60 sheets upto November, 1992.

#### **2.3.2.4 Electronic Data Processing**

Forest Survey of India has an independent unit for processing inventory data which aims at providing qualitative and quantitative information about the forest resources (growing stock) within precision limits needed for development planning. While covering an area of 30,030 sq. km for data processing in 91-92, FSI has targetted an area of 24,043 sq. km during the year.

#### **2.3.2.5 Inventory of Forest Resources**

The Forest Survey of India also undertakes works relating to preparation of forest inventory and has been preparing forest inventory for the entire North-Eastern region. The inventory of forest resources in Nagaland, Meghalaya, Mizoram, Manipur, Assam, Arunachal Pradesh and Tripura has been completed.

#### **2.3.2.6 Training of Personnel**

The FSI continued its training programmes to forest technicians on specialised subjects such as application of Remote Sensing Techniques in forest inventory management, ground truth verification of vegetation maps etc. During the year about 54 such persons have been trained by the institute.

#### **2.3.2.7 Digital Image Processing**

Since 1989, FSI has been using a computer system configured around VAX-11/780 for interpreting satellite data. A PC based GIS has also been installed and a GIS Project has been undertaken by the institute.

### 3. CONSERVATION OF NATURAL RESOURCES INCLUDING FORESTRY AND WILDLIFE

#### 3.1 NATIONAL CONSERVATION STRATEGY AND POLICY STATEMENT ON ENVIRONMENT AND DEVELOPMENT

**3.1.1** The National Conservation Strategy and Policy Statement on Environment and Development has been prepared and adopted by the Government of India in June, 1992 after a series of consultations at various levels of the Central and State Governments, Universities, academic institutions and non-government organisations.

**3.1.2** The Strategy and Policy Document has comprehensively covered various aspects and environmental concern and action points. While focussing on the priorities, the policy document has enlisted the specific requirements for environmental orientation in some key sectors of development and support systems as needed for implementation of the goals for sustainable development. The document deals with the following aspects:

— An overview of the environmental problems in the country;

- Action taken through various regulatory and promotional measures;
- Constraints and agenda for action;
- Priorities and strategies for action;
- Development policies from an environmental perspective, with particular reference to some of the key sectors such as agriculture, irrigation, animal husbandry, forestry, energy industrial development, tourism, transportation and human settlements;
- International Cooperation; and
- Support policies and systems required for implementation of the strategy.

**3.1.3** The document has been circulated to all the State Governments and concerned Central Departments/Ministries for taking appropriate action, specially for reorientation of policies and programmes in conformity with the strategy.



Fig. 16 Nanda Devi Biosphere Reserves



Fig. 17 Water Lilly with large floating leaves

## 3.2 BIOSPHERE RESERVES

**3.2.1** Biosphere Reserves are multipurpose protected areas to preserve the genetic diversity in representative ecosystems. The main objectives of the Biosphere Reserves are:

- To conserve diversity and integrity of plants, animals and micro-organisms;
- To promote research on ecological conservation and other environmental aspects; and
- To provide facilities for education, awareness and training for effective participation of the people living around the Biosphere Reserves

**3.2.2** Since the inception of the programme, the following Seven Biosphere Reserves have been set up:

- Nilgiri (Karnataka, Kerla and Tamil Nadu)
- Nanda Devi (U.P.)
- Nokrek (Meghalaya)
- Great Nicobar (Andaman and Nicobar Islands)
- Gulf of Mannar (Tamil Nadu)
- Manas (Assam)
- Sunderbans (West Bengal)

**3.2.3** The Action Plans prepared by the concerned State Governments have been sanctioned for Nilgiri, Nandadevi, Nokrek, Sunderbans and Great Nicobar for undertaking management activities such as surveys and demarcation, collection of database, social welfare, afforestation of degraded areas and generation of public awareness.

**3.2.4** A National Committee on Biosphere Reserves has been constituted in place of the existing Management

Councils and Research Committees set up earlier for individual Biosphere Reserves to oversee the implementation and monitoring of the Biosphere Reserves Programme.

## 3.3 WETLANDS, MANGROVES AND CORAL REEFS

### 3.3.1 Wetlands

**3.3.1.1** Wetlands are areas of marshes, swamps, lakes, fens, peatlands, flood plains, shallow ponds, littoral zones of large water bodies, tidal marshes etc. In India, wetlands are distributed in different geographical regions extending from cold arid zone of Ladakh through humid tropical areas in North East; warm arid zone of Gujarat-Rajasthan to tropical monsoonic Central India and wet and humid zone of Southern Peninsula. Wetlands provide the habitats for a gamut of flora and fauna and also serve as important life support systems by helping in flood control, recharging of ground water, regulation of hydrological regime and in reduction of sediment load as well as pollution.

**3.3.1.2** Realising the importance of wetlands, a National Committee on Wetlands, Mangroves and Coral reefs has been constituted to advise the Government on policy guidelines for implementing programmes of conservation, management and research on wetlands. So far, sixteen wetlands have been identified. The broad components for management action plan include:

- Survey and demarcation,
- Notification,
- Wildlife Conservation,
- Development of avifauna and fisheries,
- Weed Control,



Fig. 18, Black-necked storks court in Keoladeo Ghana National Park



Fig. 19 Harvesting Wetland plants for human consumption

- Pollution abatement,
- Water management and
- Promotion of environmental awareness

**3.3.1.3** State Level Steering Committees have been constituted for the formulation and implementation of management action plans. So far management action plans for 11 wetlands have been prepared. During the year, the following management action plans have been sanctioned:

- Bhoj (Madhya Pradesh)
- Kabar (Bihar)
- Kanjli (Punjab)

**3.3.1.4** During the year a Workshop on Conservation and Management of Wetlands was organised with the objectives of imparting training to the State and Centre wetland functionaries about the issues involved and approach for conservation and management of wetland resources in India.

**3.3.1.5** India is a signatory to the Convention on Wetlands of International Importance especially as Water Fowl Habitat generally referred to as "Ramsar Convention". The following wetlands have been designated under this Convention.

- Chilka (Orissa)
- Keoladeo Ghana National Park (Rajasthan)
- Harike (Punjab)
- Loktak (Manipur)
- Sambhar (Rajasthan)
- Wular (J&K)

### 3.3.2 Mangroves

**3.3.2.1** Mangroves are salt-tolerant forest ecosystems of tropical and sub-tropical inter-tidal regions of the world. Where conditions are suitable mangroves may form extensive and productive forests in the sheltered coastlines. They support numerous terrestrial, arboreal, benthic and aquatic organisms. Mangroves play an important role in stabilising the shore line and act as a bulwark against encroachment by the sea. They also sustain rich biological diversity which provides the source of livelihood for the people around.

**3.3.2.2** In India, the total area of mangroves is approximately 6700 sq.km. which comprises about 7% of the world's total mangrove area and harbours approximately 59 species of 41 genera belonging to different families.

**3.3.2.3** The National Mangrove Committee, constituted to advise the Government on appropriate policies and action programmes for conservation and management of mangroves, had identified 15 mangrove areas in the country for preparation of action plans covering the following aspects:

- Survey and demarcation
- Natural Regeneration
- Afforestation
- Nursery development
- Protection
- Education and awareness



Fig. 20 Water hyacinth: A beautiful Devil in eutrophic lake



Fig. 21 Evergreen Forest: Great Nicobar

State Level Steering Committees have also been constituted in order to implement conservation programmes in the identified mangrove areas.

**3.3.2.4** Management action plans have been drawn up for all these 15 mangrove areas and financial assistance has been extended for the following Action Programmes. During 1992-93 financial assistance was sanctioned for management action plans for the following mangrove areas:

- Goa mangroves (Goa)
- Achra/Ratnagiri mangroves (Maharashtra)
- Sunderbans mangroves (West Bengal)
- Coondapur mangroves (Karnataka)

**3.3.2.5** With a view to prepare a directory on the Status of Mangroves in the country, the Ministry has initiated actions for compiling information from various sources in this regard.

### 3.3.3 Corals and Coral Reefs

**3.3.3.1** Coral Reefs can be broadly defined as a "ridge" of limestone, the upper surface of which lies near the level of sea at the formation and consists of calcium carbonate secreted by corals. They are known for exceptionally diverse fauna and flora, complex food web and trophic organisation.

**3.3.3.2** Major reef formations in Indian seas are restricted to the Gulf of Mannar, Palk Bay, Gulf of Kutch, Andaman and Nicobar Islands and the Lakshadweep. With the exception of the Lakshadweep reefs which are atolls, others are of fringing type. Besides these, patchy coral growth is known from the intertidal areas of the central west coast. Submerged banks with coral growth are also known from the Arabian Sea which include:

- Gaveshani Bank,
- Cora Divh,

- Passes de Pedro; and
- Sesostris Bank.

**3.3.3.3** Main activities responsible for damage and deterioration of coral reefs are:

- Collection of corals, shells and ornamental fishes;
- Intensive fishing;
- Resource-destructive fishing methods such as dynamiting and use of poisons;
- Sewage and eutrophication;
- Petroleum hydrocarbon and metal pollution;
- Power plant discharges;
- Nuclear detonations and radioactive spillage;
- Dredging;
- Constructional activities; and
- Recreation and tourism.

**3.3.3.4** Taking into consideration the importance of coral reefs and the factors responsible for their deterioration, the following areas in the country have been identified for their conservation and management:

- Gulf of Mannar (Tamil Nadu)
- Gulf of Kutch (Gujarat)
- Lakshadweep Islands (Lakshadweep) and
- Andaman & Nicobar Islands (Andaman & Nicobar).

**3.3.3.5** Committees have been constituted in the concerned States/UTs for the preparation of Action Plans for the conservation of corals.

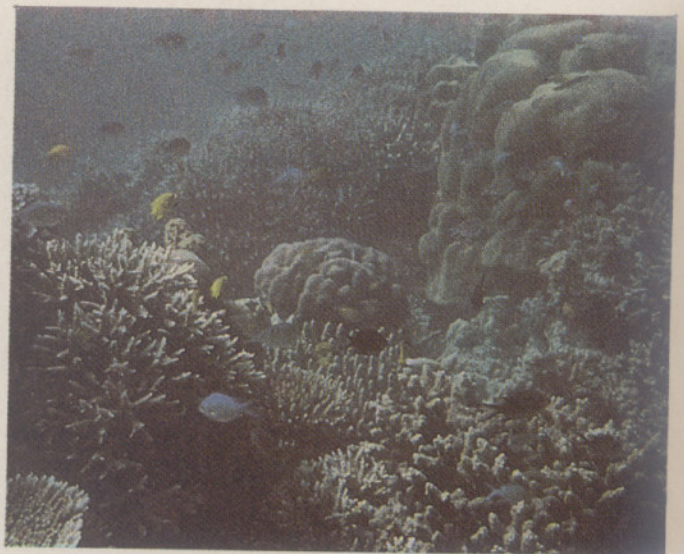


Fig. 22 Coral reef off the South Andaman Islands

**3.3.4** A National Committee on Conservation of Wetlands, Mangroves and Corals has been constituted for scrutinising proposals related to wetlands, mangroves and coral areas through a Research Sub-committee. The Committee has since recommended three projects on mangroves.

**3.3.5** In order to generate awareness about the values and conservation aspects of mangroves, wetlands and coral reefs, a booklet on "India's Wetlands, Mangroves and Coral reefs" has been prepared in collaboration with World Wide Fund for Nature (WWF)-India.

### 3.4 BIODIVERSITY CONSERVATION

**3.4.1** The scheme on biodiversity conservation has been initiated to ensure proper coordination among various agencies concerned with issues relating to conservation of biological diversity, and to review, monitor, and evolve adequate policy instruments for the same.

**3.4.2** An In-house Committee set up for this purpose had constituted two sub-groups to look into the scientific needs and management gaps in the protected area network. The reports prepared by the two sub-groups were discussed in



Fig. 23 *Nelumbo* in Indian Botanic Garden

an inter-ministerial meeting and circulated to State Govts./Union Territories for incorporating the recommendations in their plans and programmes.

**3.4.3** Actions have been initiated to prepare a comprehensive status report covering various facets of biodiversity proposed to be published in two volumes covering:



Fig. 24 A view of Himalayan Cold Desert - Ladakh

- Policy issues; and
- Scientific information on different aspects of Bio-diversity.

The Indian Institute of Public Administration has been assigned the task of preparing this report.

**3.4.4** India has effectively contributed in negotiations for finalising the Convention on Biological Diversity, which the Government of India signed along with 155 other nations, during the UNCED Earth Summit held at Rio de Janeiro, Brazil, in June 1992. The action points identified on a first-level analysis have been discussed and the specific action points and time schedule are being examined. A Core Group in this regard has also been set up for the following:

- to review the existing national legislation on bio-diversity conservation, identification of gaps and specific suggestions;
- to prepare a framework for the National Action Plan/Strategy for biodiversity conservation; and
- to identify priority areas along with the institutions, for formulating projects on conservation of biodiversity.

### 3.5 ASSISTANCE TO BOTANIC GARDENS AND FIELD CENTRES

**3.5.1** This scheme was initiated to augment the activities for conservation and propagation of plant genetic resources in different regions of the country through a network of Botanic Gardens and field centres. Under this scheme, an one-time non-recurring financial assistance is provided to botanic gardens in different phyto-geographic regions of the country for strengthening their existing facilities for:

- Conservation and propagation of threatened and endangered endemic plant species of that region; and
- Education and public awareness of endemic plant species.

**3.5.2** An Expert Group, constituted for screening and examining the proposals received from various research institutes/universities/State Governments/Union Territories for strengthening the facilities of their existing botanic gardens, has identified the criteria for consideration of these proposals. The Botanical Survey of India (BSI) has also finalised a list of some of the most vulnerable/endangered flowering plants in different phyto-geographic regions of the country that need to be conserved and the propagated on a priority basis.



Fig. 25 A view of Alpine Himalayas



**3.5.3** In addition to the three projects sanctioned during 1991-92 for strengthening of three Botanic Gardens, financial assistance has been provided to four more Botanic Gardens during the year.

### 3.6 FOREST CONSERVATION

#### 3.6.1 Implementation of Forest (Conservation) Act, 1980

**3.6.1.1** The Forest (Conservation) Act, 1980 has been enacted with a view to check indiscriminate diversion of forest land for non-forest purposes. Under this act, prior approval of the Central Government is required before any forest land is diverted for non-forest purposes. In 1988, the Act was amended to make the existing provisions more stringent.

**3.6.1.2** The State Governments/UTs are required to submit formal proposals for diversion of forest land for non-forest purposes in the prescribed proforma alongwith details such as flora, fauna, map of the area, compensatory afforestation proposed etc. In an effort to further decentralise and streamline the examination of proposals received under this Act, the Forest (Conservation) Rules, 1981 have been amended.

**3.6.1.3** The Regional Chief Conservator of Forests have been delegated with powers to decide proposals involving forest land upto 5 hectares. Proposals involving forest land between 5-20 ha are to be processed by the Regional Chief Conservator in consultation with State Advisory Group consisting of representatives of the concerned State Government. Proposals involving more than 20 hectares of forest land diversion are required to be placed before the Advisory Committee constituted under the Act for examination.

**3.6.1.4** The present status of 5104 proposals received under the Forest (Conservation) Act, 1980 till 31.12.1992 is as follows:—

Approved	2591
Rejected on merit	719
Rejected for non-furnishing of information/pending with the State Government	1553
Withdrawn by State/UT Governments	114
Pending with Central Governments	127

#### 3.6.2 Regional Offices for Monitoring of Conditions/Safeguards

**3.6.2.1** Six Regional Offices of the Ministry located at Bangalore, Bhopal, Bhubaneshwar, Lucknow, Shillong and Chandigarh continued to monitor the implementation of the conditions imposed while conveying approval for diversion of forest land for non-forest uses and also to evaluate ongoing forest development projects and schemes.

**3.6.2.2** Regional Offices have been delegated with powers to process proposals for diversion of forest land for non-forest uses upto 5 ha. and examination of such proposals to the extent of 20 ha. as amended on October, 1992.

**3.6.2.3** Region-wise targets for monitoring of cases under Forest (Conservation) Act and Environment (Protection) Act and their achievements during the year are given in Table 1.

#### 3.6.3 Forest Legislation

The Indian Forest Act, 1927 is the principal legislation which regulates the management of forest by the States. Since its adoption, forestry has undergone many conceptual changes leading to the new National Forest Policy in 1988. Consequently, a need has been felt for a revised and more

Table 1

Sl No.	Regional Office	Forest (Conservation) Act		Environment (Protection) Act	
		Target	(No. of cases) Achievement (Up to Dec. 1992)	Target	(No. of cases) Achievement (Up to Dec. 1992)
1.	Bangalore	175	104	80	62
2.	Bhopal	175	62	80	37
3.	Bhubaneshwar	175	104	80	79
4.	Lucknow	175	141	80	64
5.	Shillong	120	80	45	34
6.	Chandigarh	80	63	35	25
Total		900	554	400	301

comprehensive legislation which would take into account the new National Forest Policy and the emerging imperatives of conservation of Forests and Wildlife and preservation of the nation's biodiversity. The Indian Forest Act is therefore being amended and the draft of the revised legislation has been circulated among the State Governments for their views before taking up the process of finalising the legislation.

### 3.6.4 Joint Management of Forest Resources

**3.6.4.1** As indicated in the National Forest Policy 1988, people's involvement in managing the forests is imperative to attain the desired objectives of forest conservation, extension of tree cover and meeting the requirement of people. Accordingly, the Government of India issued guidelines to the State Governments to formulate specific schemes on involvement of village communities, voluntary organisations in protection and regeneration of degraded forests on the basis of sharing of forest produce.

**3.6.4.2** As a follow up of these guidelines, eleven States have issued usufruct sharing orders. These are West Bengal, Orissa, Bihar, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, Tripura, Haryana, Jammu & Kashmir and Andhra Pradesh. Other states are being pursued to do so.

### 3.6.5 Association of Scheduled Tribes and Rural Poor in regeneration of Degraded Forests on usufruct sharing basis.

**3.6.5.1** During the year, a new scheme in this regard has been launched to associate Scheduled Tribes and Rural Poor in regeneration of degraded forests with the aim of improving biomass resource base in degraded forests on usufruct sharing basis. This will provide gainful employment and the resource so generated will be shared by the tribal and other rural people, thus providing a sustainable economic base to these people.

**3.6.5.2** The Scheme is being implemented through the State Forest Departments on the basis of projects formulated for the purpose.

### 3.6.6 National Forestry Action Programme

**3.6.6.1** Consequent to the announcement of the new National Forest Policy 1988, all the on going forestry practices and programmes have been reoriented to meet the objectives. An integrated perspective programme for the long and medium term development of forestry sector at National and State level, together with a short term priority action programme for the next five years is therefore being prepared



Fig. 26 Bhutia community in Lata village in Nanda Devi



Fig. 27 Rehabilitation of degraded forests - Usufruct sharing

covering all aspects of forestry and people under the project 'National Forestry Action Programme'.

### 3.6.6.2 Implementation

During the year, detailed discussions on implementation of various forestry programmes were held with the Principal Chief Conservators of Forests of the States and Union Territories.

### 3.6.7 Modern Forest Fire Control Methods

**3.6.7.1** As per the State of Forest Report of the Forest Survey of India (FSI) the dense forest cover of the country is 3,85,000 sq. kms, the open forest area is 2,39,930 sq. kms and scrub areas are 59,640 sq. kms. Nearly 11.71% of the total geographical area of the country is under good forest cover.

**3.6.7.2** Forest fires is one of the major factors responsible for depletion/destruction of forest areas. The major thrust of the scheme is to achieve the following objectives:

- To control forest fires with a view to protect and conserve forests;
- To improve productivity of forests by reducing the incidents and extents of forest fires;

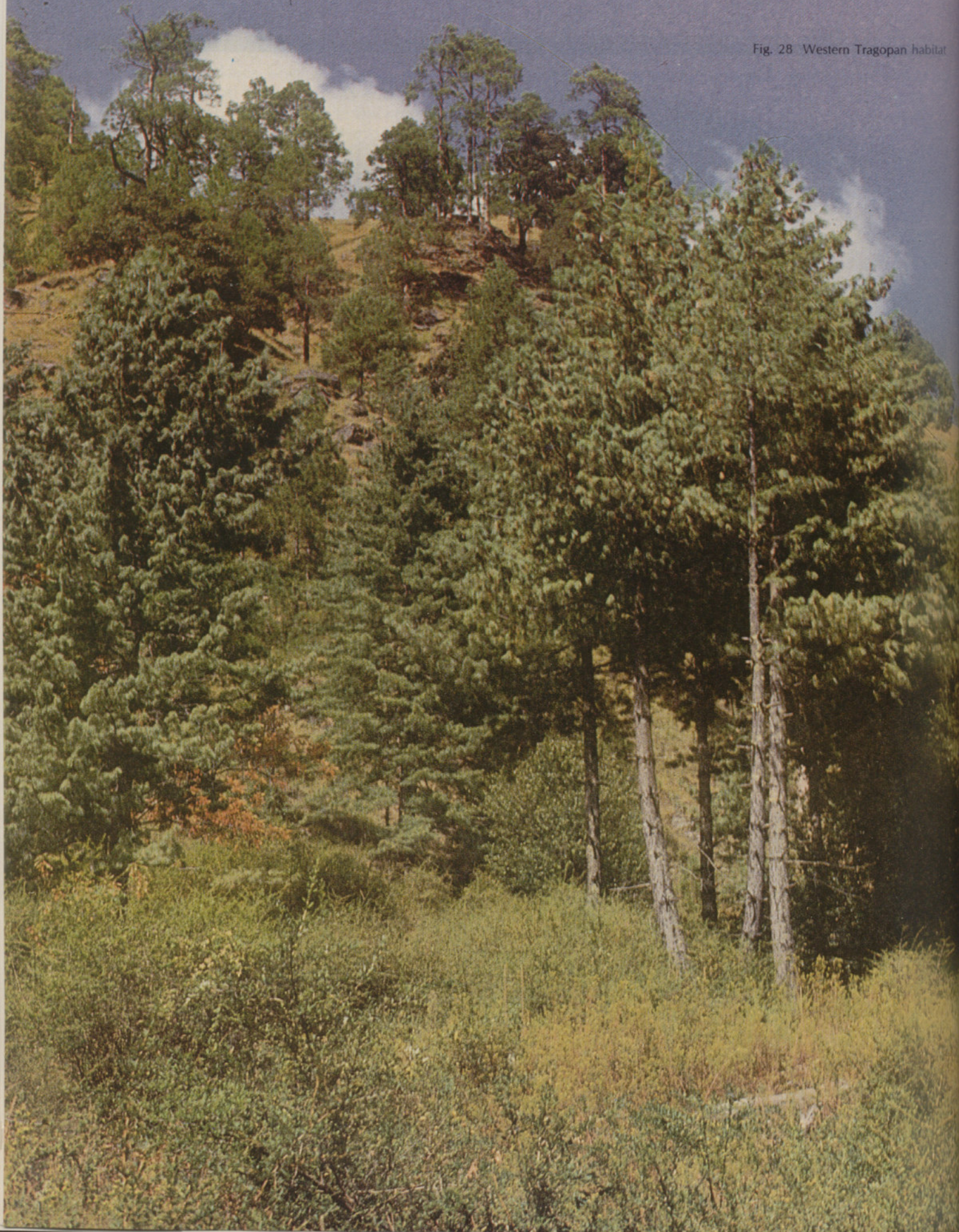
- To devise, test and demonstrate principles and techniques of prevention, detection and suppression of forest fires with the help of watch towers, walkie-talkie sets, hand tools etc. by setting up an effective communication method and training in the use of hand tools.

**3.6.7.3** Based on the experience of the demonstration projects in the States of Uttar Pradesh and Maharashtra under the Modern Forest Fire Control Project with UNDP assistance, actions are being initiated to replicate these methods in other states prone to forest fires.

**3.6.7.4** This Centrally sponsored scheme provides assistance to selected States/Union Territories which are prone to forest fires and have valuable forest assets. The concerned State Governments will bear the cost for recurring items. During the year the following 11 States were provided assistance under the Scheme.

- Andhra Pradesh
- Bihar
- Gujarat
- Himachal Pradesh
- Karnataka

Fig. 28 Western Tragopan habitat



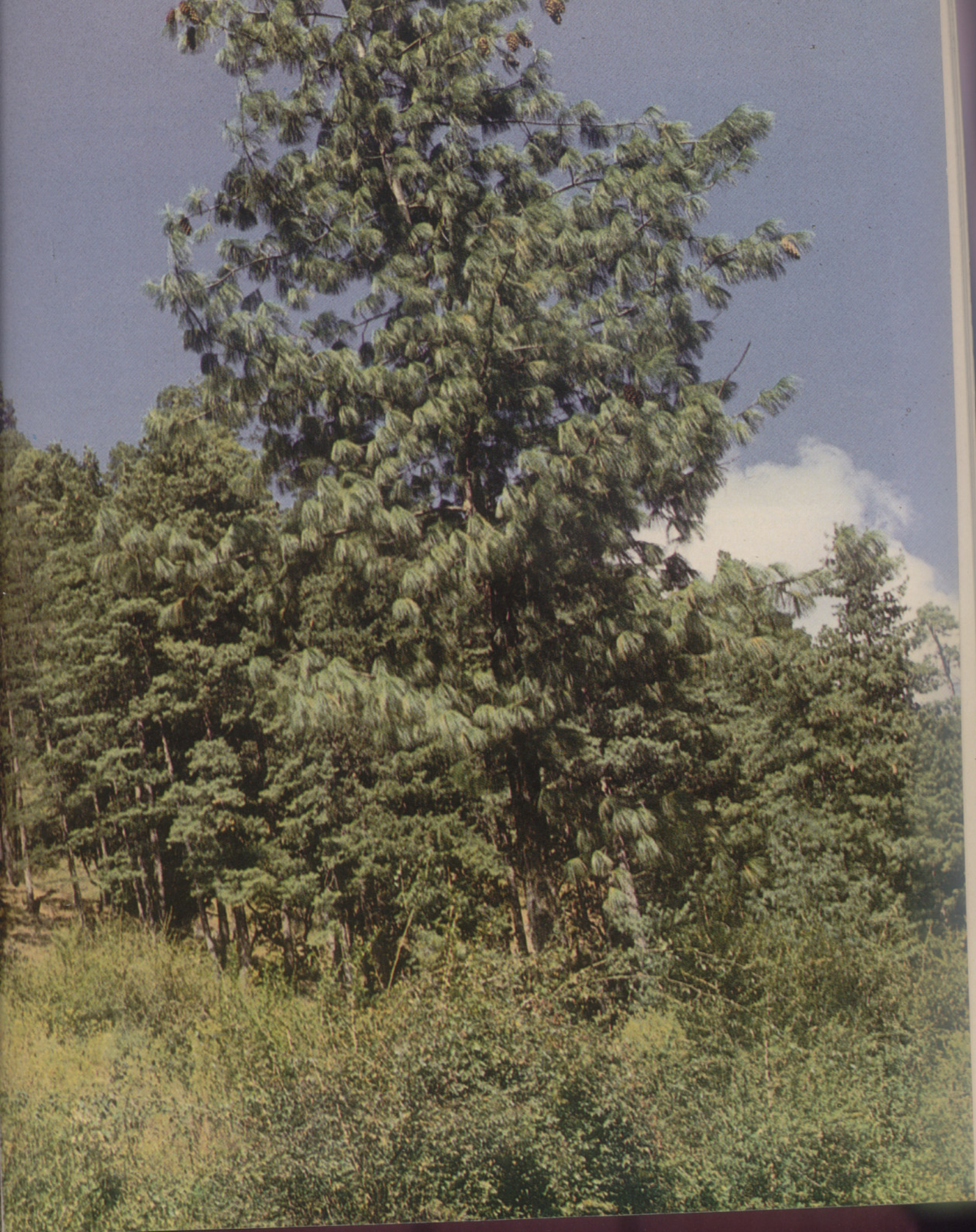




Fig. 29 A Jarwa Tribal Girl from Andaman

- Kerala
- Madhya Pradesh
- Maharashtra
- Orissa
- Uttar Pradesh
- Tamil Nadu

**3.6.7.5** The major items that are included in the Scheme are use of hand tools, wireless communication set, watch towers, fire finders, fire resistant clothing and creation of fire lines and the main components are

- Prevention
- Detection
- Suppression
- Research and Development

### 3.7 WILDLIFE CONSERVATION

**3.7.1** The National Wildlife Action Plan continued to be implemented during the year, and the major activities are as follows:

- One National Park and two sanctuaries were added during the year to the network of protected areas, which now comprises 75 National Parks and 421 Wildlife Sanctuaries

covering a total of 1,40,675.46 sq. km area. Pench National Park, (MP) has been included as the 19th Tiger Reserve of the country.

- Efforts to build up professional managers for protected areas through training of professional cadre in all aspects of wildlife were continued at the Wildlife Institute of India. The new campus of the Institute at Chandrabani (Dehra Dun) has already been opened and is in final stages of completion.
- A number of research projects have been taken up and some research projects have been completed and reports published.
- The State Governments were extended financial and technical support for development and improved management of National Parks, Sanctuaries, Tiger Reserves and Zoological Gardens in the country.
- Effective measures were taken for control of illegal trade in wildlife and its products at national and international level.
- Participation in an international programme of augmentation of the dwindling population of the Western flock of Siberian Cranes in Siberia commenced with deputation of a scientist to participate in an experiment to release captive bred juveniles in the wild from Siberia. Captive bred Siberian cranes have also been released in Keoladeo, Ghana National Park at Bharatpur during February, 1993.

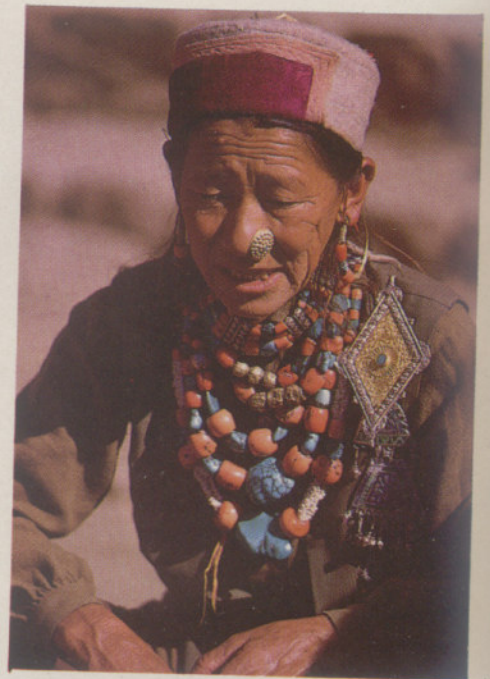


Fig. 30 Tribal from Ladakh

### 3.7.2 Enforcement of Wildlife (Protection) Act, 1972 and Amendment to the Act.

The Wildlife (Protection) Act, 1972, and the provisions of the Convention on International Trade in Endangered Species (CITES) and Export and Import policy of India continued to be enforced through the offices of the Regional Deputy Directors of Wildlife Preservation located at Delhi, Bombay, Calcutta and Madras, with the help of State Wildlife Wings and the Customs Departments. Several cases of poaching and illegal trade in wildlife products were detected. Sub-regional offices have been opened at Pathankot and Cochin.

### 3.7.3 Central Zoo Authority

The need for prescribing standards and norms that are uniformly applicable to all the Zoos in the country has been felt for a long time. According to the amended Act, the Government established a Central Zoo Authority on 3rd February, 1992 to support, oversee, monitor and co-ordinate the management of the zoos in the country. The main functions of the Authority are:

- to specify the minimum standards for the housing, upkeep and veterinary care of animals kept in zoos;
  - to evaluate and assess the functioning of Zoos with respect to the prescribed standards and norms and recognise or derecognise zoos on the basis of this evaluation;
  - to coordinate the captive breeding programmes of rare and endangered species, including acquisition, exchange and loan of animals and maintaining of stud books and such other measures that are necessary for maintaining appropriate genetic diversity;
  - to organise training of zoo personnel and coordinate research on various aspects of captive breeding and animal behaviour;
  - to coordinate the development of suitable educational programmes to disseminate knowledge and inculcate empathy for wild animals amongst the general public.
- The Authority has also finalised and notified the Rules for recognition of the Zoos which, *inter alia*, stipulate the standards for upkeep and maintenance and veterinary care of the zoo animals. The rules were notified on 4th September, 1992.

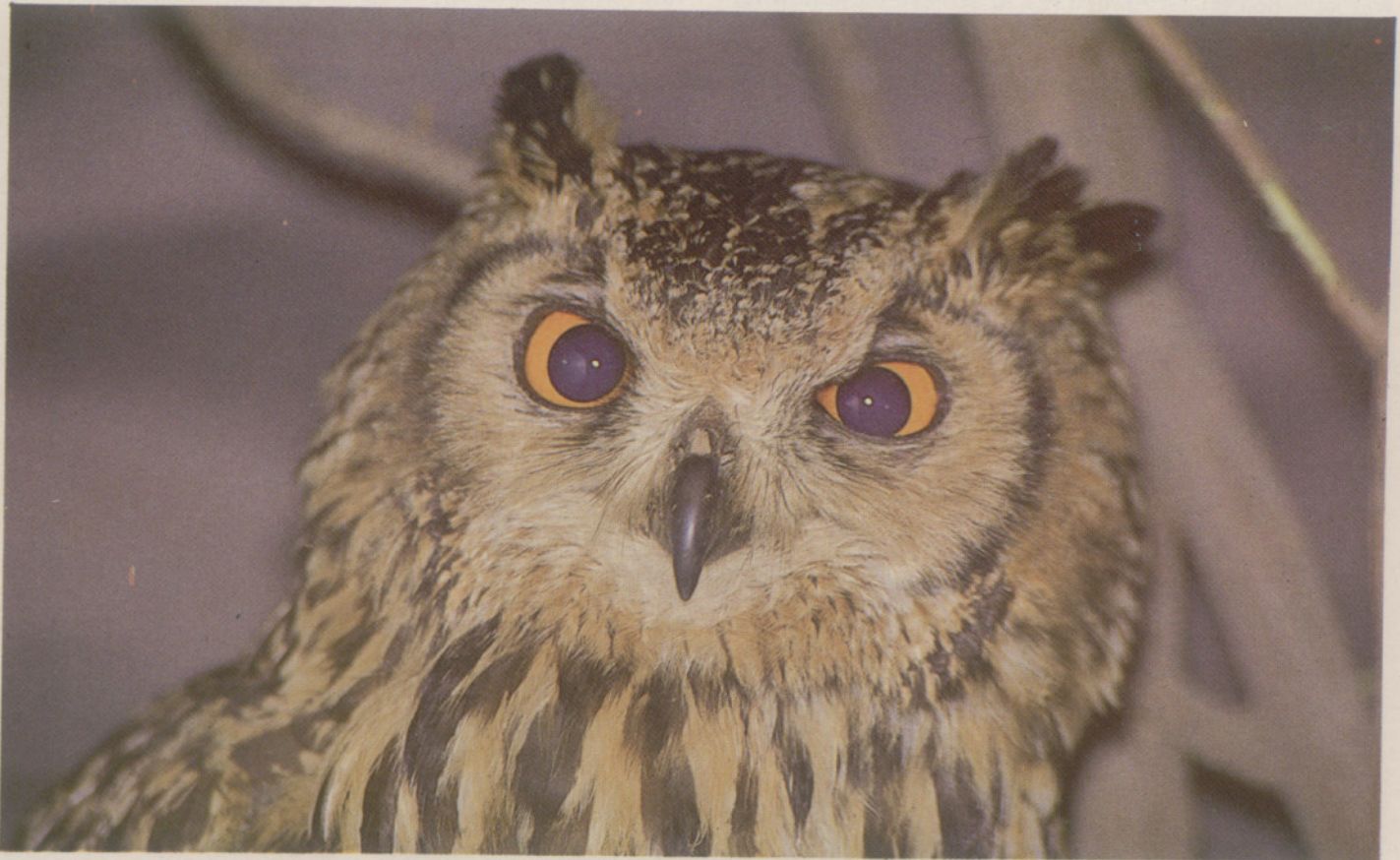


Fig. 31 Great Horned Owl - A bird of prey

### 3.7.4 Conservation Programmes

- Under the Centrally Sponsored Scheme, financial assistance for development of National Parks and Sanctuaries was provided to 30 National Parks and 140 Sanctuaries during the year. Assistance was provided at the rate of 100% on selected items of non-recurring expenditure both to National Parks and Sanctuaries. 50% of the expenditure for selected items of recurring nature was also provided to National Parks.
- During the year, the Centrally Sponsored Scheme "Control of poaching and illegal trade in wildlife" was transferred to the States with its budget provision as per the decision of National Development Council. Thus the Scheme 'Conservation of Rhinos in Assam' was transferred to Assam state with a funding of Rs. 75 lakhs.
- Assistance was provided to the States for taking up programmes of Eco Development around National Parks and Sanctuaries in order to achieve ecologically sustainable economic development of these areas.

### 3.7.5 Project Tiger

3.7.5.1 The Centrally Sponsored Scheme 'Project Tiger' was launched on 1st April, 1973 to achieve the following objectives:

- To ensure maintenance of a viable population of tigers in India for scientific, economic, aesthetic, cultural and ecological values.
- To preserve for all times, areas of such biological importance as a national heritage for the benefit, education and enjoyment of the people.

3.7.5.2 To achieve these objectives, 19 Tiger Reserves have so far been established in 13 States, covering over 29,716 sq. km forest area. The Pench Tiger Reserve, Madhya Pradesh is the 19th Tiger Reserve established during this year and distribution of the Tiger Reserves in the country are given in Table 2.

3.7.5.3 A Steering Committee reconstituted under the Chairmanship of the Union Minister for Environment and Forests provides guideline for the management of tiger Reserves. The non-official members of the Steering Committee review the Project Tiger areas bi-annually.

3.7.5.4 During the year, an amount of Rs. 6.25 crores has been provided as Central Assistance for the maintenance and development of the existing 18 Tiger Reserves and establishment of one Tiger Reserve in Madhya Pradesh. The State Governments contribute 50% of the recurring cost of the scheme and all non-plan expenditure of the Tiger Reserves.



Fig. 32 Tigress with cubs



Table 2

Sl No.	Name of the Tiger Reserve	Area (in Sq. Kms)		
		Core	Buffer	Total
<b>Tiger Reserve Established in 1973-74</b>				
1.	Bandipur (Karnataka)	523	343	866
2.	Corbett (Uttar Pradesh)	338	796	1134
3.	Kanha (Madhya Pradesh)	940	1005	1945
4.	Manas (Assam)	470	2370	2840
5.	Melghat (Maharashtra)	308	1229	1597
6.	Palamau (Bihar)	213	715	928
7.	Ranthambhore (Rajasthan)	392	782	1174
8.	Simplipal (Orissa)	845	1905	2750
9.	Sunderbans (West Bengal)	1330	1255	2585
<b>Tiger Reserves Established in 1978-79</b>				
10.	Periyar (Kerala)	350	427	777
11.	Sariska (Rajasthan)	498	302	800
<b>Tiger Reserves Established in 1982-83</b>				
12.	Buxa (West Bengal)	315	444	759
13.	Indravati (M.P)	1258	1541	2799
14.	Nagarjunasagar (A.P)	1200	2368	3568
15.	Namdapha (Arunachal Pradesh)	1808	177	1985
<b>Tiger Reserve Established in 1987-88</b>				
16.	Dudhwa (Uttar Pradesh)	648	163	811
<b>Tiger Reserve Established in 1988-89</b>				
17.	Kalakad-Mundanthurai (Tamil Nadu)	571	229	800
<b>Tiger Reserve Established in 1989-90</b>				
18.	Valmiki (Bihar)	336	504	840
<b>Tiger Reserve Established in 1992-93</b>				
19.	Pench (Madhya Pradesh)	293	465	758
Total		12,636	17,080	29,716

3.7.5.5 Project Tiger, one of the premier conservation efforts of the country, is completing 20 years in April, 1993. To commemorate this occasion, an International Symposium on tiger at New Delhi and other activities like holding of a Seminar, Photographic exhibition, organisation of visits to parks by local people have been organised around each Tiger Reserve to educate the people in the matter of wildlife conservation alongwith dissemination of the message of Project Tiger. Among other things, a photographic exhibition on Project Tiger has also been organised at New Delhi alongwith release of a documentary film chartering the



Fig. 33 Spotted Deer herd - *Axis axis axis*

achievements and constraints of Project Tiger over the past twenty years and stressing the concept and scheme of eco-development.

3.7.5.6 During the year, the following development activities were undertaken in various Tiger Reserves.

- Eco-development work has been initiated in 12 Project Tiger areas under the Centrally Sponsored Scheme "Eco-development around National Parks and Sanctuaries including Tiger Reserves".
- The Conference of all Field Directors was organised at New Delhi during 6-7, May, 1992;
- The 29th Meeting of the Steering Committee of Project Tiger was held in New Delhi on 21st October, 1992;
- The preparation of project document for eco-development for funding under GEF has been taken up in six Tiger Reserves areas;
- The work of computerisation for monitoring various activities has been initiated in all Tiger Reserves. Rs. 9.90



Fig. 34 Dry tree: A habitat for Wild animal

lakhs have been provided for installation of computers in eight Tiger Reserves;

- The bi-annual review of all Tiger Reserves has been initiated by the members of the Steering Committee and other wildlife experts;
- Rs. 3.50 lakhs have been provided to the State Governments for taking up monitoring and evaluation of seven Tiger Reserves by independent agencies;
- Rs. 14.70 lakhs have been provided to develop Nature Interpretation Centres at Ranthambhore, Kalakad, Buxar, Palamau and Sariska Tiger Reserves.
- Rs. 10 lakhs have been provided for the preservation of the endangered animal Barasingha in the Kanha Tiger Reserve.
- Financial assistance was provided for the construction/strengthening of various buildings, roads, anicuts, check dams and purchasing of arms and ammunition, scientific equipments, wireless equipments etc, to all Tiger Reserves.

### 3.7.6 Project Elephant

**3.7.6.1** The Project Elephant has been launched with the objectives of ensuring long term survival of identified viable populations of elephants and tackling the problematic elephant populations causing serious depredation.

**3.7.6.2** A sum of Rs. 102 lakhs was released under the Centrally Sponsored Scheme, which provides for restoring the lost and degraded habitats of elephants, mitigation of man-elephant conflict and establishment of data base on the migration and population dynamics of elephants. It also aims at improving the quality of life of people living around elephant habitats through sustainable development.

**3.7.6.3** A Steering Committee on the Project Elephant under the Chairmanship of Minister of Environment and Forests has also been constituted in October, 1992 which would keep a watch on the implementation of the project and also provide suitable guidance from time to time.

### 3.7.7 Zoological Parks

**3.7.7.1** The National Zoological Park, New Delhi presently displays 1264 animals comprising 54 species of mammals, 85 species of birds and 16 species of reptiles. On an average 16 to 17 lakh people visit the zoo annually. The major activities are as follows:

- During the year, construction of a boundary wall has been taken up and renovation and improvement of Hippo and Monkey enclosures have also been initiated. The main thrust of the management of the zoo was on creation of awareness amongst the visitors regarding nature conservation. During the Wild Life



Fig. 35 An Elephant herd

Week, on-the-spot painting and essay competitions for school children were organised.

- The Zoo continued to contribute in conservation of rare and endangered species by successful captive breeding of Brow antlered deer, Swamp deer, Himalayan blackbear, Hippopotamus and White tiger. This zoo also attracted about 400 painted storks from nearby areas for nesting and breeding.

### 3.7.7.2 Padmaja Naidu Himalayan Zoological Park

The Zoological Park in Darjeeling, an autonomous organisation of the State Government of West Bengal, houses and breeds a number of endangered and rare species of wild animals and birds of Himalayan Region. During the year, the Park continued its activities including research on the behaviour and breeding biology of the fauna of the Eastern Himalayan Region and provided visitors an opportunity to learn about the high altitude fauna and flora.

### 3.7.8 Animal Welfare

**3.7.8.1** In order to involve the State Government in animal welfare and effectively implement the prevention of Cruelty to Animals Act, (PCA), 1960, the State Governments have been advised to constitute State Advisory Boards and appoint a nodal officer. Fifteen States/UTs have so far notified the formation of such Advisory Board and 26 States/UTs have appointed such nodal officer. The committee constituted under the Prevention of Cruelty to Animals Act, with the main objective to supervise and control experiments on animals, has decided to prepare a status report on the use of animals for experiment purposes in the country for making recommendations in this regard.



Fig. 36 A Wild Dog



Fig. 37 Gaur in Kanha National Park

### 3.7.8.2 Animal Welfare Board of India

Under the provision of PCA Act, 1960, the Ministry has reconstituted the Animal Welfare Board of India, with the following objectives:

- To promote the cause of Animal Welfare in the country;
- To encourage the activities of the Society for prevention of Cruelty to Animals and other Animal Welfare Organisations;
- To provide financial assistance to voluntary Animal Welfare Organisations for animal population and anti-rabies programme, rescue homes and shelters, mitigation of sufferings of animals in natural calamities, purchase of ambulance and medical equipments, veterinary hospitals and purchase of films etc., for carrying out the Animal Welfare Awareness programme.

**3.7.8.3** Animal Welfare Board of India in collaboration with Royal Society for the prevention of Cruelty to Animals (RSPCA), London, has chalked out a training programme of 5 days duration in different parts of the country to educate the members of SPCAs/Animal Welfare Organisations and staff of relevant departments. Animal Welfare Board of India celebrates Animal Welfare Fortnight from 14th January every year. During this period, rallies for the cause of animal welfare, painting competition, radio talks, film shows etc. are arranged.

## 4. ENVIRONMENTAL IMPACT ASSESSMENT

### 4.1 INTRODUCTION

Environmental Impact Assessment (EIA) of developmental projects was first started in 1977-78 when Planning Commission requested the then Department of Science & Technology to take up environmental appraisal of river valley projects. Subsequently, projects in mining, industries, thermal power, ports and harbours were brought under the purview of EIA.

### 4.2 COVERAGE OF PROJECTS

At present, environmental impact assessment is being done for the following types of projects:

- I — River Valley;
  - Thermal Power;
  - Mining;
  - Industries;
  - Atomic Power;
  - Rail, Road, Highways, Bridges;
  - Ports and Harbours;
  - Airport;
  - New Towns; and
  - Communication projects.
- II Projects which require approval of the public Investment Board/Planning Commission/Central Electricity authority
- III Projects referred to this Ministry by other Ministries.
- IV Projects which are sensitive and located in environmentally degraded areas
- V Public sector undertakings of the Government of India where the project cost is more than Rs. 20 crores.

### 4.3 PROCEDURE FOR ENVIRONMENTAL IMPACT ASSESSMENT

4.3.1 The Ministry has developed guidelines for preparation of environmental impact assessment statements along with questionnaires and checklists for the following sectors:

- Industry and Mining,
- Thermal Power,
- River Valley,
- Rail, Road, Highway Projects,
- Ports & Harbours,

- Airport,
- Communication Projects,
- New Towns
- Parameters for determining ecological fragility

4.3.2 The project authorities are requested to provide relevant information as indicated in the guidelines along with the Environmental Impact Assessment Statement/Environmental Management Plan (EMP). A preliminary scrutiny of the project proposals is made by the technical experts of the Ministry. After ensuring that main aspects are covered, it is placed before the Appraisal Committee of Experts. The Appraisal Committee discusses the impact of the project with the project authorities and, if necessary, site visits are made for on-the-spot assessment of various environmental aspects. Based on their examination, the Appraisal Committee makes recommendations for approval or rejection of a project.

4.3.3 While recommending approval of a project the Committee also suggests certain safeguards in specific cases. In cases where the Appraisal Committee is not satisfied about the environmental action plans incorporated in the EIA/EMP, the project authorities are advised to revise the reports and resubmit them for consideration of the Ministry/Appraisal Committees. The recommendations of the Appraisal Committee are processed for approval or rejection of the proposal by the Ministry.

### 4.4 APPRAISAL COMMITTEES AND STAGES OF ENVIRONMENTAL CLEARANCE

4.4.1 The following Environmental Appraisal Committee have been reconstituted during the year:

- River Valley, Multipurpose Irrigation and Hydro electrical projects,
- Atomic Power and Nuclear Fuel Projects
- Mining projects,
- Industrial Projects,
- Thermal Power Projects,

Besides, the following Appraisal Committees were also constituted:

- Tourism/Transport and Miscellaneous Projects,
- Committee for Aravalli areas of Gurgaon District in Haryana and Alwar District in Rajasthan.

4.4.2 In addition to the above mentioned Committees the following specific committees were also constituted during the year:

- An Expert Committee to examine the proposed Konkan Railway Line.
- An Expert Committee to examine the issues relating to tourism/hotel facilities in coastal areas and related issues.

**4.4.3** A two stages clearance procedure has been adopted as per the site specific nature of a large number of projects. This clearance is essential for the following types of projects:

- Mining,
- Pithead Thermal Power Station,
- Multipurpose River Valley Projects.

All other projects which require environmental clearance on the basis of detailed project reports are required to obtain environmental clearance by submitting complete environmental action plan clearly indicating time schedule and financial investment.

#### 4.5 MONITORING

**4.5.1** The environmental clearance to development projects is subject to implementation of stipulated safeguards under the provisions of Environment (Protection) Act, 1986,

Forest (Conservation) Act, 1980 and other rules and regulations in force. The projects are monitored through six Regional Offices of the Ministry located in different regions so as to cover the entire country. The procedure followed is as follows:

- Project authorities are required to report back every six months the progress of implementation of the safeguards.
- Cross checks are made through field visits of officers and expert teams from the Ministry and/or its Regional Offices.
- Difficulties encountered are discussed with the proponent to find solution.
- In case of poor or no response, the matter is taken up with the concerned State Secretary or, if need be, with the Chief Secretary.
- Changes in scope of project are identified to check whether review of earlier decision is called for or not.

#### 4.6 ARAVALLI NOTIFICATION

**4.6.1** Keeping in view the environmental degradation to the eco-system of Aravalli, Government of India, Ministry of Environment and Forests has decided to regulate the



Fig. 38 Buffer zone in Nanda Devi Biosphere Reserve.

developmental activities in the Aravalli range. In the first instance, Gurgaon district of Haryana and Alwar district of Rajasthan have been chosen and a draft notification was issued on 9th Jan. 92 indicating the Government's intention to regulate certain developmental activities in specific areas of the two districts. In response to the notification, objections and suggestions were received and hearings were held. After incorporating the relevant suggestions, the notification was finally gazetted on 7th May, 1992.

**4.6.2** The notification regulates developmental activities including safety of new industry (including expansion/modernization), new mining operations, (including renewal of the mining leaser), sanctuaries, national parks and areas covered under project tiger, cutting of trees, construction of clusters of dwelling units etc. and laying of new transmission lines. The areas covered by the notification include reserved forests, protected forests or any other areas shown as forests in the land records maintained by the State Government, areas shown as Gair Mumkin Pahar, Gair Mumkin Rade, Gair Mumkin Behed or Rundh, and all areas covered by the notification issued under Section 4 and 5 of the Punjab Land Preservation Act, 1900 as applicable to the State of Haryana in the district of Gurgaon and all areas of Sariska National Park and Sariska Sanctuary in Alwar district of Rajasthan.

The Government of India has also constituted an Expert Committee to appraise the developmental projects from the environmental angle.

#### **4.6.3 Notification on Environmental Impact Assessment & Clearance of Developmental Projects.**

A draft notification was issued on 29th January, 1992 indicating Government's intention to make environmental impact assessment a statutory requirement for all projects both in the public and private sectors. 246 objections/comments/suggestions were received from the Central Government and its agencies, State Government and its agencies, Industry and Mining Associations, Non Governmental Organisations, Individuals etc. These suggestions were taken into account and a revised draft notification incorporating these suggestions, was issued on 28.1.93.

#### **4.7 STATUS OF APPRAISAL OF THE PROJECTS**

During the year, One hundred and twenty eight projects were received for environmental appraisal. Required information was also received in respect of most of the 79 projects pending at the beginning of the year. Two hundred and forty seven projects were appraised/re-appraised during the year out of which 101 projects were granted environmental clearance and 29 projects were returned/rejected. Additional

information has been sought for the remaining projects. A detailed break up on the status of the environmental appraisal of various projects received during the year is given in the Table 3.

#### **4.7.1 Mining Projects**

During the year, 37 projects were received for environmental appraisal. Required information was also received in respect of 18 projects pending at the beginning of the year. 63 projects were appraised/re-appraised out of which 20 projects were cleared and two projects were rejected. Additional information was sought for the 33 projects. Environmental clearances were accorded to the projects subject to implementation of stipulated safeguards like mechanical and biological reclamation of quarried land and over burden dumps, management of subseeded area, rehabilitation of affected families, air and water pollution control measures. Ninety cleared projects were monitored during the year.

#### **4.7.2 Industrial Projects**

During the year, 25 projects were received for environmental appraisal. Required information was also received in respect of 27 pending projects at the beginning of the year. Forty four projects were appraised out of which 31 projects were cleared and 13 projects were rejected. Additional information was sought for eight projects. While according environmental clearance necessary safeguards for

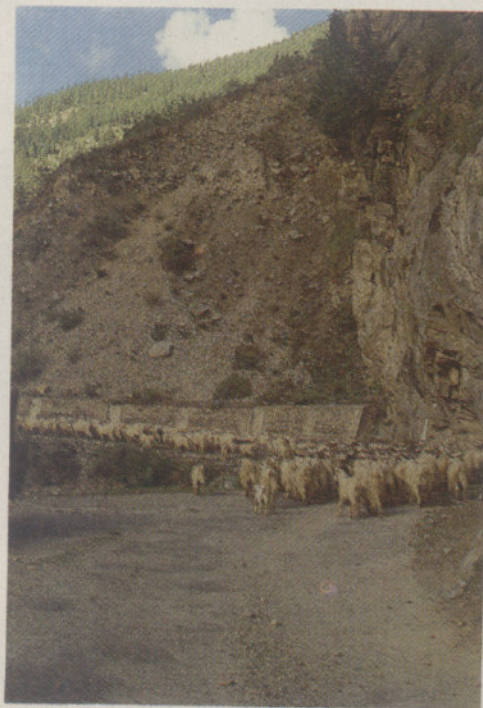


Fig. 39. Denudation due to grazing

Table 3

(From 1.2.1992 to 31.1.1993)

Sl.No.	Development Sector	Projects pend at the beginning of the year	Projects Received	Projects Appraised/ Re-appraised	Projects Cleared	Projects Rejected	Additional Information Sought
1.	Mining	18	37	63	20	2	33
2.	Industries	27	25	44	31	13	8
3.	Atomic Power	3	—	2	2	—	1
4.	Thermal Power	8	12	39	13	—	7
5.	River Valley Projects	6	20	26	5	12	9
6.	Other Sectors (including Transport, Tourism, Ports, Harbours, Airports, Highways, Communication Projects)	17	34	73	30	2	19
	Total	79	128	247	101	29	77

pollution control measures were stipulated for avoiding adverse impact on the environment. Ninety cleared projects were monitored during the year.

#### 4.7.3 Nuclear Power and Nuclear Fuel Complex Projects

No project was received for environmental appraisal during the year. Required information was received in respect of three pending projects at the beginning of the year. Two projects were appraised and granted environmental clearance. Additional information was sought for one project. Ten projects were monitored during the year.

#### 4.7.4 Thermal Power Projects

During the year, 12 projects were received for appraisal. Additional information was also received in respect of eight projects pending at the beginning of the year. Thirty-nine projects were appraised/re-appraised, out of which 13 projects were given environmental clearance. Additional information of seven projects were sought. Thirty Thermal Power projects were monitored.

#### 4.7.5 River Valley Projects

During the year, 20 projects were received for environmental appraisal. Required information was received in respect of six pending projects at the beginning of the year. Twenty six projects were appraised, out of which five projects were cleared and 12 projects were rejected. Additional information was sought for nine projects. While according clearance necessary environmental safeguards were stipulated for avoiding adverse impacts on environment. One hundred cleared projects were monitored during the year.

#### 4.7.5.1 Tehri Dam Project, U.P.

Tehri Dam project with an installed capacity of 600 MW was initiated in 1972. The scope of the project was subsequently changed and the scheme has now been revised with an installed capacity of 2400 MW. On the basis of available information the project was accorded environmental clearance in July, 1990 stipulating that time-phased environmental plans will be implemented *pari-passu* with project works failing which engineering works would be stopped. Even though various studies have been initiated by the project authorities, final comprehensive plans are still awaited.

One of the key issues related to Tehri Dam Project is its safety due to its location in highly seismic and geologically weak area. Uttar kashi Earthquake has given rise to fresh apprehensions regarding safety of the dam. Considering the risk involved due to its location, the Department of mines was directed to constitute a High Level Committee of Experts for reviewing the safety aspects. On the basis of the report of the High Level Committee under the Chairmanship of Director General, Geological Survey of India, the Department of Mines has stipulated that further scientific studies on micro-level seismicity and actual testing of the design for accellerogram of Gazli Earthquake, may be undertaken.

#### 4.7.5.2 Narmada Sagar and Sardar Sarovar Project

Narmada Sagar and Sardar Sarovar Projects are the forerunners of 30 major and 300 medium projects proposed for harnessing the water in Narmada Basin for irrigation and power development. These schemes were accorded conditional environmental clearance in June'87 with the



Fig. 40 Moisture conservation through check dams

proviso that environmental action plans will be drawn up and implemented *pari-passu* with engineering works. The scope of the Narmada Control Authority was also enlarged with a view to ensure effective implementation of environmental mitigative measures. Various studies and surveys were accordingly initiated by the concerned States with the help of Universities and Research Institutes.

Sardar Sarovar Project with an estimated cost of Rs. 6404 crores is receiving World Bank Assistance of US \$ 532.2 million, amounting to 16% of the total cost. The project has been receiving considerable attention by national/international agencies and NGOs on account of the magnitude of environmental and rehabilitation issues. An independent review was, therefore, ordered by the World Bank. The review report has reiterated the need to "Adopt Basin—Approach for sustainable Development" through optimisation of natural resources and recommended that detailed assessments of social, human and environmental impacts need to be carried out for the project.

#### 4.7.6 Other Sectors (including transport, tourism, ports and harbours, airports, highways and communication projects)

During the year, 34 projects were received for environmental appraisal. Required information was received in respect of 17 projects pending at the beginning of the year. Seventy three projects were appraised/re-appraised, out of which 30 projects were cleared and two projects were rejected. Additional information was sought for 19 projects.

### 4.8 COASTAL AREA MANAGEMENT

4.8.1 The Ministry issued in February 1991, a notification under Environment (Protection) Act, 1986 declaring coastal stretches as Coastal Regulation Zones (CRZ). In accordance with CRZ guidelines the administration of Union Territories and State Governments surrounded by coastal belts were directed to prepare Coastal Zone Management Plans (CZMP) and forward to the Ministry for approval.

Some of the UTs/State Governments have forwarded their CZMPs to the Ministry. The Ministry has constituted a Task Force to examine the CZMPs for possible suggestions/modifications and subsequent approval in consultation with the UTs/State Governments in conformity with the provisions of the CRZ notification.

#### 4.8.2 Review on Establishment of Hotels in Coastal Area

On the basis of representation from Hotel Industries and Department of Tourism, an Expert Committee has been constituted to examine the issues relating to tourism and hotel facilities in the coastal areas. The Committee has met twice and the members of the Committee have also made on-the-spot assessment of the situation in coastal areas. The report of the Committee has been submitted and being studied.

### 4.9 DEVELOPMENT OF TOURISM IN ANDAMAN AND NICOBAR AND LAKSHADWEEP ISLANDS

4.9.1 Based on discussions held at various levels in the Ministry of Home Affairs and the Department of Tourism, Ministry of Environment and Forests, while conveying its approval for opening up of more islands for tourism in Andaman and Nicobar Group of Islands, has made it clear that important environmental issues should be addressed and adequate mitigative measures enforced while taking up any activity in these areas.

4.9.2 The Ministry has strongly opposed the idea of letting up of entire Lakshadweep Islands for development of tourism, and has recommended that specific areas should be identified for development of beach resorts/tourism facilities.

4.9.3 The Island Development Authority (IDA) was reconstituted in November 1991 with the Prime Minister as the Chairman. The IDA was first set-up in August, 1986 with a view to deciding on policies and programmes for ensuring environmentally sound development of Andaman Nicobar and Lakshadweep group of Islands. Since then IDA, has been issuing guidelines for ensuring that the natural resources of Andaman & Nicobar and Lakshadweep Islands are put to optimal use without creating adverse environmental impacts.

4.9.4 The newly constituted authority will decide on policies and programmes for the integrated development of the Islands keeping in view all aspects of environmental protection as well as the special technical and scientific requirements of the Islands and review progress of implementation and impact of the developmental programmes.

#### 4.10 STUDIES

It has been established that development can take place in harmony with environment only if it takes place within



the carrying capacity of the area, for which extensive studies should be conducted to draw up long term plan. Keeping this in view, the Ministry has sponsored projects/studies on the carrying capacities of the following three regions, to be implemented by a network of institutions.

- Doon Valley
- Damodar Basin
- National Capital Region

These studies are expected to provide basic environmental data for development and planning.

#### 4.11 TRAINING PROGRAMMES AND WORKSHOPS

During the year the following workshops were organised.

- Two Indo-Dutch workshops were held on EIA for water

resources, one at University of Delhi from 16-20 March, 1992 and the other at Indian Institute of management, Calcutta from 23-28 March, 1992.

- Three Indo-Dutch Workshops were held on EIA on industrial siting and land use planning at the Administrative Staff College of India, Hyderabad from 7-10 October'92, National Environmental Engineering Research Institute, Nagpur, from 12-16 October'92 and National Institute of Oceanography, Goa, from 19-23 October 1992.
- Third Indo-Dutch policy level seminar on EIA was held at Vigyan Bhawan, New Delhi on 2nd April, 1992.
- Two training programmes were held at Jawaharlal Nehru University, New Delhi and Dr. Ranzani Research Institute, Pune on environmental impact assessment on thermal power projects and on occupational health respectively.

# 5. ENVIRONMENT PROTECTION AND PREVENTION OF POLLUTION

## 5.1 INTRODUCTION

The Forest Policy Statement, the National Conservation Strategy and the Policy Statement for Abatement of Pollution cover a wider ground integrating various facets of environment protection. The Ministry has been following up these activities in several ways: by discussions with Central Ministries, State Governments and other organisations and also commissioning studies where necessary. These include the studies related to the Environment Action Programme which will cover a wide ambit of subjects, like clean technologies, improvement of water quality, institutional and human resource development, forestry and natural resource accounting. These initiatives should lead, by stages, to concrete action plans in each sector to supplement efforts already under way.

## 5.2 NATURAL RESOURCE ACCOUNTING OF ENVIRONMENTAL STATISTICS

**5.2.1** Environmental problems are the result of human activities and natural events. The content of environmental statistics will include bio-physical data and related social, demographic and economic statistics. The scope includes the media of the natural environment, the biota found within these media and human settlements. The presentation of data from various subject areas and sources will require collection, processing and dissemination in a computerised format. Bio-physical data bases differ from socio-economic data bases. An important activity will be to determine relevant classifications and data sources.

**5.2.2** Realising the need for authoritative statistical data on environment especially to integrate natural resource accounting into the national accounting process, work relating to collection, collation and analysis of environmental data and its depiction in an atlas has been taken up. The major objectives of this work are as follows:

- to determine the status of pollution
- to develop a concise set of environmental indicators for monitoring the effect of pollution, and
- to disseminate necessary information to all concerned.

**5.2.3** Activities relating to the production of a computerised map of the critically polluted areas through digitisation and a format based on Geographic Information System (GIS) have also been initiated to provide thematic information on pollution status particularly for air, water and land.

## 5.3 POLLUTION PREVENTION

According to the Policy Statement for Abatement of Pollution, the key elements for pollution prevention are

adoption of best available clean and practicable technologies rather than end of the pipe treatment. The focus is, therefore, on source reduction and substitution of chemicals with safe alternatives. These programmes go beyond identifying changes in disposal techniques. The thrust has, therefore, been made for considering process changes which involve significant improvement in energy and water conservation. One of the significant benefits in this economical approach is that when wastes are reduced or eliminated, cost savings in material are ensured.

## 5.4 ENVIRONMENTAL AUDIT

**5.4.1** A notification making environmental audit mandatory has been issued during the year which requires all industries applying for environmental clearance, to submit an annual environmental audit report to the concerned State Pollution Control Board. The Department of Company Affairs has agreed to amend the companies Act, 1956 to include the Environment Statement in the Annual Reports of Companies.

**5.4.2** A scheme for conducting environmental audits in selected units belonging to the 17 heavily polluting industrial sectors and training of personnel in these units, has been initiated. The objectives of this scheme are as follows:

- to evaluate the performance of the pollution control systems,
- to identify good pollution prevention and control systems for demonstration, and
- to impart on-the-job training to industry personnel in environmental monitoring including sampling and analysis of effluents/emissions.

**5.4.3** The Central Pollution Control Board has completed audits of 56 industries in these categories and 90 more industrial units have been identified for such studies during the year. A report containing the general aspects of environmental auditing and brief details of such studies conducted so far is being published by the Central Board.

## 5.5 FISCAL MEASURES-WATER CESS

**5.5.1** There are at present several fiscal incentives for installation of pollution control equipments. Steps have been taken to encourage the shift from curative to preventive measures and internalise the cost of pollution and conserve resources. The Water (Prevention and Control of Pollution) Cess Amendment Act, 1991 was brought into effect from January 26, 1992 whereby the cess charges on water consumption have been increased to encourage conservation. Additionally, rebate is given to the ore industries which comply not only with the prescribed standards but also with the consumption norms.

**5.5.2** A Similar exercise has also been taken up for pollution from industries and vehicles.

**5.5.3** The National Institute of Public Finance and Policy has been requested to suggest fiscal instruments for prevention of pollution.

## 5.6 ECO-LABELLING

**5.6.1** The scheme of labelling of Environment Friendly Products was initiated for house hold and other consumer products to meet certain environment criteria along with the quality requirements of Indian Standards. The label is known as 'Ecomark'.

**5.6.2** In the first phase under this scheme, 16 items were identified and final notifications on soaps and detergents, paper and paints have been notified. Ten draft notifications have also been prepared for inviting comments and public suggestions from the concerned organisations for finalising the same.

**5.6.3** The Eco-logo, 'an earthen pot', for awarding ecomark to the products covered under the scheme has also been notified during the year.

**5.6.4** A programme on publicity campaign of 'Eco-logo' has been launched on Pollution Prevention Day (2nd December, 1992) for mass awareness by the Ministry.

## 5.7 BIOTECHNOLOGY

The Ministry has initiated steps to promote Environment Friendly Technologies which would be less energy intensive and also not create wastes which are difficult to dispose of. Bio-technology methods are eminently suited for Indian conditions in these directions. Two such techniques, one using vermiculture and the other using pisciculture are currently under evaluation. The wastes in the former case can be a source of organic fertilizer which can be recycled.

## 5.8 CLEAN TECHNOLOGY FOR SMALL SCALE INDUSTRIES

**5.8.1** During the year, a scheme on "Adoption of clean technology to the small scale industries and to extend necessary technical support" has been approved by the Ministry. The objectives of the scheme are:

- to encourage modernisation of existing industrial units in the small scale sector by assisting small scale industries for adoption of cleaner technologies by way of interest subsidy
- to create awareness among the small scale entrepreneurs regarding adoption of pollution abatement measures and

their essentiality from the social angle and also creation of awareness among the staff of the prospective/existing entrepreneurs

- to identify clean technology from the research institutions, through bilateral/multilateral programmes and diffusion of clean technology to the industries, particularly the 17 identified polluting categories of industries
- to create a data base for the availability of clean technology or present status of clean technology used in the industries
- to assist for demonstration projects strictly for the isolated units. The laboratory or the research institutions must certify that the demonstration unit is the first case where industrial scale demonstration is being set up in that category of industry and is not upscaling or transferring available technology.

**5.8.2** Several proposals for Research and Development Programmes for innovation, identification and diffusion of clean technology, creation of a data base, awareness programme, and personnel training of the small scale industries are being considered. Technology choice is the most important factor in the Strategy to reduce pollution. These technologies also require little need for regulation.

## 5.9 INTEGRATION

**5.9.1** Under the provision of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981, no person shall without the previous consent of the State/Central Pollution Control Board established or operate any industrial unit. The consent format was prescribed separately in the Water and the Air Act.

**5.9.2** A new format for the consent application and for authorization, required under the Environment (Protection) Act, 1986 has been developed and notified during the year.

### 5.9.3 Simplification of consent procedure for small scale units.

The procedure for granting consent to small scale industries has been simplified. For industries with a low pollution load, the application form would serve the purpose of consent and there would also be no need for the industry to obtain periodic renewal of consent till such time that a unit modifies/changes its process (processes). The State Pollution Control Board or the Committee specified by the Central Government (for Union Territories) may conduct random checks or call for information from any small scale unit, and make a formal consent order prescribing conditions etc., as required.

## 5.10 ASSESSMENT OF POLLUTION BY SURVEY

### 5.10.1 River Basin Studies

The comprehensive River Basin Study of Ganga, Sabarmati, Subarnarekha, Krishna and Brahmani-Baitarni have been completed and reports published. Preparation of Basin Study reports of river Cauvery, Godavari, Indus, Narmada, Tapi and Mahanadi are under process. The wet studies and dry data collection in respect of Mahi and Ulhas have been completed, while such studies for river Pennar are in progress. The River Basin Study of Brahmaputra has been initiated in coordination with the State Pollution Control Board of Assam.

### 5.10.2 Survey of Polluted River Stretches

The polluted river stretches on 26 rivers have been identified for restoration of water quality. The detailed pollution load survey of these stretches have been undertaken for incorporation of selected stretches in the National River Action Plan. The reports on detailed surveys have been completed for the rivers Betwa, Tapi, Krishna, Narmada, Imphal, Bhogdoi, Sabarmati, Gomti, Chambal, Hindon, Khan and Kshipra. Reports in respect of remaining polluted river stretches are under preparation.

### 5.10.3 Water Quality Profile Study

The water quality profile study of river Gomti from its origin to confluence with river Ganga has been initiated to study the temporal and spatial variation in water quality along with pollution load assessment and assimilation capacity.

### 5.10.4 Special Studies

Survey of Western Yamuna Canal from Yamunanagar to Delhi was conducted to identify the sources of pollution and



Fig. 41 Permanent Meteorological Station set up at CME building, Dhanbad

to assess the status of water quality at the Haiderpur water works, responsible for civic water supply to Western Delhi.

## 5.11 ASSESSMENT OF POLLUTION BY MONITORING

### 5.11.1 National Water Quality Monitoring Network

Water Quality Monitoring of Indian aquatic resources continued at 480 stations under the Global Environmental Monitoring System (GEMS), Monitoring of Indian National Aquatic Resources (MINARS) and Ganga Action Plan (GAP) programmes. The network of 480 stations comprises 51 stations under GEMS, 27 stations under GAP and 402 stations under MINARS programme. The network covers 13 major rivers, 15 medium rivers and 99 minor and other rivers, 42 lakes, 25 groundwater stations and 3 each of canal, creeks and drains.

### 5.11.2 Automatic Water Quality Monitoring Stations on River Ganga

Nine locations have been identified along the stretches of the river Ganga from Kannauj to Calcutta for installing Automatic Water Quality Monitoring Stations to monitor the quality of the river water continuously. Four such stations, one in Kannauj, two in Kanpur and one in Patna have been installed so far and made operational.

### 5.11.3 Bio-monitoring

A project with the Dutch assistance on Bio-monitoring of the Yamuna was initiated in October, 1988. The total duration of the Project was three years.

The Central Pollution Control Board was responsible for coordinating the project as well as conducting the sampling analysis and inventory of the biotic species and to conduct acute sub-chronic toxicity evaluation in the Yamuna while Indian Toxicological Research Centre, Lucknow was responsible for analysis of micro-pollutants including heavy metals and pesticides.

The Dutch Mission chose the Yamuna river for pilot study and demonstration. Based upon the findings of this three year study, a water quality index was developed (yardstick).

In order to validate the index (yardstick) a bio-monitoring programme has been taken up in the Tunghabhadra and Chaliyar rivers in Karnataka and Kerala respectively. The Phase II of the Yamuna bio-monitoring programme will continue till 1993.

## 5.12 STATUS OF CONTROL OF INDUSTRIAL POLLUTION ALONG THE RIVER GANGA

5.12.1 Sixty-eight major polluting industries along the river have been identified for rigorous implementation of the

provisions of the Pollution Control Acts. Some of the polluting units have been closed. The pollution control status in these 68 industries is given in Table 4.

Table 4

Status	No. of Industries			Total
	U.P.	Bihar	W.B.	
ETP operating	22	4	16	42
ETP being constructed	02	—	05	07
No ETP at site	02	—	02	04
Unit closed/lock-out	08	1	06	15
Total	34	5	29	68

**5.12.2** A total of 590 highly polluting industries have further been identified in the Ganga basin including its tributaries and actions are being initiated to control pollution of this river.

### 5.13 CRITICALLY POLLUTED AREAS

**5.13.1** The Ministry in consultation with the State Governments have identified 19 critically polluted areas in the country for Abatement of Pollution. The progress in abatement of pollution in these areas has been reviewed and interim report of the following nine areas has been prepared:

- Durgapur (WB)
- Howrah (WB)
- Talcher-Angul (Orissa)
- Digbot (Assam)
- Dhanbad (Bihar)
- Najafgarh (Delhi)
- Pali (Rajstahan)
- Vapi (Gujarat)
- Govindgarh (Punjab)

The locations are shown in Figure 43.

**5.13.2** The key issues which would help in achieving cleaner environment in these areas have been identified and circulated to the respective State Pollution Control Boards for taking necessary actions in this regard.

**5.13.3** The key issues in the critically polluted areas are

- The inventory of solid waste generation both industry wise and industry process wise is to be included in the problem areas. Proper assessment should also suggest possibility of waste minimisation, process modification, recycling and recovery. The impact of existing disposal sites on ground water and flow need to be reviewed.
- Criteria for siting of industrial estates including the suitability and the reasons for selecting the site.
- Education and awareness programmes to make the people aware about the harmful effects of the pollutants emitted into the area.

### 5.14 ENVIRONMENTAL EPIDEMIOLOGY

Studies on effects of environmental pollutants on health and assessment of ground water quality in these problem areas have been initiated through National Institute of Occupational Health, Ahmedabad and the Central Ground Water Board, New Delhi. A methodology for environmental epidemiology is also being developed.

### 5.15 STATUS OF POLLUTION CONTROL IN THE IDENTIFIED POLLUTING INDUSTRIES

**5.15.1** Pollution control status of the identified 17 categories of industries in 21 States and UTs have been collected, collated and compiled and defaulting units have been identified. A report containing these details has also been published by the Central Pollution Control Board (CPCB). The Board has also issued directions to the State Pollution Control Boards to ensure that the identified polluting industries take steps to adopt self-monitoring depending upon the pollutant loads specified in these directions. State level Task Forces for all States/UTs and a Review Committee at CPCB have also been constituted for effective implementation and regular review of the actions taken by the polluting industries.

**5.15.2** Action Plans have also been prepared in consultation with the State Governments for control of pollution in the identified 17 categories of heavily polluting industries.

**5.15.3** The reduction in the pollution levels in the 17 Categories is given at Figure 44.

### 5.16 ACTION PLAN FOR 1993

The following areas have been identified for 1993 where special stress will be given by the Central and State Governments and the Central and State Pollution Control Boards.

**Environmental Audit:** The accent in Environmental Audit would be in the conservation of natural resources, computerisation and networking between the different agencies. The major effort would be in ensuring that standards of waste generation are available and published. This would help in setting attainment standards for existing and future industries.

**Pollution Control in Small Scale Units:** The scheme for giving assistance to SSI units has already been indicated in Item 7 above. It is proposed to implement the scheme in small scale industries through modernisation of the units and monitor compliance with standards in the SSI units in the 17 highly polluting sectors.

**Compliance:** The units which were set up prior to May 1981 would need to comply with the standards by

December, 1993 with a special focus on chemical pollutants. The States have to ensure that this deadline is met by the units.

**Air Pollution Control in Metropolitan areas/State Capitals:** Task Forces have been set up by the CPCB on air pollution control in urban areas. It is necessary that special efforts are made to control vehicular pollution and noise. The concept of having air pollution control areas by setting up air sheds has not been followed in all the States. It is necessary that this concept is introduced in designing air pollution control areas.

**State of Environment Reports:** The States had earlier brought out their State of Environment Report which helped in formulating policies with regard to intensively polluted areas, waste utilisation and control technology. The States need to regularly bring out such reports, as a part of their Annual Reports, so that policies for the future can be framed.

### 5.17 DEVELOPMENT OF STANDARDS

**5.17.1** Environment standards in respect of the following six industrial categories have been notified:

- Dairy
- Tanneries
- Natural Rubber Processing Industry
- Bagasse fired boilers
- Man made fibre industry (semi-synthetic)
- Ceramic industry

**5.17.2** Industry-specific standards for water use and wastewater generation (quantum limits) have been finalised in respect of the following industries and subsequently notified:

- Integrated iron and steel
- Sugar
- Fertiliser-nitrogenous and phosphatic (SSF & TSP) excluding manufacture of any acid
- Complex fertilizer
- Small pulp and paper-agro-residue and waste paper based
- Large pulp and paper-pulp and paper and rayon grade pulp
- Fermentation-maltry, brewery and distillery
- Caustic soda-mercury cell and membrane cell processes
- Textiles-manmade fibre, nylon and ployster and viscose rayon
- Tannery
- Natural rubber
- Starch, glucose and related products

**5.17.3** Environmental standards for the following industries are also being finalised:

- Soda ash

- Explosives
- Acids and alkalies
- Pencil and slate
- Rubber products

**5.17.4** In addition, review of emission standards from dieselgenerator sets and temperature limit for discharge of cooling water from thermal power plants have been initiated. A survey is being conducted for standardisation of air pollution control equipment, viz. cyclone, multiclone, electrostatic precipitator, bag filter, scrubbers and fabric filters.

**5.17.5** Preparation of guidelines for mining industries is in progress and a feasibility report is also being prepared for identification of minimum level of production capacity for certain toxic chemicals to ensure pollution control equipment installation.

### 5.18 AUTOMOBILE POLLUTION

Mass emission standards for petrol and diesel driven vehicles for the year 1995 have been notified by the Ministry of Surface Transport under the Central Motor Vehicles Rules, 1989. The same standards have also been issued under the Air (Prevention and Control of Pollution) Act, 1981 which also includes indicative mass emission standards for vehicles to be manufactured after 2000 AD.

### 5.19 NOISE POLLUTION

**5.19.1** Standards for ambient levels of noise have been notified and the State Governments have been directed to implement noise pollution control, particularly in urban areas through the identified agencies in the States. Metropolitan cities have declared silence zones and these are being rigorously enforced.

**5.19.2** A study has also been initiated to evaluate, the noise levels at international airports since aircraft landing and take off are major sources of noise pollution in urban areas.



Fig. 42 Monitoring of Vehicular pollution

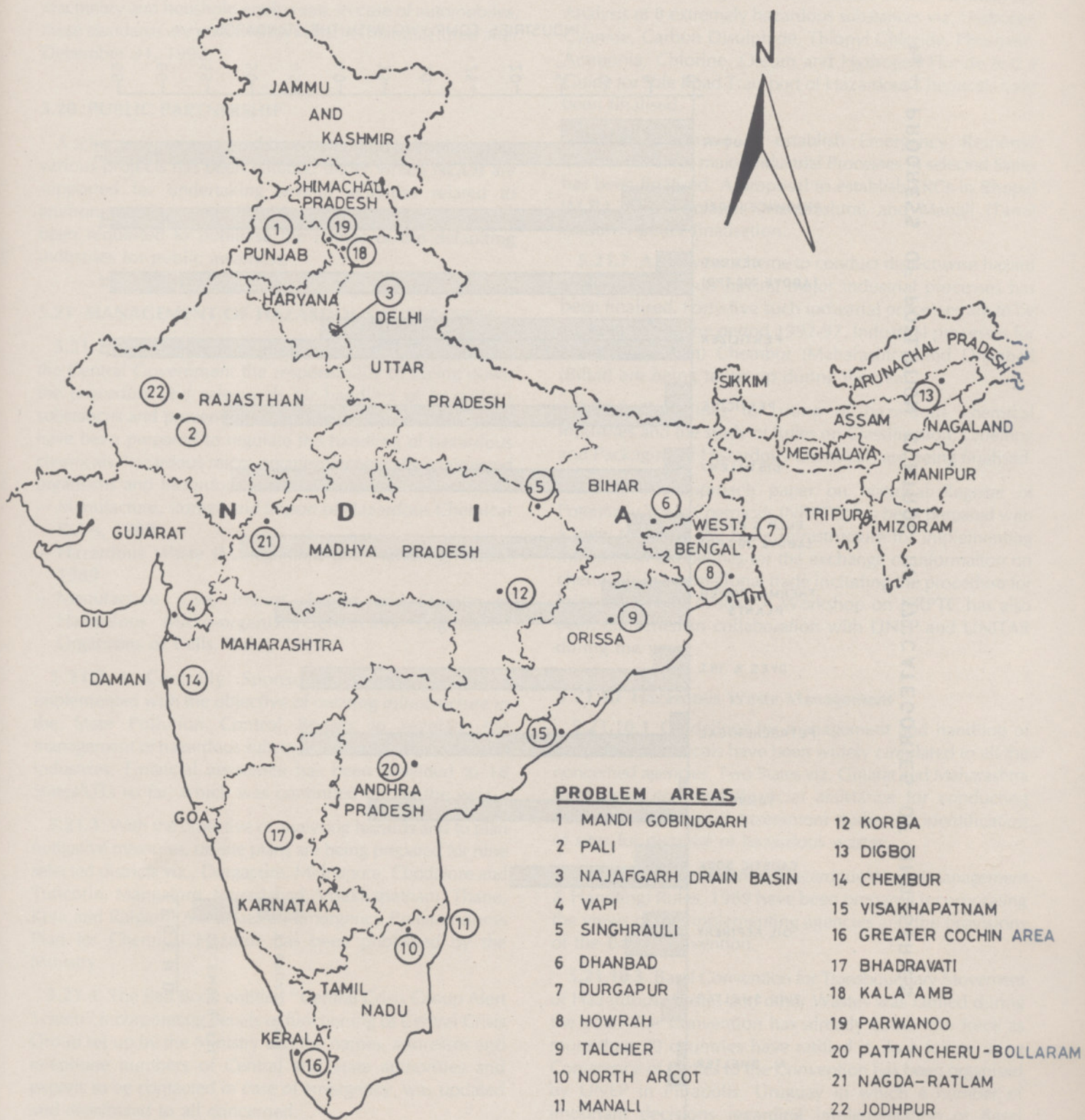
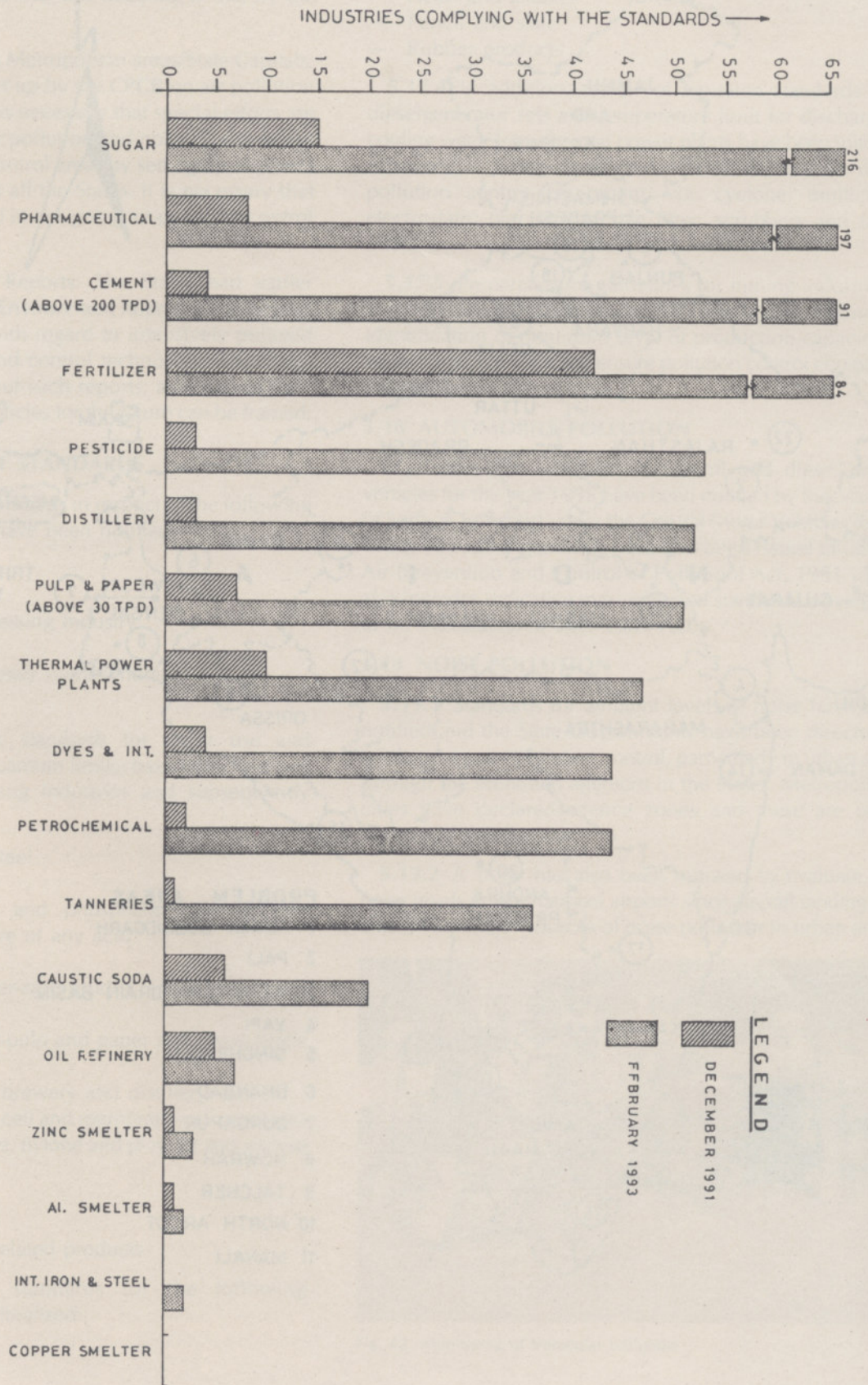


Fig. 43 LOCATION OF PROBLEM AREAS

Fig. 44 PROGRESS OF POLLUTION CONTROL IN 17 CATEGORIES OF INDUSTRIES





**5.19.3** Noise standards have also been notified for various machinery and household equipment. In case of automobiles, these standards are effective for vehicles manufactured after December 31, 1992.

## **5.20 PUBLIC PARTNERSHIP**

A scheme for ensuring public cooperation in implementing various projects has been initiated under which NGOs are supported for undertaking several activities related to environmental awareness. The State Governments have also been requested to publicise the names of the defaulting industries for public awareness.

## **5.21 MANAGEMENT OF HAZARDOUS SUBSTANCES**

**5.21.1** The Environment (Protection) Act, 1986 places on the Central Government the responsibility of laying down the procedure and safeguards for handling of hazardous substances and prevention of accidents. Three sets of rules have been prepared to regulate the handling of hazardous chemicals, hazardous micro-organism/genetically engineered organisms and hazardous wastes. These are

- Manufacture, storage and Import of Hazardous Chemical Rules, 1989.
- Hazardous Waste (Management and Handling) Rules, 1989
- Manufacture, Use, Import, Export and Storage of Hazardous Micro-organism/Genetically Engineered Organisms or Cells, Rules, 1989.

**5.21.2** A Centrally Sponsored Scheme is being implemented with the objective of creating infrastructure in the State Pollution Control Boards to regulate the management of hazardous substances handled by hazardous industries. Financial assistance has been provided to 18 States/UTs so far, which was continued during the year.

**5.21.3** With the objective of analysing hazards and to plan mitigative measures, off-site plans are being prepared for nine selected districts viz., Durgapure, Midnapore, Cuddalore and Tuticorin, Mangalore, Moradabad, Visakhapatnam, Thane, Kota and Raigarh. A manual on Emergency Preparedness Plan for Chemical Hazards has been published by the Ministry.

**5.21.4** The Red Book entitled "Central Crisis Group Alert System" incorporating details of functioning of Central Crisis Group set up by the Ministry and the names, addresses and telephone numbers of Central and State authorities and experts to be contacted in case of emergency, was updated and distributed to all concerned.

**5.21.5** A publication entitled "A Guide to Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989"

was released during the year. A Guide to the Vulnerability Analysis of 8 extremely hazardous substances viz. Hydrogen Cyanide, Carbon Disulphide, Thionyl Chloride, Phosgene, Ammonia, Chlorine, Oleum and Hydrogen Fluoride and a Guide for Safe Road Transport of Hazardous Chemicals have been finalised.

**5.21.6** A scheme to establish Emergency Response Centres (ERC) for major Industrial Processes in selected States has been finalised. A proposal to establish ERCs in Bhopal (M.P.), Thane-Belapur (Maharashtra) and Manali (Tamil Nadu) is under finalisation.

**5.21.7** A five-year scheme to conduct district-wise hazard analysis in districts having major industrial processes has been finalised. Forty-five such industrial processes are to be covered during the period 1992-97. Industrial processes for Alwar (Rajasthan) Chembur (Maharashtra) and Dhanbad (Bihar) are being taken up during the year.

**5.21.8** Guidelines for siting of hazardous chemical industries and the study of Rules on Classification, Labelling and Packaging of Hazardous Chemicals are being finalised.

**5.21.9** An approach paper on National Register of Potentially Toxic Chemicals (NRPTC) has been prepared with a view to set up the basic infrastructure for implementing the London Guidelines for the exchange of information on chemicals in international trade including the procedure for Prior Informed Consent. A Workshop on NRPTC has also been convened in collaboration with UNEP and UNITAR during the year.

### **5.21.10 Hazardous Waste Management**

**5.21.10.1** Guidelines for management and handling of hazardous chemicals have been widely circulated to all the concerned agencies. Two States viz. Gujarat and Maharashtra have been provided financial assistance for conducting Environmental Impact Assessment studies for identification of sites for disposal of hazardous wastes.

**5.21.10.2** Amendment to Hazardous Waste (Management & Handling) Rules, 1989 have been prepared incorporating the views of the implementing agencies and the provisions of the Basel Convention.

**5.21.10.3** Basel Convention for Transboundary Movement of Hazardous Wastes and other Wastes was ratified during the year. The Convention has already come into force as more than 20 countries have ratified it. As a follow up, a Conference of Parties to the Convention has been organised by UNEP in Piriapolis, Uruguay in which a number of important decisions regarding implementation of Basel Convention have been taken. The Ministry also participated in finalising the technical guidelines for various categories of hazardous wastes as identified in the Convention.

## 5.21.11 Solid Waste Management

**5.21.11.1** Special attention has been given to the utilisation of wastes, such as flyash, phospho-gypsum, red-mud, iron and steel slags. A series of meetings were held with the generators and users of these wastes. A National level meeting on Environmentally Sound Management of Urban Solid Wastes was held during the year to discuss recycling of house-hold, community and industrial wastes by utilising proper technology and dissemination of information.

**5.21.11.2** The National Waste Management Council has been reconstituted on 13.10.1992 under the Chairmanship of Minister of Environment and Forests.

**5.21.12** A research project on application of clay soil and indigenously available Synthetic Membranes for lining land fills for hazardous waste has been assigned to NEERI, Nagpur.

**5.21.13** Final summary report of the project sponsored by the Scientific Commission for continuing Studies on the "Effect of Bhopal Gas Leakage on Life System and Environment" has been completed and circulated to the concerned Ministry for comments.

**5.21.14** Meeting with Chloro-Alkali industries were held

to phase out the Mercury Diaphragm Cell based technology and to adopt the cleaner Membrane Cell Technology. Discussions have also been held to take necessary steps to treat and minimise the mercury bearing wastes as well as to contain and dispose these scientifically.

**5.21.15** Certain specified major accident hazardous installations were visited to make the industrial units aware of the Rules notified by the Ministry and to gauge the status of implementation of these Rules.

**5.21.16** Meetings of 3 sub-groups constituted under the Scientific Advisory Committee on Chemical Hazards were held.

**5.21.17** The three year phasing out period for restricting the use of Benzidine and Benzidine based dyes was over during January, 1993 and no extension of the period is envisaged.

**5.21.18** A scheme on the training programme for various categories of personnel for management of chemical accidents has been prepared. A training programme on house hold disposal of wastes and environmental sanitation for urban slum dwellers of Delhi has also been scheduled.

## 6. REGENERATION AND DEVELOPMENT

### 6.1 GANGA ACTION PLAN (GAP)

**6.1.1** The Central Ganga Authority established in 1985 under the Chairmanship of the Prime Minister, lays down the policies for works to be taken up under the Ganga Action Plan. The Authority is assisted by the Steering Committee and the Monitoring Committee. The Ganga Project Directorate of the Ministry services these Committees and coordinates the implementation of the schemes under the Ganga Action Plan.

**6.1.2** During the year, the Central Ganga Authority and the Monitoring Committee met once while the Steering Committee held two meetings to review the progress of the Ganga Action Plan.

**6.1.3** The Ganga Action Plan was launched in 1986 for improving the quality of the river Ganga, by reducing the pollution load and establishing self-sustaining sewage treatment plant system. The schemes under this plan are being implemented by various agencies of the respective State Governments of Uttar Pradesh, Bihar and West Bengal.

#### 6.1.4 Schemes Sanctioned and thier Progress

**6.1.4.1** A total of 261 schemes have been sanctioned under the Ganga Action Plan. These schemes can be broadly divided into six categories and the State-wise distribution of these schemes is given in the following Table.

Table 5

Category	Uttar Pradesh	Bihar	West Bengal	Total
Interception and diversion schemes	40	17	31	88
Sewage treatment plants (STPs)	13	7	15	35
Low cost sanitation (LCs)	14	7	22	43
Electric Crematoria	3	8	17	28
River front facilities	8	3	24	35
Other schemes for biological re-generation of the river etc.	28	3	1	32
Total	106	45	110	261

**6.1.4.2** Out of these 261 schemes, 192 schemes have been completed so far. The remaining schemes are at various stages of implementation. The State-wise physical progress of these schemes is given in Table 6

Table 6.

Category	Uttar Pradesh	Bihar	West Bengal	Total
Interception and diversion schemes	31	15	14	60
Sewage treatment plants (STPs)	6	0	1	7
Low cost sanitation (LCs)	11	7	22	40
Electric crematoria	2	7	15	24
River front facilities	7	3	24	34
Other schemes for biological regeneration of the river etc.	23	3	1	27
Total	80	35	77	192

#### 6.1.5 Impact of the Ganga Action Plan Scheme

**6.1.5.1** Out of the set target under Phase I of the GAP to create infrastructure capable of intercepting, diverting and treating 873 mld of domestic sewage, infrastructure capable of intercepting and diverting 485 mld and treating 223 mld of municipal sewage has been created. Besides this, completion of most of the low cost sanitation schemes and electric crematoria has helped in reducing the pollution load.

**6.1.5.2** Out of 264 polluting industries which discharge their effluents into the river Ganga and its tributaries, 68 grossly polluting units have been monitored for installation of Effluent Treatment Plants (ETP). At present 43 units have ETPs against 14 units in 1985. Besides, seven units are in the process of installation and 10 units have been closed down, and prosecution has been launched against eight units. Infrastructure to treat 210 mld of industrial effluent out of the estimated quantity of 260 mld has been set up.

**6.1.5.3** The efficiency of the GAP schemes with respect to peoples' health, is being evaluated and results available so far indicate that there is a decreasing trend in the incidence of water-borne diseases such as diarrhoea, helminthic infection, skin diseases, respiratory tract infection etc.

#### 6.1.6 Public Participation

Initiatives have been taken to enlist peoples' participation in cleaning and maintaining the purity of the river Ganga through public awareness and education programmes involving NGOs, youth, pilgrims and school students.

#### 6.1.7 Ganga Action Plan Phase II

**6.1.7.1** A scheme of pollution abatement of Yamuna and Gomti rivers has been formulated and approved by the

Expenditure Finance Committee at an estimated cost of Rs. 421 crores, as Second Phase of Ganga Action Plan.

**6.1.7.2** Under this scheme, it is envisaged to undertake pollution abatement works in 15 towns along the Yamuna and three towns along the Gomti.

**6.1.7.3** The scheme would be taken up as a centrally sponsored scheme with equal contribution from the Centre and the concerned State Governments.

#### **6.1.8 National River Action Plan (NRAP)**

A National River Action Plan (NRAP) has been proposed for undertaking pollution abatement works in other grossly polluted stretches of major rivers of the country. An Approach Paper on the NRAP, with tentative cost estimates, has been prepared and is under finalisation in consultation with the Planning Commission.

### **6.2 NATIONAL AFFORESTATION AND ECO-DEVELOPMENT BOARD**

**6.2.1** The National Afforestation and Eco-Development Board (NAEB) was constituted in the Ministry in August, 1992, with the responsibility of promoting afforestation, tree planting, ecological restoration and eco-development activities in the country, with special attention to the degraded forest areas and lands adjoining the forest areas, national parks, sanctuaries and other protected areas as well as the ecologically fragile areas like the Western Himalayas, Aravallis, Western Ghats etc.

#### **6.2.2 The objectives and functions of NAEB are**

- to evolve mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation, in a cost effective manner;
- to restore through natural regeneration or appropriate intervention of the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities;
- to undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country.
- to restore fuelwood, fodder, timber and other forest produce on the degraded forest and adjoining lands in order to meet the demands for these items;
- to sponsor research and extension of research findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;
- to create general awareness and help foster peoples' movements for promoting afforestation and eco-development with the assistance of voluntary agencies, non-government organisations, panchayati raj institutions and others and promote participatory and sustainable management of degraded forest areas and adjoining lands;
- to coordinate and monitor the Action Plans for afforestation, tree planting, ecological restoration and eco-development; and



Fig. 45 Panoramic view of a sewage treatment plant at Gardenreach, Calcutta

### 6.2.3 Schemes under NAEB

6.2.3.1 The following schemes are being implemented exclusively by the NAEB:—

- Scheme for Conservation of Minor Forest Produce, including medicinal plants.
- Scheme for Development of Forest and Pasture seeds.
- Scheme of Aerial Seeding.

6.2.3.2 The schemes operated by both the National Afforestation and Eco-Development Board and National Wastelands Development Board, (now transferred to Ministry of Rural Development,) with separate funds are:—

- Integrated Wastelands Development Projects Scheme.
- Fuelwood and Fodder Projects Scheme.
- Grants-in-Aid Scheme.

6.2.3.3 The following schemes have been transferred to the new Department of Wastelands Development in the Ministry of Rural Development:

- Margin Money Scheme.
- Peoples' Nurseries Scheme.

### 6.2.4 Afforestation under the 20-Point Programme

Prior to 1990-91, the targets under the 20-Point Programme for afforestation and wastelands development were set in terms of seedlings only. Since 1991-92, targets have been set in terms of two mutually exclusive items viz. 'seedling

distribution' for planting on private lands and 'area coverage' in respect of public lands, including forest lands. The targets and achievements for the years 1991-92 and 1992-93 are given in the following Table 7.

Table 7

	1991-92		1992-93	
	Target	Achievement	Target	Achievement
(i) Area coverage public lands, including forest lands. (area in lakh ha)	10.50	10.16	10.64	8.65*
(ii) Seedling distribution for planting on private lands (seedlings in crores)	150.00	141.95	145.00	100.49*

\* (upto 31st December, 1992)

### 6.2.5 Plan Schemes

#### 6.2.5.1 Integrated Wastelands Development Projects Scheme (IWGPS) (100% Centrally sponsored)

This scheme is intended to promote afforestation and wastelands development by adopting an integrated approach to the management of land and other related natural resources on watershed basis. The thrust is in favour of micro-level planning in selected micro-watersheds of identified districts in the States with the active participation of the local people at all stages of planning and implementation. Projects under the scheme are being implemented in all the States.





Fig. 46 Rehabilitation of degraded forest lands - enrichment planting with natural regeneration

#### 6.2.5.2. Fuelwood and Fodder Projects Scheme (50% Centrally Sponsored)

The scheme is meant to augment production of fuelwood and fodder in identified fuelwood deficit districts of the country by combining activities like tree-planting, silvipasture, agro-forestry and soil and moisture conservation, etc. Projects under this scheme are being implemented in 23 States.

#### 6.2.5.3 Scheme for raising Minor Forest Produce including Medicinal Plants (100% Centrally Sponsored)

The scheme aims at conservation and improvement of the minor forest produce, including medicinal plants, by adopting effective production and appropriate silvicultural practices. It is specially meant to benefit the tribal population who depend upon the minor forest produce. The scheme is being operated in 23 States.

#### 6.2.5.4 Scheme of Aerial Seeding (100% Centrally Sponsored)

This scheme is intended to promote the regeneration of difficult and inaccessible areas like mountains/hills, ravines, deserts, etc. through aerial seeding which is expected to provide large area coverage at a reasonable cost. The scheme is being operated in the States of Tamil Nadu, Andhra Pradesh, Madhya Pradesh and Karnataka.

#### 6.2.5.5 Seed Development Scheme (100% Centrally Sponsored)

A major problem in afforestation and wastelands development activities relates to the availability of quality seeds, which results in lower survival rate as well as low productivity of the planted areas. Under this scheme, the State Governments are being assisted to develop facilities for collection, testing, certification, storage and distribution of quality seeds of known origin. The scheme is in operation in 22 States.

#### 6.2.5.6 Peoples' Nursery Scheme (100% Centrally Sponsored)

This scheme is intended to decentralise the process of seedling production so that seedlings are available near the sites where they would be planted. In the process of setting up the decentralised nurseries, employment is also generated in the rural areas which provides income to the rural poor, women and disadvantaged sections. Under this scheme, assistance is provided to the State Governments/Union Territories, Cooperatives, Corporations, and Non-Governmental Organisations.



Fig. 47 Poplar plantation



Farm Forestry

Poplar nursery



Fig. 48 before



after

Rehabilitation of degraded village common lands

#### 6.2.5.7 Grants-in-Aid Scheme

The scheme of Grants-in-Aid to Voluntary Agencies is being implemented with a view to involve the Non-Government Organisations (NGOs) and Voluntary Agencies (VA) in afforestation and wastelands development activities by providing financial assistance. However, part of the programme with financial outlay have been transferred to Department of Wastelands Development for promoting wastelands development activities on private and community lands.

#### 6.2.5.8 Technology Extension

In order to harness the inputs of science and technology for reducing land-degradation, enhancing bio-mass production, achieving cost-effectiveness and sustainability, technology extension activities are being undertaken with the assistance of a number of scientific and technical institutions/departments, universities and voluntary agencies. Various demonstration projects covering saline/alkaline lands, gullied and ravinous lands, marshy and water-logged areas, etc. have been launched.

#### 6.2.5.9 Inter-Departmental Coordination

The following Policy Advisory Groups (PAGs) have been set up to address crucial policy issues:

- Fuelwood Conservation
- Wood Substitution
- Grazing and Livestock Management
- Benefit Distribution from Common Lands
- Institutional Finance and Fiscal Incentives for Farm Forestry.

The draft reports of the PAGs on Grazing and Livestock Management as well as on Benefit Distribution from Common Lands have been placed for approval. Reports in respect of other policy issues have been circulated to all concerned for comments.

#### 6.2.6 Communications

6.2.6.1 Films production and dissemination of the films on the following themes have been taken up during the year:

- Pole Planting
- Agro Forestry
- Sand-dune Stabilisation.
- Sewage Water Disposal through Tree Planting.
- Sukhomajri-regeneration of the Shivaliks.
- Bio-gas Utilisation



Fig. 49 Social forestry plantation - village Woodlot

- Green Haryana Programme
- Participatory Forest Management in Orissa, Gujarat and Jammu and Kashmir.
- West Bengal Experience in Participatory Forest Management.

#### 6.2.6.2 Print Media

With a view to inculcate awareness regarding the importance of afforestation and tree-planting, 34 publications have been brought out in the form of brochures, booklets, reports, etc. During the year, the following documents were prepared and distributed:

- People-oriented Strategies for Regenerating India's Wastelands.
- Greening Wastelands through Waste Water.

#### 6.2.6.3 Journalists Fellowship Scheme

Nine fellowships were awarded to journalists during the year with a view to disseminate success stories of Indira Priyadarshini Vrikshamitra Awardees. A publication on these success stories is also being prepared.

#### 6.2.6.4 Communication Strategy

Recognising the importance of communication, a framework of Strategy document on communication has been finalised.

#### 6.2.7 National Fund for Afforestation

The National Fund for Afforestation and Wastelands Development was set up earlier in the National Wastelands Development Board. Donations from individuals as well as corporate/non-corporate bodies to regenerate degraded areas/wastelands are eligible for 100% tax deduction under the relevant provisions of the Income-Tax Act. The Fund is managed by a committee headed by the Minister of Environment and Forests.

#### 6.2.8 Regional Centres

Seven Regional Centres have been set up under the World Bank assisted National Social Forestry Project (NSFP) in different universities and national level institutions like the IIM, Ahmedabad, Jadhavpur University, IIFM, Bhopal, etc. They provide support to the State Governments in preparing projects for afforestation and eco-development with people's participation. They also act as a forum for exchange of ideas and experiences amongst the States concerned as well as the Non-Government Organisations and carry out evaluations, problems specific studies and training.



Fig. 50 Silvopasture model for rehabilitation of degraded forests

#### 6.2.9 Mapping of Wastelands

**6.2.9.1** The National Wastelands Identification Project (NWIP) was initiated in 1986 in collaboration with the National Remote Sensing Agency and Survey of India to prepare district-wise wastelands maps on 1:50,000 scale by using satellite data. During the first two phases of this project, wastelands maps for 146 districts were prepared and distributed to the concerned State and district level agencies. The districts selected for mapping were estimated to have more than 15% of their area as wastelands. During the next phase of NWIP, initiated in 1991, 84 districts were taken up for preparation of similar maps. Selection of these districts was made on the criterion that 5% or more of their area is estimated to be under wastelands.

**6.2.9.2** During the year, processing of satellite data, groundtruth verification and preparation of master copies of the maps for 84 districts were completed by most of the Work Centres. The master-sheets are under scrutiny in the Ministry of Defence for according security clearance before the maps are printed for distribution. Preparation of wastelands maps for the nine remaining districts of Madhya Pradesh was also commenced during the year.

#### 6.2.10 Geographical Information System (GIS)

Ten GIS projects were taken up in different agro-climatic zones in collaboration with some of the leading scientific/technical institutions in the country. The aim of these projects is to study the possible utilisation of the GIS technology for land use management, decentralised planning, and the programme for developing degraded lands. The pilot phase of these projects has since been completed and the results obtained are being evaluated with a view to enhance the scope of these projects to larger area.



### 6.2.11 Monitoring & Evaluation

**6.2.11.1** Besides the regular monitoring by the State Governments, monitoring of progress of tree-planting/afforestation activities were undertaken at the Central Government level through various independent agencies like Indian Institute of Public Opinion (IIPO), National Council of Applied Economic Research (NCAER), Institute for Research Management and Economic Development, Agricultural Finance Corporation (AFC) and Non Government Organisations like PRADAN and individual forestry experts. Survival rate studies have also been entrusted to the Regional Centres.

**6.2.11.2** The detailed district/taluk wise information in respect of afforestation/tree planting activities has been compiled and computerised reports for 24 States have been placed in the library of Parliament as well as in that of the Ministry for information of the Public.

## 6.3 OTHER ACTIVITIES ON ECO-REGENERATION

### 6.3.1 Eco-Task Forces

Eco-Task Forces of ex-servicemen is a joint venture of the Ministry of Environment and Forests, Ministry of Defence and the concerned State Governments to undertake ecological restoration work in selected environmentally degraded areas, particularly in unapproachable and hostile terrains. The scheme provides re-employment of the ex-servicemen and also serves the cause of ecological improvement. The activities include afforestation, pasture development, soil and water conservation and other restorative works. Activities undertaken by the three Eco-Task Forces presently deployed in the States of Uttar Pradesh, Rajasthan and Jammu & Kashmir are given below:

#### 6.3.1.1 Eco-Task Force (TA-127), Uttar Pradesh

This Task Force is deployed in the Kairkuli micro-



Fig. 51 Stemming Soil erosion on Mussorie Slopes by Ex-servicemen of U.P. Eco-task Force

catchment near Mussoorie. The achievements of the Task-Force during the year are:

— Plantation (nos)	3,63,000
— Mining area reclamation (no. of Mines)	2
— New area covered (ha)	563
— Protection of old plantation (lakhs)	20

#### 6.3.1.2 Eco-Task Force (TA-128), Rajasthan

This Task Force continued to work on the left bank of Indira Gandhi Canal, Rajasthan. The main achievements during the year are as follows:

— Plantation (nos.)	7,35,000
— New area covered (ha)	620
— Maintenance	14,35,000

#### 6.3.1.3 Eco-Task Force (TA-129), Jammu & Kashmir

This Task-Force is engaged in eco-regeneration work in Samba region near Jammu by involving local people. The achievements during the year are as follows:

— New Plantation (nos)	1,14,000
— Total new area covered (ha)	98
— Fencing (meters)	24,356
— Pruning of plants/trees (lakhs)	2.7

## 7. RESEARCH

### 7.1 ENVIRONMENTAL RESEARCH

#### 7.1.1 Introduction

The main objective of the environmental research programme is to develop strategies and methodologies for better environmental management. It seeks to attempt solution to the problems of immediate environmental concerns as well as its short and long term implications besides providing vital inputs for development and formulation of action plans for conservation and restoration of environmental quality.

**7.1.1.1** Research projects are supported in the multi-disciplinary aspects of environment protection. Conservation and management at various universities, Research and development institutions and non-governmental voluntary organisations in the country.

**7.1.1.2** Three major schemes are in operation under this programme viz., Man and Biosphere Programme—which emphasises an ecological approach to the study of Inter-relationship between man and his environment. Environmental Research Scheme—which covers the areas of chemical engineering and technological aspects of environmental management and the Integrated Action Oriented Research Demonstration and Extension Programmes on Eastern and Western Ghats—which aims at finding solutions to the local environmental problem of Eastern and Western Ghats regions of the country through action oriented projects.

**7.1.1.3** During the year, fifty new projects were sanctioned and eighteen projects were completed under the above mentioned schemes. The list of sanctioned and completed projects are given at Annexure II and III respectively.

#### 7.1.2 CO-ORDINATED RESEARCH PROGRAMME

##### 7.1.2.1 Studies on Sea Level Rise

The All India Coordinated programme for studies on Sea Level Rise continued during the year. The Coordination, compilation, consolidation, collation and analysis of data provided by the ten different sub-units are being co-ordinated for preparation of the final report.

##### 7.1.2.2 National Methane Campaign

The coordinated project on National Methane Campaign coordinated by the National Physical Laboratory, New Delhi for actual methane measurements was completed. The following institutions participated in the investigations:

- National Physical laboratory, New Delhi,
- Indian Agricultural Research Institute, New Delhi,

- Central Fuel Research Institute, Dhanbad,
- Regional Research Laboratory, Bhubaneshwar,
- Central Rice Research Institute, Cuttack,
- Central Leather Research Institute, Madras,
- Institute of Radio Physics and Electronics, University of Calcutta, West Bengal,
- Central Research Institute for Jute and Allied Fabrics, Kalyani University, West Bengal,
- National Council of Science Museums, West Bengal,
- Regional Research Laboratory, Tiruvanandapuram,
- Regional Research Laboratory, Jorhat,
- National Botanical Research Institute, Lucknow,
- Physical Research Laboratory, Ahmedabad,
- Narayan Dev Agricultural University.

Methane emission data from paddy areas comprising of more than 2000 observations were collected during the campaign. The methane budget estimates were in the low range of 2.5 to 6 tera g/year.

##### 7.1.2.3 Integrated Action Oriented Programme on River Kaveri.

The project is coordinated by the Madras Science Foundation in collaboration with Tamil Nadu and Karnataka Pollution Control Boards. The studies have provided relevant data from which master lists of 1186 species of macrophytes, 205 species of algae from fish gut and 269 species of fish, have been prepared. Master lists for 1196 species of algae,



Fig. 52 Rehabilitation of Jhum land

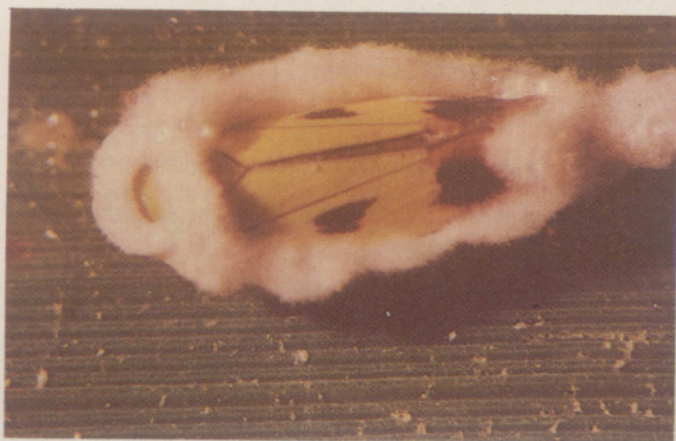


Fig. 53 Mycosis of GLH due to *Fusarium* sp.

389 species of benthos, 781 species of zoo plankton and 282 species of fungi are also under preparation. All reports from 29 different sub-projects have been received. The Technical Report of the project is under finalisation.

#### 7.1.2.4 Co-ordinated Research Project on Ethnobiology

All India Coordinated Research Programme on Ethnobiology (AICRPE) is an integrated trans-disciplinary multi-institutional and action-oriented research programme. It is aimed at an indepth study, evaluation and analysis on multi-dimensional perspectives of the tribal life, culture, traditions and their impact on the surrounding environment. The project also intends to develop strategies for conservation/preservation of traditional life, knowledge system and resource utilisation. At present, following institutions are participating;

- Central Drug Research Institute, Lucknow,
- Tropical Botanic Garden and Research Institute Trivandrum and
- Nagpur University, Nagpur.

## 7.2 G.B. PANT INSTITUTE OF HIMALAYAN ENVIRONMENT AND DEVELOPMENT

**7.2.1** The Institute, established in August, 1988, as an autonomous organisation of the Ministry has been given the mandate of advancing the knowledge and actions for ecologically sound development in the Himalayan Region.

**7.2.2** The foundation stone of the Institute's building complex at Katarmal, Almora has been laid and the first meeting of the G.B. Pant Society of Himalayan Environment and Development was held during the year. A unit of the Institute was also set up in Kullu to facilitate research and development activities in the Western Himalayan Region in a more effective way.

**7.2.3** Twelve action oriented research and development projects launched earlier in different parts of the Himalayas focussing on location specific environment and development linked issues were carried forward. Networking with other relevant organisations both at national and international level, were also strengthened.

**7.2.4** During the year, the Institute planned and initiated the following projects:

- Exploration of lesser known crops of Garhwal Himalaya,
- An analysis of transhumanic repository of knowledge in Central Himalaya,
- Ecosystem studies on sensitive habitats,
- Establishment of a functional arboretum at Kosi-Katarmal, Almora,
- Establishment of an ENVIS Centre catering to the information needs pertaining to Himalayan Ecology,
- Environmental impact analysis of multi-purpose river valley projects—Tehri dam.
- Impact of domestic sewage disposal on natural water springs,
- Analysis of the development dilemma: National context and rural scenario in the Himalaya,
- Understanding the constraints of institution building at community level.

**7.2.5** To augment the efforts of the Institute for environmentally sound development in the Himalayas extramural funding was started under the Integrated Eco-development Research Programme. Five new projects have been initiated in different parts of the Himalayas in this regard by the Institute.

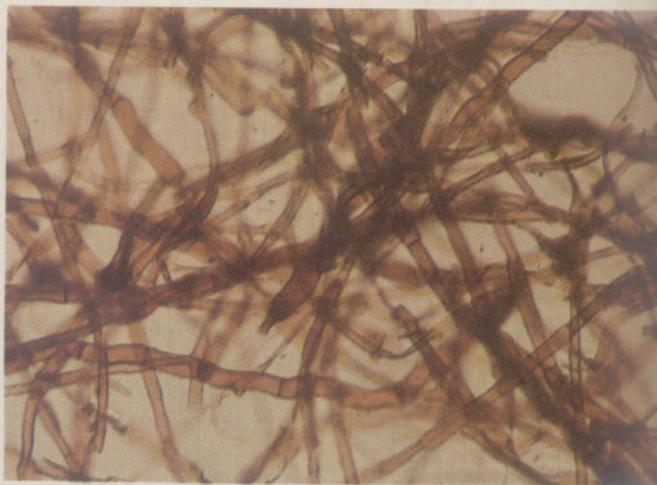


Fig. 54 *Rhizoctonia repens*: A vam fungi in Orchid of Nilgiri Hills



Fig. 55 *Costus speciosus* - A medicinal plant

**7.2.6** The Institute organised workshops on Environmental Impact Analysis of Multi-purpose River Valley Projects, Tropical Soil Biology and Fertility, Sustainable Development and Bio-diversity.

### 7.2.7 Publications

**7.2.7.1** During the year, the following publications were brought out by the Institute.

- Agricultural Economy of Himalayan Region with special reference to Kumaon,
- Himalayan Environment and Development: Problems and perspectives.

In addition, R & D outputs were published in 14 publications in National/International journals/other journals.

**7.2.7.2** The Institute has brought out a comprehensive document "Action Plan for Himalaya" which spells out specific actions that need to be undertaken to achieve ecologically sound development of the Himalayas.

## 7.3 RESEARCH ON WETLANDS, MANGROVES AND BIOSPHERE RESERVES

### 7.3.1 Wetlands

In order to provide scientific inputs for conservation and



Fig. 56 *Rhizophora mucronata* - A mangrove forest in Andamans

management of wetlands in the country, nodal research institutions have been identified and various research projects have been sponsored by the Ministry.

### 7.3.2 Mangroves

In order to provide scientific inputs for effective management of mangroves in the country, various research projects have been sanctioned by the Ministry to selected nodal institutions/universities which work in close collaboration with the State Governments. The list of research projects sanctioned by the Ministry is given at Annexure II.

### 7.3.3 Biosphere Reserves

Meetings of the Research Committees on Nanda Devi and Gulf of Mannar Biosphere Reserves were organised during the year in which priority areas and institutions have been identified for undertaking research and to provide the scientific inputs for effective management of Biosphere Reserves.

## 7.4 FORESTRY RESEARCH

### 7.4.1 Indian Council of Forestry Research and Education (ICFRE)

The ICFRE, an autonomous body of the Ministry of Environment and Forests is entrusted with the responsibility of undertaking, aiding, promoting and coordinating research, education and extension programmes in the field of forestry. The ICFRE also acts as a clearing house for forestry research activities and general information pertaining to forestry and allied disciplines.

**7.4.1.1** The Research Institutes and Centres under the Council are:-

- Forest Research Institute, Dehra Dun (FRI),
- Tropical Forestry Research Institute, Jabalpur,
- Arid Forest Research Institute, Jodhpur,
- Institute of Wood Sciences and Technology, Bangalore,
- Institute of Forest Genetics and Tree Breeding, Coimbatore,
- Institute of Rain and Moist Deciduous Forests, Jorhat,
- Directorate of Lac Development, Ranchi,
- Conifers Research Centre, Shimla.

A new centre for "Ecology and Environment" has been set up during the year at Allahabad.

**7.4.1.2** All these institutes continued to cater to the research needs of different eco-climatic zones in which they are located.

**7.4.1.3** Some of the major research activities and achievements undertaken by the council and its institutions during the year are as follows:-

- Nutrient cycling in natural forests in different forest ecosystems.
- Ecological aspects and the role of marine wood-borers in the destruction of living mangrove vegetation along the Goa Coast; 14 species of borers and three species of predominant foulers have been identified.
- The shelter effects of *Eucalyptus* sp. and *Syzygium cumini*—concluded that a moderately dense windbreak of *Syzygium cumini* is more effective in reducing windspeed than *Eucalyptus*.
- Experiments on different methods of sowing and spacing of *Abies pindrow* seeds.
- Twenty eight exotic clones of four species of *Poplar* screened for agroforestry systems in Haryana.
- Experiments with soil amendments with the application of soil ameliorants, organic residue, fertilisers and micro-nutrients.
- Tree improvement work relating to collection and testing of provenances of tree species.
- Germplasm banks of *Tectona grandis*, *Santalum album* and *Casuarina equisetifolia* have been established with the assistance of various State Forest Departments.
- Twenty three species, belonging to 14 families, were screened for Vesicular Arbuscular Mycorrhiza associations in nurseries.
- A new genus of fungus has been discovered and designated as *Tandonea dargentiana*, which was found



Fig. 57 Mouse Hare in Kedarnath Sanctuary

Fig. No. 58

### WETLANDS, MANGROVES AND CORAL REEFS SELECTED FOR SPECIAL CONSERVATION ACTION BY THE MINISTRY OF ENVIRONMENT & FORESTS

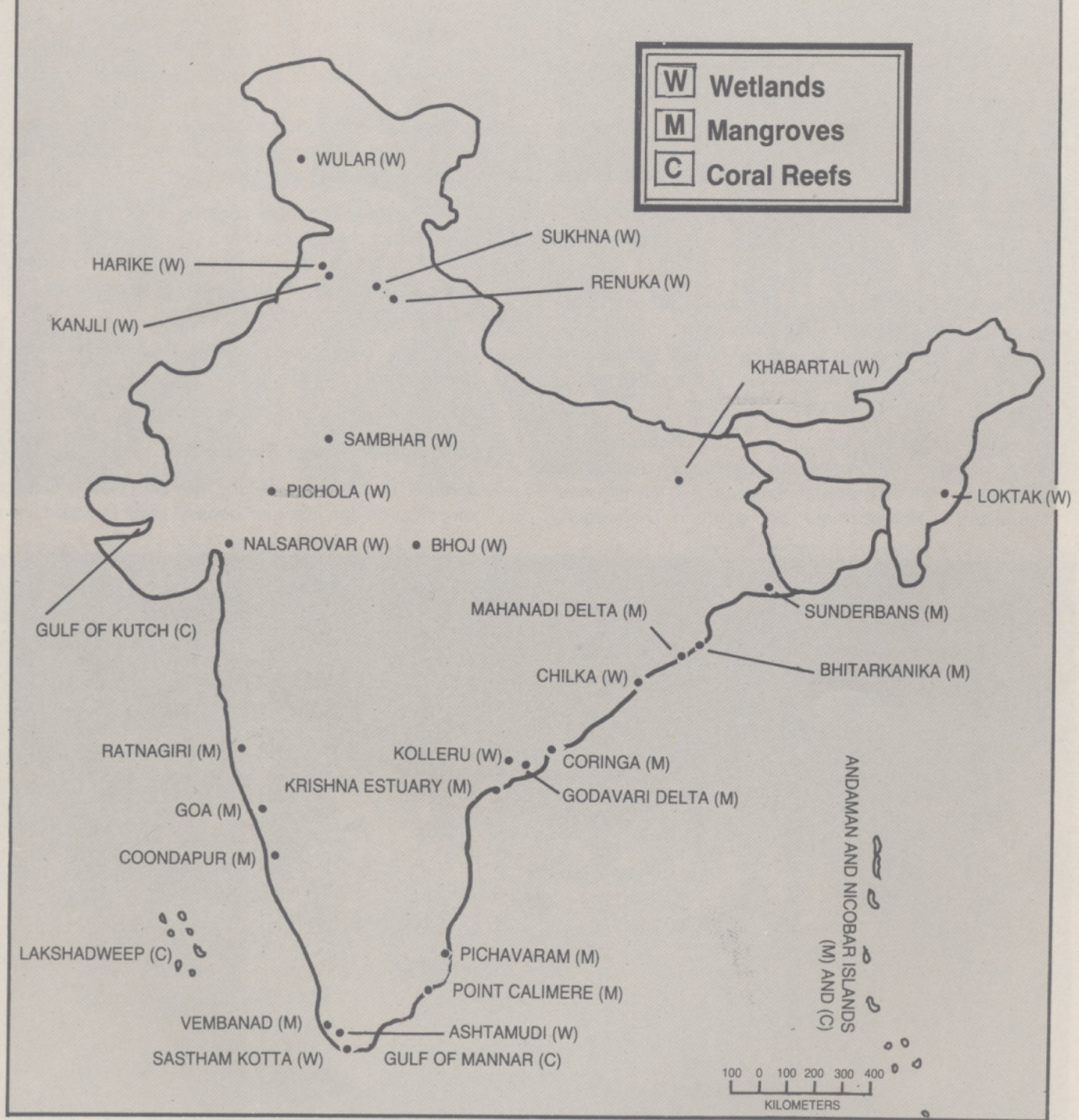




Fig. 59 Andaman Tribal collecting forest produce

to cause leaf blight in *Exbucklandia populnea*, in nurseries at Kurseong, West Bengal.

- One hundred and nine clones of *Populus deltoides* from Australia, Italy, Germany, Netherlands and U.S.A. origins, planted in clonal orchards at New Forest, Dehra Dun, were evaluated for their relative natural resistance against its primary defoliator *Clostera cupreata*.
- Seven species of egg-parasitic genus *Trichogramma*, viz., *Trichogramma achae*, *Trichogramma chilonis*, *Trichogramma confusum*, *Trichogramma exiguum*, *Trichogramma japonicum*, *Trichogramma perkensi* and *Trichogramma*

*pretiosum* were evaluated for their potentiality against the poplar defoliator *Clostera cupreata*.

- A total of 348 species of medicinal plants, including some rare and endangered ones, were raised at TFRI, Jabalpur. The collection serves as valuable education, extension and reference material for students of Ayurveda and Unani systems of medicine.
- Woods from about 20 plantation species grown under agro and social forestry programmes were evaluated for their density, strength and shrinkage characteristics. The data has formed the basis for recommending their mechanical suitability for various end uses such as construction, joinery, tool handles, packing cases, furniture, defence stores, etc.
- The solar heated timber seasoning kiln developed by Forest Research Institute, Dehra Dun, saves the equivalent of about 370 kg of steam coal consumed per cubic meter of wood seasoned, in conventional steam heated kiln, reducing cost by one third.
- Following Forestry tools have been developed and their standards formulated:
  - Planting Hoe IS 13486 (Part I): 1992;
  - Stalk Puller IS 13485 (Part I), 1992.
- Particle boards, conforming to the Indian Standard specification for medium density particle boards were

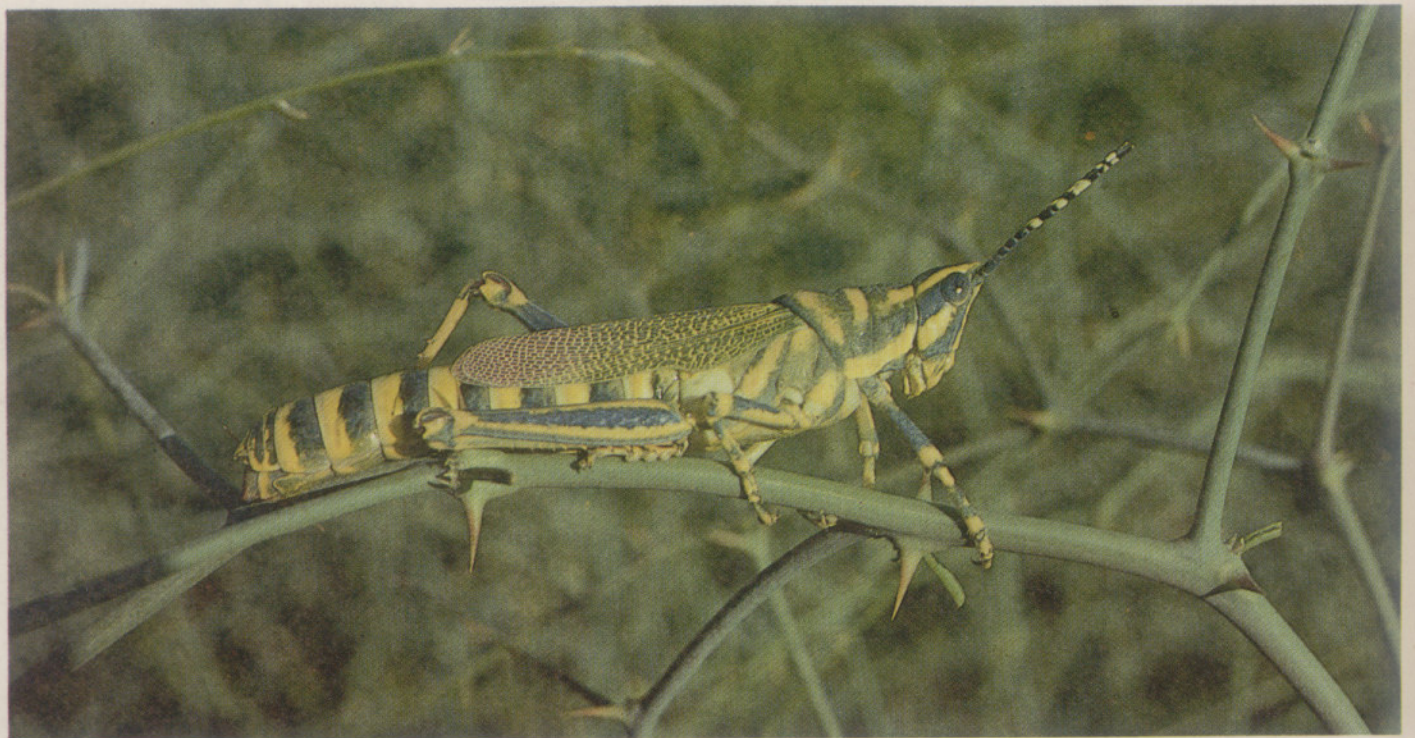


Fig. 60 Grasshopper: A crop pest





Fig. 61 A Tiger in Kanha National Park

prepared from *Lantana camara*, using 10 per cent Urea Formaldehyde resin.

- In the field of pulp and paper research, laboratory scale experiments were carried out to develop micro-glass fibre media for Bhabha Atomic Research Centre using acrylic binder and silicons emulsion as a filtering media. The preliminary trials have shown encouraging results.
- The ICFRE has initiated steps towards updating information on preservation plots both in natural forests and in plantations throughout the country as well as its monitoring in collaboration with State Forest Departments.

**7.4.2** Indian Plywood Industries Research Institute, an autonomous body of the Ministry also continued its 42 ongoing research projects on various topics relating to plywood both at the Institute and its field stations.

Bamboo mat board developed by the Institute has been found suitable to replace plywood and other wood-based panels.

## 7.5 WILDLIFE RESEARCH

### 7.5.1 Wildlife Institute of India (WII)

#### 7.5.1.1 One of the major activities of the Wildlife Institute

of India is to conduct research in selected priority areas pertaining to wildlife. The Institute attempts to meet this objective through its several research projects and by interacting with various research organisations and universities within the country and abroad. The thrust is on applied research covering ecological, managerial and sociological aspects, so that findings directly address field problems. Currently sixteen research projects are continuing dealing with the biology, ecology and management of endangered species viz., Himalayan musk deer, ibex, wild ass, elephant, wild buffalo, wolf and river otter representing different biogeographic regions, study on the management of montane grasslands, strengthening of national wildlife data base, environmental impact assessment studies; conservation of biodiversity; study on disease among wild ungulates and socio-economic studies in and around protected areas.

**7.5.1.2** The following two research projects with external collaboration with US Fish and Wildlife Service are also in operation by the Institute.

- Conservation of turtle and tortoise species and
- Indian giant squirrel

**7.5.1.3** Three studies as follows have been completed by the Institute:



Fig. 62 *Paphiopedilum druryi* (Bedd) Pfitz - An endangered orchid from Western Ghats



- Ecology and management of swamp deer,
- Pilot study on conservation of Malabar Civet, and
- Assessment of crop damage problems by Nilgai in Haryana.

**7.5.1.4** During the year, the following five new research projects has been approved.

- Behavioural ecology of Caracal,
- Developing wildlife forensic techniques
- A study of wild animal damage problems,
- Ecological significance of mugger crocodile burrows and
- Resource study in buffer zone of tiger reserve.

In addition, the Institute's faculty has developed 12 new research proposals on the following five themes:

- Bio-diversity research in representative Indian habitats.
- Developing laboratory technology for conservation support,
- Developing field mass capture and handling techniques of wild animals,

- Planning and development of interpretive facilities in parks and
- Management of marine protected areas.

**7.5.1.5** The Institute also continued its consultancy service in the following projects:

- Zoo Consultancy Project,
- EIA Project on Narmada Valley Development Authority,
- Review and revision of forestry training syllabi for State Forest Service and Rangers College and for the training of foresters and forest guards.
- Animal damage control, Nilgai problem at Chandigarh Airport and
- Development of bio-habitat component of Engineers India and Tata Energy Research Institute's project.

**7.5.1.6** The Institute published a special issue of its regular Newsletter commemorating a decade of WII during the year. Besides, the following books and technical reports were also brought out.

- Aviculture of Pheasants



No. 63 A Fruit Bat carrying fruits

- Procedure for Monitoring Wildlife Health and Investigating Diseases, and
- Proceedings of High Altitude Ecology Workshop.

A computerised database containing information on the bio-geographically correlated network of protected areas, status of the threatened species and bibliography of wildlife literature has been developed by the Institute.

#### 7.5.2 Salim Ali Centre for Ornithology and Natural History, (SACON), Coimbatore.

During the year the SACON an autonomous organisation of the Ministry initiated the following 11 research projects in the field of ornithology and Natural History in various parts of the country.

- A study on the Ecology, Status and Conservation Perspectives of Certain Rare Endemic Avifauna of the Andaman and Nicobar Islands,
- Status of Feral Elephants in Andamans,
- Long term monitoring of Elephant-Habitat interaction in Mudumalai Wildlife Sanctuary, Tamil Nadu,
- A Rapid Assessment of biodiversity in Mehao Sanctuary (Mishmi Hills, Arunachal Pradesh)
- Keoladeo National Park Ecosystem, Modelling and Simulation Studies;
- Impact of Development Projects on the Fish diversity of the Western Ghats;
- Breeding Strategies of Birds in a Tropical Moist Deciduous forest at Siruvani, Coimbatore.
- Indian Avifauna-A national database,
- Monitoring of Keoladeo National Park Eco-system,
- A Survey of information resources and services in Ornithology and Natural History,
- Elephant Telemetry Project, (By SACON and BNHS)

#### 7.6 NATIONAL NATURAL RESOURCES MANAGEMENT SYSTEM (NNRMS)

**7.6.1** The scheme of NNRMS involves utilisation of remote sensing technology for accurate inventory of resources such as land, water, forests, minerals, oceans etc, and to utilise this information for monitoring changes, in ecological systems. The Ministry has constituted a Standing Committee on Bio-resources and Environment with the following objectives.

- to examine and identify the key issues in the management of (including information systems) bio-resources and environment,

- to study the national requirements and identify the potential user/users for remote sensing technology,
- to identify improved methods for a management of resources by integrating conventional surveys and remote sensing techniques and generate specific national programmes/projects for achieving the above,
- to identify the data sources required for NNRMS especially bringing out the requirement of remote sensing data, and
- to identify supporting research, training programmes joint experiments and technology development/transfer for the above.

**7.6.2** Out of the 13 sanctioned projects under NNRMS programme, eight projects have so far been completed and remaining are in different stages of completion. Four more new projects have been considered for funding by the Standing Committee on Bio-resources and Environment during the year. The list of sanctioned and completed projects during the year are given at Annexure II and III respectively.

#### 7.7 DETAILS OF RESEARCH ACTIVITIES UNDER GANGA ACTION PLAN

**7.7.1** A Research Committee, under Ganga Action Plan, has identified the thrust areas of R & D work to meet the specific requirements of the Ganga Action Plan particularly on low cost technology options for sewage treatment using non-conventional technologies during the year. More emphasis has been laid on scheme specific and site specific activities which have a direct bearing on the objectives and mandate of the Ganga Action Plan.

**7.7.2 Studies on some of the action oriented research programmes which continued during the year are as follows:**

##### 7.7.2.1 Water Quality Monitoring

Water quality monitoring on 42 parameters at 27 selected locations continued during the year. The generated data would be used to establish trends both in time and space for modelling exercises to predict the changes in the water quality.

##### 7.7.2.2 Pollution Monitoring

A study on the impact of agriculture run off, containing the residues of pesticides and insecticides which contaminate surface as well as ground water in the riparian area of Ganga, has been initiated. The study aims at determining a safe level of use of fertilisers, pesticides and insecticides to contain the pollution from these non-point sources.

### 7.7.2.3 Resource Recovery

Two research projects for resource recovery have been taken up. One project on use of treated sewage for irrigation will study the different combinations of treated waste water with different combinations of fertilisers and fresh water to find out the best combination for getting the highest yields per unit area. Under the second project on sewage fed fish culture, studies are being undertaken on the use of treated waste water for pisciculture.

### 7.7.2.4 Bio-monitoring and bio-conservation

To restore the ecological health and biological wealth of the river Ganga, six research projects on bio-monitoring and bio-conservation have been taken up.

### 7.7.2.5 Rehabilitation of Turtles

To utilise the scavenging habits of river turtles, a research project for captive rearing and subsequent release into the river is in progress. So far 25,000 turtles against a target of 40,000 turtles have been released in the river.

### 7.7.2.6 Bio-diversity

This project aims at conserving the biodiversity of river Ganga in the stretch of Bihar. It also aims at ascertaining the role of riparian vegetation in checking siltation.

### 7.7.2.7 Conservation of Gangetic Dolphin

To study the habitat degradation and to restore the population, of the Gangetic Dolphin, *in situ* conservation methods are being adopted. A stretch of 50 kms near Buxar has been declared as a sanctuary for its protection.

### 7.7.2.8 Status Survey and Bio Conservation

Research projects on status survey and bio-conservation of endangered indicator species such as mahaseer in the upper stretch, otter and crocodile in the middle stretch and major carp fish in the lower stretch of Uttar Pradesh have been initiated.

### 7.7.2.9 New Technologies

Besides constructing sewage treatment plants to treat sewage, alternatives in the shape of low cost technologies are also being explored and adopted wherever feasible, as these are not only inexpensive to implement, but also yield revenue. Some such technologies under consideration are as follows:-

— Sewage treatment through plantation:

A research project through Central Soil salinity Research Institute, Karnal, has been initiated at Buxar in Bihar and



Fig. 64 Rehabilitation of Turtles at Varanasi

Dinapur in Varanasi for treating raw sewage through afforestation.

— Sewage treatment through vermiculture,

Bhawalkar Research Institute, Pune has developed a technology of treating sewage through vermiculture. This technology is being studied and field replication is under consideration.

— Sewage treatment through aquaculture technology

Aquaculture as a tool for sewage treatment can be utilised for achieving the desired standards of sewage treatment. The system of treatment comprises of a series of ponds where initially suitable species of *Lamina* and duck weed are cultured for acting as bio filters for oxidising the nitrogenous metabolites followed by *Spirulina* culture and ultimately by fish and shell fish culture. Experiments are being planned for standardisation of the integrated biological treatment system with respect to area, detention time, volume of effluents, desilting rates and effects on surrounding surface and ground waters.

This technology can also be clubbed with systems like Upflow Anaerobic sludge Blanket (UASB) Technology by sewage treatment developed in collaboration with the Dutch Government. This system has an efficiency of 75% and, therefore, duck weed culture and fish and shell fish culture can be dovetailed as a post treatment option to achieve the requisite standards of effluent quality including revenue generation.

Possibilities are being explored to introduce this, at one of the existing UASB technology based plants at Kanpur.

### 7.7.2.10 Impact assessment on public health

In this study the efficacy of the schemes implemented under the Ganga Action Plan is being evaluated for their effects on the health of the people particularly who are directly affected by the Ganga Water.

## 8. EDUCATION AND INFORMATION

### 8.1 FORESTRY EDUCATION AND TRAINING

#### 8.1.1 Forestry Education

##### 8.1.1.1 Indian Council of Forestry Research and Education (ICFRE), Dehradun.

The Indian Council of Forestry Research and Education (ICFRE), an autonomous institution of the Ministry, is the focal point for forestry research, education and extension development in the country. Besides carrying out research, education and extension activities directly, the Council also provides financial assistance to State Universities and Research Organisations to encourage them to undertake projects related to forestry research and education.

During the year, ICFRE conducted several short-term training courses on the latest advancements in forestry related disciplines. The one-week training courses on seed technology and management covered 23 senior and 81 junior professionals, while the 4-days training courses in Mycorrhiza were attended by 26 participants from various disciplines. The Institute also published 13 different publications in forestry and its related areas during the year.

##### 8.1.1.2 Forest Research Institute (FRI), Dehradun.

The Forest Research Institute (FRI), Dehradun, a research institute and a deemed University undertook the following activities during the year in the field of forestry education:

- Forty research scholars have been registered for Doctoral degree.
- Twenty one students have been admitted to the one year P.G. Diploma Course in plantation technology/wood science and technology/pulp and paper technology.

##### 8.1.1.3 Indian Plywood Industries Research Institute (IPIRI), Bangalore.

The IPIRI, an autonomous body of the Ministry, conducted eight short-term courses in critical areas of wood processing during the year. The Institute also conducted a Certificate Course in Mechanical Wood Industries Technology.

##### 8.1.1.4 Indian Institute of Forest Management (IIFM), Bhopal.

During the year the Institute organised 14 Management Development Programmes and undertook 14 research projects relating to various ecological and socio-economic issues.

The Institute also conducted Post-Graduate Diploma Courses in Forest Management attended by 25 students.

#### 8.1.2 Forestry Training

##### 8.1.2.1 Indira Gandhi National Forest Academy (IGNFA), Dehradun.

The Indira Gandhi National Forest Academy (IGNFA), Dehradun continued its primary task of imparting initial inservice training to IFS probationers. Sixty three IFS Probationers including eight lady probationers and two foreign trainees from Bhutan passed out during the year. Currently, sixty five probationers including 10 lady probationers and two trainees from Bhutan are undergoing training. Sixty five probationers of 1992-93 batch after completing their foundational course at Lal Bahadur Shastri National Academy, Mussoorie are undergoing their training at IGNFA.

During the year, the Academy conducted 3 three-week inservice training courses on Computer Applications and Project identification, formulation, monitoring and appraisal for middle level officers of Indian Forest Service.

##### 8.1.2.2 State Forest Service Colleges

Three State Forest Service Colleges located at Dehradun (UP), Burnihat (Assam) and Coimbatore (Tamil Nadu) continued to impart initial 2 year inservice training to Officers of the State Forest Services (SFS). Eighty SFS trainees from various States are undergoing training at these colleges.

##### 8.1.2.3 Eastern Forest Rangers College (EFRC), Kurseong

During the year, 62 ranger trainees are undergoing the 2 year training course at EFRC, Kurseong.

##### 8.1.2.4 In-service Training of SFS Officers

During the year, the Directorate of Forest Education organised 10 in-service 2-week training courses for SFS officers of various states at SFS College, Dehradun, SFS College, Coimbatore, SFS College, Burnihat and Indian Institute of Forest Management, Bhopal. A six-months Special Diploma Course in Social Forestry was also organised at the SFS College, Dehradun.

A Committee has been constituted to look into the revision of the syllabi of the courses for the SFS, Rangers and subordinate level officers of the Forest Departments of various States.

The Directorate, in collaboration with the Institute of Applied Manpower Research, New Delhi, is carrying out a pilot study on Manpower Planning in Forestry Sector in Uttar Pradesh.

##### 8.1.2.5 Training under Colombo Plan

Thirty-nine IFS Officers, 18 SFS Officers, 17 Range Forest Officers and 8 Scientists were sponsored for training mainly in U.K. under Colombo Plan during the year.

### 8.1.2.6 In-service Training of Forest Officers

The Ministry, in addition to 44 one-week programmes, also organised 13 three-week compulsory training orientation programmes for IFS Officers during the year at various premier institutions throughout the country on forestry related disciplines and application of modern techniques in forestry. The main thrust of the courses was on computer applications in Forestry, Wildlife Management, Participatory Forest Management, Project Identification, Formulation, Monitoring and Appraisal, Forest Tribal Interface, Forestry in Rural Development etc. About 1400 IFS Officers attended the courses thus covering almost 60% of the total cadre strength of the IFS.

## 8.2 WILDLIFE EDUCATION AND TRAINING

**8.2.1** The Wildlife Institute of India (WII), Dehradun continued its activities to provide inservice training in Wildlife Management for forest officers, wildlife ecologists and various other professionals.

During the year following courses were conducted by WII:

- A one week capsule course for IFS Officers which was attended by 25 participants from seven States.
- 3 month's Certificate Course in Wildlife Management.
- 9 month's Post Graduate diploma Course in Wildlife Management. One trainee from Nepal is presently undergoing training in 9 months post graduate course availing SAARC fellowship of Government of India.
- 2 weeks capsule course in Zoo management for Zoo personnel including forest officers.
- One week capsule course on Eco-development and Participatory Rural Appraisal (PRA) techniques for Field Directors, Project Tiger and Chief Wildlife Wardens.

**8.2.2** The Institute also organised a two day workshop on Strategic Planning for Wildlife Management at Dehradun for officer trainees of diploma and certificate courses' and faculty members under the Indo-US collaborative project. Besides, a 3-day workshop on Field Research Methods for Park Area Managers and Wildlife Scientists, an International Seminar on Integrated Forestry Planning and Management and a mobile seminar on Park Area Management for Park Area Managers from South and Central Asian countries were also organised by WII during the year.

## 8.3 NON FORMAL ENVIRONMENTAL EDUCATION AND AWARENESS

Environmental education, awareness and training plays a vital role in evolving strategies for conservation protection and management of environment. The Ministry therefore, accords priority to promote environmental education and create environmental awareness among all sections of the society through diverse activities and mass media.

### 8.3.1 National Environmental Awareness Campaign (NEAC), 1992.

**8.3.1.1** The Ministry has been organising a National Environment Awareness Campaign (NEAC) since 1986 to create environmental consciousness at all levels of the society. During the year, the activities relating to NEAC with the main theme as "Biodiversity" were planned and some of them conducted. The campaign addressed the whole gamut of environmental issues such as afforestation, eco-regeneration, pollution control, conservation of flora and fauna etc. Around 1200 organisations comprising of NGOs, Schools & Colleges, Universities, Research Organisations, Women & Youth Organisations, Government Departments etc. from various States and Union Territories were provided financial assistance in organising various activities like seminars, workshops, rallies, training courses, public meetings, padyatras, exhibitions, essay/debate/painting/poster competitions for school children, tree plantation drives, folk dances, street theatres etc. and preparation and distribution of environmental education resource material with the financial assistance granted by the Ministry. The target groups covered under the campaign are students/youth, teachers, women, tribals, administrators, professionals, voluntary workers, armed force personnel and the general public.

**8.3.1.2** As one of the co-ordinating agencies of the campaign, the Centre for Environment Education, Ahmedabad continued its efforts towards teacher training and initiation and strengthening of school NGO clusters. Its Southern Regional Cell set up about 20 NEAC school clusters in the various Southern States. Efforts are being made to initiate Resource Centres in each of these clusters which would provide low cost teaching aids and basic environment educational materials to the teachers. The activities of the clusters have been monitored and a comprehensive report has been prepared.



Fig. 65 Use of folk media to spread Environmental Awareness



**8.3.1.3** C.P.R. Environmental Education Centre, Madras continued to act as a Regional Resource Agency (RRA) for monitoring NEAC in Tamil Nadu and Pondicherry. Apart from conducting various orientation programmes with participatory organisations in NEAC, the centre organised a mobile exhibition in a video van which spread the message of environmental conservation in various villages of Tamil Nadu and Pondicherry. During the campaign, the centre also organised diverse programmes for school children, teachers, villagers etc., with the purpose of promoting conservation of nature and natural resources.

**8.3.1.4** The National Museum of Natural History, New Delhi organised Teacher Orientation Workshop and a number of environmental education programmes and activities for different target groups under the NEAC.

**8.3.2** During the year, the Ministry also considered several proposals on non-formal education and environment awareness, setting up of Eco-clubs in schools, preparation of instructional packages for school children etc., and provided financial assistance to various organisations. Financial assistance was also provided to some organisations for supplying journals/books/publications on environment and ecology to school children, research and educational institutions, Government Departments etc., to promote non-formal environmental education.

**8.3.3** A project for spreading environmental awareness through publicity of environment slogans on bus panels of 1000 buses of M.P. State Road Transport Corporation was undertaken during the year. Steps are being initiated to extend the project in other States as well.

**8.3.4** In response to a judgement delivered by the Supreme Court of India, the Ministry prepared two sets of 10 cinema slides on environmental themes in different languages and has forwarded them to the Governments of all States/Union Territories for displaying in cinema halls, video parlours etc., with the ultimate objective of inculcating environmental awareness among the country's population.

**8.3.5** Realising the role of films/audio-visuals in propagating environmental messages, the Ministry considered various proposals for production of documentary films on environment related topics. Seven films have been completed during the year, and about 60 films are under production. The Ministry has requested Electronic Trade and Technology Development to take up the responsibilities for distribution of such films.

### 8.3.6 Paryavaran Vahinis

**8.3.6.1** A new scheme titled "Paryavaran Vahini" has been launched during the year with the following objectives:

- Creation of environmental awareness and involvement of people through active participation.



Fig. 66 Painting competition at NMNH

- Reporting on illegal acts pertaining to forests, wildlife, pollution and environmental degradation.
- Feedback regarding afforestation and survival of plants.
- Monitoring including collection of sample, analysis of ambient air and water quality including vehicular pollution.

**8.3.6.2** Paryavaran Vahinis have been constituted in 100 districts, which have been identified on the basis of high incidence of pollution and density of tribal and forest population. These districts are spread over, all the 25 States and 4 Union Territories. Each Vahini has 20 members who are drawn from amongst the students, youth, individuals and Non Government Organisations. The Vahinis are functioning under the charge of District Collectors 'with active cooperation of the States/Union Territories Governments. The entire expenditure on the scheme is borne by the Ministry of Environment & Forests.

**8.3.6.3** The members of the Vahinis not only create environmental awareness amongst general public by disseminating relevant literature but also play a watchdog role by reporting of environmental pollution, deforestation etc. The follow up action on the complaints received from various members is taken by the District Collectors who pursue the matter with the respective authorities. Initially Members of 20 Vahinis have been provided with water testing kits.

### 8.3.7 Centres of Excellence

The following five Centres of Excellence which have a linkage with an institution have been assisted or set up by the Ministry with a view to strengthening awareness, research and training in priority areas of Environmental Science and Management.

- Centre for Environment Education, Ahmedabad; (linked with Nehru Foundation for Development, Ahmedabad)

- C.P.R Environmental Education Centre, Madras; (linked with C.P.R Aiyar Foundation, Madras)
- Ecological Research and Training Centre, Bangalore; (linked with Indian Institute of Science, Bangalore)
- Centre for Mining Environment, Dhanbad (linked with Indian School of Mines, Dhanbad) and
- Salim Ali Centre for Ornithology and Natural History, Coimbatore; (Linked with Bombay National History Society, Bombay)

#### 8.3.7.1 Centre for Environmental Education (CEE), Ahmedabad.

The CEE, Ahmedabad set up in 1984, continued its activities relating to the development of environmental education resource materials, training programmes, interpretation programmes and creation of environmental awareness among the children and the general community. Details of the activities of the centre during the year are as follows:

- The National Report to UNCED titled 'Environment and Development: Traditions, Concerns and efforts in India' was prepared. The document aimed at bringing out the broad features of India's tradition of environmental awareness and action. It highlights some of the activities undertaken by the State, by people and NGOs in addressing environmental issues. It also brings out the overall dimensions of the problems which India faces.
- The Centre alongwith Development Alternatives and the M.S. Swaminathan Research Foundation, organized an 'NGO consultation on UNCED Follow-up' meeting on 13-14 November, 1992 at New Delhi to provide a forum for interaction between Independent Sector, Non-Governmental Organizations and the Government.
- Under the scheme for Environment Orientation to School Education of the Ministry of Human Resources Development, work continued to review and guide the project agencies in developing locale-specific environmental education materials. Thirteen of the twenty-six project agencies were visited to review the materials developed by them.
- The third Training programme in Environmental Education, TEE-91 ended in July, 1992. Sixteen persons including 4 candidates from Ghana, Malta, Sri Lanka and Zimbabwe Sponsored by the Common wealth Secretariat attended the training programme.
- Work on formulation of Short Term Training Programmes for various specialised target groups has been initiated.

- On World Environment Day (5th June), CEE organised a day-long 'Paryavaran Mela' which was attended by over 300 persons and most of them were children. Environmental education was imparted through games, screening of films, story telling, poster making etc.
- A team from CEE visited the Madras Crocodile Bank in response to their request for an interpretive plan. CEE is also actively involved in the planning of signage, exhibits and publications for the Natural History Museum being established at Mysore. Besides these, interpretive plans have also been initiated for the Guindy National Park and the Mysore Zoo.
- The first issue of Nature Scope India, 'Amazing Mammals' was disseminated to agencies in India and other countries. A catalogue of conservation related initiatives in India by the people and government is being put together for which information on entries and illustrations are being finalized.
- 'Vid Vagdana Pankhi' which is the third in the series of books on birds of Gujarat was published. The first two in the series, 'Aaspaasno Pankhi' and 'Panina Sangathi' have won State awards in the Science Category.
- Collection of environment education materials and information on environmental education related programmes were continued for the establishment of an Environmental Education Data Bank under ENVIS Centre. In this regard, workshops for teachers, media programmers and other communicators were organized to develop their own situation specific EE programmes and materials at Ahmedabad and Bangalore.
- Development of materials accompanying the film 'Drakhi', the first of thirteen modules of teacher and student material was completed under the Children's Environmental Education Television (CEETV) project.
- In an effort to make the ten-part television serial 'Race to Save the Planet' more relevant to the Indian context, related activities for identification of Indian segments for integration into various parts of the serial, have been initiated.
- Ecc-development activities continued under the Hingolghadh and the Ranthambore Ecodevelopment Projects. These activities include training of farmers and women's groups in nursery raising, Ber plantations, animal husbandry, demonstrations of drip irrigation methods, exposure tours, introduction of biogas, etc.
- At the Sundarvan Nature Discovery Centre, programmes aimed at creating an interest in nature and general awareness continued. A training programme at Baker being conducted with the objective of creating environmental awareness among rural youth.

- As a step towards achieving regional co-operation in the South and South-east Asia region for enhancing the quality of environment education, the centre organised a workshop jointly with IUCN.
- The Southern Regional Cell initiated garbage and solid waste management projects in the slums of Bangalore, with the support of the Norwegian Agency for Development Co-operation (NORAD). pamphlets and posters have been developed for these projects. The Cell also participated in Parisara Prajna Utsav, a children's festival sponsored by the Government of Karnataka, by organizing activities and games for the children.
- Edutech coordinated the development of a set of products titled "Living with Nature-Art and Environment" for the Royal Society for Preservation of Nature, Bhutan. Some of CEE's publications were reprinted by Edutech for distribution.

#### **8.3.7.2 C.P.R. Environmental Education Centre (CPREC), Madras**

The Centre started in 1988 with the objective of creating and increasing consciousness and knowledge about the environment and to generate resource material and education packages on environment. Various activities undertaken by the Centre, during the year are as follows:

- Training Programmes for NGOs, rural workers, students and teachers from Andhra Pradesh, Tamil Nadu, Karnataka, Kerala and Orissa were organised.
- Awareness programmes, ecoclubs, essay, quiz, painting and oratorical competition on various environmental themes were conducted for children.
- Exhibitions on 'Birds', 'Trees', 'Vanishing Species', 'Sustainable Technologies', 'Man and the Environment', 'Why Save a Tree' and 'Nilgiri Biosphere Reserve' were organised.
- A participatory science exhibition on Environmental Experiments for Children has been set up in Madras.
- Two video films 'Pachchai Kovil' ('Temple of Green') and 'Pasumai Payanam' ('Campaign on Wheels'), an audio cassette of Tamil Environmental folk songs and an audio visual on 'Wasteland Development' in English, Tamil and Telugu were produced by the Centre.
- A publication on "Environmental Education in the School Curriculum" and an accompanying Teachers' Kit, and "Energy - A Book of Facts and Activities" and several booklets and pamphlets were brought out by the Centre for distribution.
- An Awareness raising programme was conducted in the Nilgiri Biosphere Reserve, including a project to clean and

maintain Dodabetta, and the setting-up of Eco-Model villages at Bokkapuram and Adhiharatty villages.

- Sustainable technologies were demonstrated by setting up community Smokeless Chulhas and water recycling units.
- A soil testing kit to determine Nitrogen, Phosphorous, Potassium and pH levels has been developed by the Centre.
- A low cost biological treatment of tannery effluents has been developed.
- A project on 'Women in Wasteland Development' which has been undertaken by the Centre has been going on in eight districts of Tamil Nadu with local NGO groups and Mahila Mandals. Several health camps, women's melas, NGO meetings and alternate income generating programmes (nurseries and plantation programmes) for women have been organised. Training programmes for women on project administration have also been organised by the Centre.

#### **8.3.7.3 Ecological Research & Training Centre (ERTC), Indian Institute of Science, Bangalore.**

This Centre, established in 1983 with a mandate to focus on the ecology and environment of Western Ghats initiated more than 15 research projects covering various aspects of the ecology and environment of the Western Ghats.

Some of the major projects are as follows:—

- Paleocology of the Shola forest and grasslands in the upper Nilgiri Plateau
- Patterns of geographical distribution and diversity of birds and Amphibians on the Western Ghats.
- Plant diversity in two Western Ghat village eco-systems.
- Vegetation status of community forest and Soppinabetta forest.
- Propagation methods and performance of plant species in Western Ghat region of Uttara Kannada District.
- Effect of lopping on tropical tree species.
- Plant reproductive strategies.
- Study of forest dynamics of Western Ghat Region.

A book titled "This fissured land: An Ecological History of India" and several technical papers, popular articles etc. on various aspects of the Western Ghats were published by the centre during the year. The following workshops/training programmes were also organised by the Centre.

- A Consultation Workshop on Biodiversity of Western Ghats in collaboration with WWF-India and the Indian Institute of Science.

- A workshop on "Methods in Behavioural Ecology".
- A training programme on "Management of Environment & Forests" for IAS Officers.

#### 8.3.7.4 Centre for Mining Environment, Dhanbad

The Centre for Mining Environment was established at the Indian School of Mines, Dhanbad in 1987 with the following objectives:

- to impart training to in-service field personnel in environmental science and technology with particular reference to environmental management in mining areas
- to carry out research in the field of mining environment
- initiation of regular academic programmes leading to M. Tech degree in Environmental Science and Engineering, and
- to undertake consultancy and testing work to help mining and mineral industries and the neighbouring areas in solving environmental pollution problems.

Based on the report of the Experts Committee appointed by the UGC it has been decided that the centre would be taken over by UGC w.e.f. 1.4.1993. The Ministry, however, would continue to provide support to the R&D projects of the centre in the relevant areas.

During the year, the syllabus of the M.Tech, programme was revised and the first batch of students successfully completed the programme. The following research work is co-ordinated by the centre at present.

- Dust Control Technology in opencast local mines
- Studies on the Shelf Life of Top Soil and its prevention in coal mining areas.
- Changes in Vegetation Index and Soil Moisture in India
- Assessment of Socio-economic life in a Mining Environment and measures for Settlement Planning
- Experimental Studies on to Ecological Aspects of Reclamation in Open Cast Coal Mines in Jharia Coalfield.

In addition, the Centre also initiated the following research projects

- Monitoring Environmental Impacts of Iron ore, Limestone and China Clay Mining in Singhbhum District of Bihar Using Remotely Sensed Data.
- Development of coagulants for clarification of coal washery effluents.
- Studies on Air Quality in Jharia Coalfield with particular reference to the impact of some Mining Operations.

- Studies and Management of Tailings and Spoils in Mining Areas.

Besides the Centre also organised two training programmes during the year for inservice personnel from mining and associated industries.

#### 8.3.7.5 Salim Ali Centre for Ornithology and Natural History (SACON)

This Centre was established in June, 1990 with the major objectives of conducting research and Postgraduate level courses on all aspects of Ornithology and Natural History of other life-forms.

During the year, the Centre initiated several research projects/studies in various parts of the country. Details may be seen in Chapter 7.

#### 8.3.8 National Museum of Natural History (NMNH), New Delhi

The National Museum of Natural History (NMNH) was established in 1978 to promote non-formal environmental education and to create conservation awareness among the people. The museum has several exhibit galleries that deal with biological diversity, ecology and conservation, a Discovery Room for Children, an Activity Room for pre-schoolers, a Bio-science Computer room for high school students and a Mobile Museum for outreach activities, all aimed at promoting environmental awareness among various target groups. The museum conducts a number of educational activities all the year round including the organisation of temporary exhibitions on themes relevant to Environment, Ecology and Conservation. A brief report of the activities of the NMNH during the year is as follows:

##### 8.3.8.1 Exhibit Galleries

Under the on-going programme of renovating and updating the exhibit galleries of the Museum, the gallery on 'Cell -the basic Unit of Life' was re-organised with new thematic exhibits and improved display techniques. The exhibits on Ganga and Tropical Forest in the Conservation Gallery and those on Food Web and Extinct Animals in the Ecology Gallery were also improved and updated.

##### 8.3.8.2 Temporary Exhibitions

The Museum coordinated and participated in the organisation of an Exhibition on "Environment and Development" at the Teen Murti Lawns to commemorate the 103rd Birth Anniversary of Pandit Jawaharlal Nehru. The exhibition displayed exquisite photographs, translites and exhibits depicting the biological diversity of the country. Several government departments, institutes, museums and

NGOs also participated in the exhibition. Besides the displays, a number of educational activities such as a nature train, puppet show, nature painting, discovery quiz, clay modelling contests etc., were also organised during the exhibition. The exhibition was visited by over a lakh of people and about 50,000 school children.

An Exhibition on Tiger was also organised by the Museum in collaboration with the Project Tiger Directorate to commemorate 20 years of Project Tiger.

#### 8.3.8.3 Educational Activities

The educational activities of the NMNH included a number of special events besides the regular programme of lectures, film shows and pedagogical activities for the benefit of school children and teachers within the museum premises. These included:

- A month long Summer Programme for teenagers on "Exploring the Environment"
- Creative activity for children on nature painting and animal/plant modelling
- Poster, painting and modelling contests organised on the occasion of the World Environment Day, Wildlife Week, Earth Day, Conservation Day etc
- Audio-visual extension programmes and film shows organised at schools, colleges, resettlement colonies in Delhi and rural areas
- Special museum programmes for handicapped children
- Environmental education programmes and activities for different target groups under the National Environment Awareness Campaign
- Teacher Orientation Workshops
- Publication of popular environment education resource materials.

#### 8.3.8.4 Care for the Environment Contest

A nation-wide 'Care for the Environment Contest' was conducted by the Museum during the year. The contest item consisted on the following six categories:

- To design a Symbol or Logo representing concern for the Environment;
- To write a slogan that motivates environmental awareness and action;
- To compose a poem/song expressing love and concern for nature symbolising the spirit of nature conservation;

- To illustrate a comic strip depicting an interesting anecdote or story that reflects the spirit of environmental awareness;
- To script a film for an environment related story; and
- To paint a poster with a striking illustration to promote environmental awareness and concern.

The contests were open in 14 major Indian languages and English with attractive prizes in each category and in each language. Over 2 lakhs entries from various States/UTs were received which have been sorted out, classified and documented. Judging Committees of eminent persons have been constituted for selecting the award winning entries. Awards under two categories viz., "Illustrate a Comic Strip" and "Paint a Poster" have been announced so far and those for other categories are under finalisation.

#### 8.3.8.5 Collaboration with Universities

The NMNH continued its academic collaboration with the Delhi University by conducting a month long course on 'Environmental Education' for the final year students of B.Sc. (Environmental Science). The Museum also assisted the Department of Environmental Biology, Delhi University (South Campus) by conducting lectures and practical classes on 'Systematics and Evolutionary Biology' and by organising slide presentations, film shows, field study visits and guidance in project work for the students of M.Sc. (Environmental Biology).

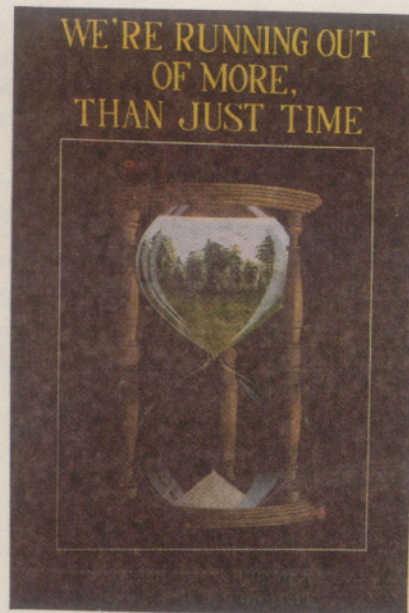
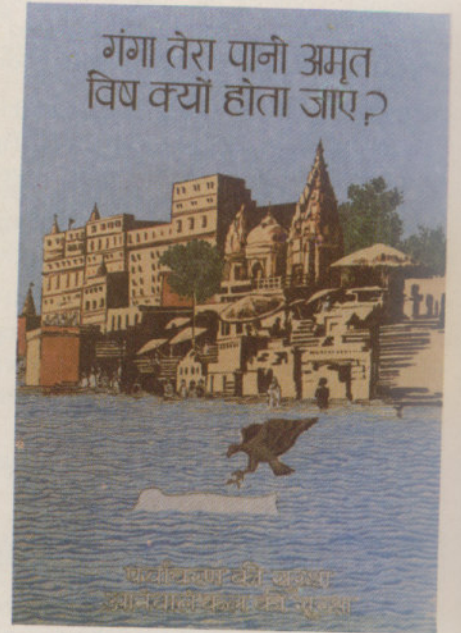
The NMNH also extended its cooperation to the National Museum, New Delhi (a deemed University) in the teaching of Museology and in conducting courses on 'Museum Communication', 'Computerization in Museums' and 'Exhibit Planning and Designing'.

#### 8.3.8.6 Indo-US Natural History Workshop

An Indo-US Natural History Workshop on the subject, "Environmentally Oriented Natural History Museums - Exhibits, Programmes and Public Services" was organised by the NMNH in India during the year under the auspices of the Indo-US Sub-commission on Education and Culture. The Regional Museum of Natural History was used as a programmatic base for the workshop which made a critical analysis of the exhibit plans and educational programmes of the museum from the point of view of developing it as a centre for environmental education with linkages with nature reserves and outdoor nature interpretation facilities.

#### 8.3.8.7 Regional Museums

During the year, construction of a new building and development of a museum complex at Mysore was completed. Exhibit designing and planning for the galleries and



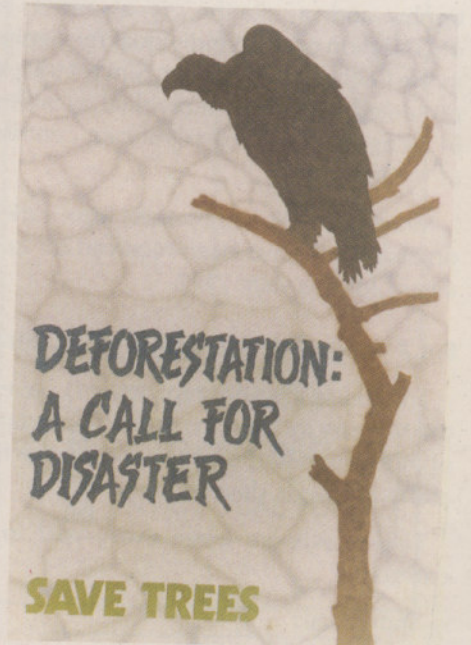
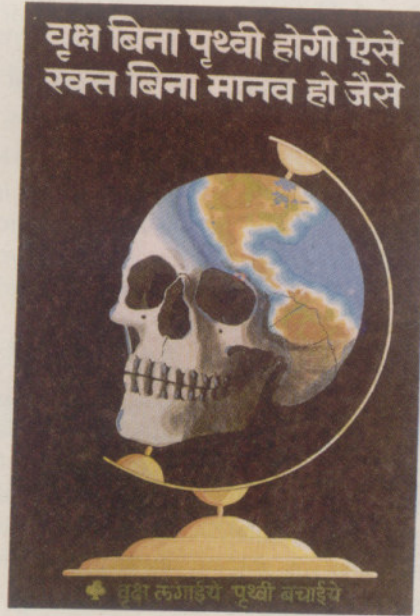




Fig. 68 An exhibit Gallery at NMNH

installation of internal structures have also been undertaken. The Museum at Mysore is being developed as a Regional Museum of Natural History for catering to the environmental education needs in Southern India.

Regional Museums of Natural History are to be established in Bhubaneswar and Bhopal. Land has been made available by the State Govt. It is expected that some of the responsibilities for the management of these museums will be that of State Governments.

## 8.4 FELLOWSHIPS AND AWARDS

### 8.4.1 Indira Gandhi Paryavaran Puraskar (IGPP)

Instituted in 1987, the Indira Gandhi Paryavaran Puraskar, consisting of a cash component of Rs. one lakh, a silver trophy and a citation, is awarded every year to an organisation or to an individual for significant contributions in the field of environment. Since 1991, this award is being presented both to an individual as well as an organisation in recognition of their significant contributions in the field of environment.

More than 400 nominations from various individuals and organisations have been received for consideration for the award for the year 1992.

### 8.4.2 Indira Priyadarshini Vrikshamitra Award (IPVM)

The Indira Priyadarshini Awards have been instituted by the Ministry in 1986 to recognise outstanding contributions of individuals and organisations in the field of afforestation and wastelands development.

Ten awards are given every year in the following five categories:

- Individuals
- Educational Institutes
- Panchayats
- Voluntary Agencies and
- Government Agencies

Each award carries a medallion, a citation and a cash component of Rs. 50,000.

Nominations from various individuals, institutions, NGOs, etc. received for the awards for 1991 are being considered.

### 8.4.3 National Awards for Prevention and Control of Pollution

Since 1991, National awards are being presented every year to eligible industries in recognition of their contributions to the prevention and control of environmental pollution. Four awards were given during 1992 and work relating to the selection of awardees for 1992 is in progress.

### 8.4.4 Desert Ecology Fellowship

In recognition of the Bishnoi Community's contribution to nature conservation and to encourage studies on desert ecology, the Ministry has instituted a Desert Ecology Fellowship at the University of Jodhpur. A Committee has been constituted for selecting a suitable candidate for awarding the fellowship.

### 8.4.5 Pitamber Pant National Environment Fellowship Award

This annual fellowship, instituted in 1978, is awarded to recognise, encourage and support excellence in any branch of research related to environmental sciences. The fellowship for the year 1990, 1991 and 1992 have been awarded to Dr. Cecil J. Saldanha, Dr. (Mrs.) P. Mohanty Hejmadi and Dr. T.N. Ananthkrishnan respectively in recognition of valuable contributions made by them in the field of environmental sciences.

During the period of the fellowship, Dr. Saldanha will prepare a book on 'Eco-development of the Western Ghats, Dr. (Mrs.) Hejmadi will undertake research on developmental biology of sea turtles for their conservation and perfect techniques for their mass culture and Dr. Ananthkrishnan intends studying resources competition and insect community structure in natural and disturbed forest litter ecosystems.

## 8.5 ENVIRONMENTAL INFORMATION

### 8.5.1 Environmental Information System (ENVIS)

The ENVIS network with its focal point in the Ministry continued its activities in information collection, collation, storage, retrieval and dissemination in environmental related areas to all concerned. During the year, ENVIS expanded its network by incorporating four network partners in the areas of 'Himalayan Ecology', 'Animal Ecology', 'Solid Wastes Disposal' and 'Environmental Problems of Mining'. The network therefore at present consists of 17 subject oriented



centres, known as ENVIS Centres, besides the focal point in the Ministry. All these Centres were engaged in developing the information base and creating the relevant data bases in their concerned subject areas for disseminating information to the users. A list of the existing ENVIS Centres alongwith their corresponding subject areas is given at Annexure IV.

The activities of the ENVIS focal point and its various centres during the year are given below.

## 8.5.2 Focal Point

### 8.5.2.1 Documentation Service

The focal point continued its activities in regard to strengthen its information base in the form of publication, reports, bibliographies, journals, monographs, etc. for speedy dissemination of information to the various user groups. The information base was also enriched by several

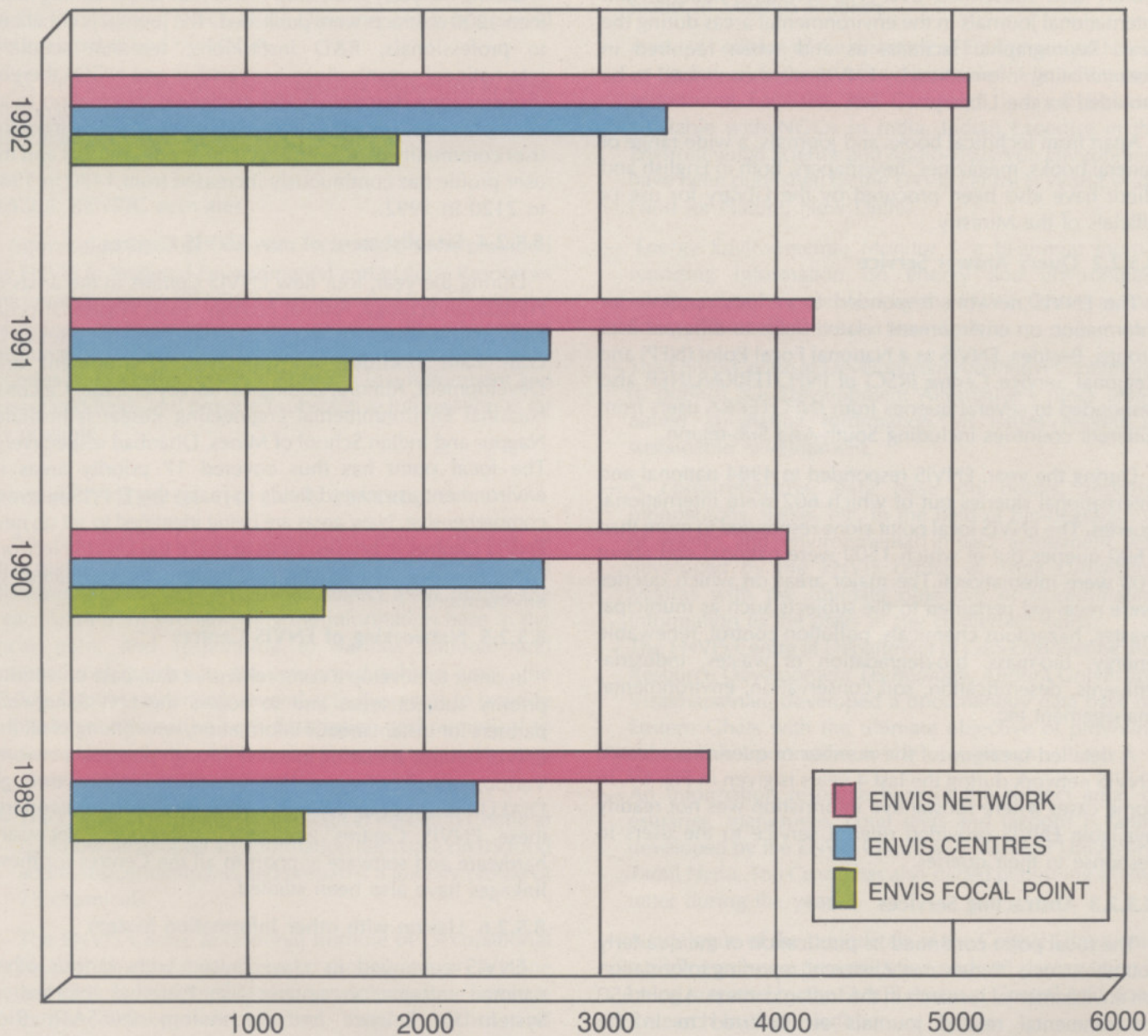


Fig. 69 TOTAL NO OF QUERIES RESPONDED BY ENVIS DURINGS 1989-92

documentation support provided by ENVIS network partners in their specialised subject areas.

The Library in the Ministry is also looked after by ENVIS. During the year, the documentary repository in the Library was enriched by collection of books, national/international scientific periodicals, conference proceedings, etc. in the field of environment and its related areas. The Library at present has a collection of approximately 18,000 books, scientific and technical reports, national and international journals, research abstracts, etc. for providing back-up support to ENVIS in disseminating substantive information. Besides, Library also subscribed over 170 scientific national and international journals in the environmental areas during the year. Reprographic facilities as and when required in disseminating information by ENVIS were continued to be provided by the Library.

Apart from technical books and journals, a wide range of general books, magazines, newspapers, both in English and Hindi have also been procured by the Library for use of officials of the Ministry.

#### **8.5.2.2 Query Answer Service**

The ENVIS network responded to various requests for information on environment related fields to different user groups. Besides, ENVIS as a National Focal Point (NFP) and Regional Service Centre (RSC) of INFOTERRA/UNEP also responded to several queries from INFOTERRA users from different countries including South-Asia Sub-region.

During the year, ENVIS responded to 4984 national and international queries out of which 602 were international queries. The ENVIS focal point alone responded to more than 1600 queries out of which 1500 were national and about 100 were international. The major areas on which queries were received pertained to the subjects such as municipal wastes, hazardous chemicals, pollution control, renewable energy, bio-mass, bio-degradation of wastes, industrial effluents, desertification, soil conservation, environmental management etc.

A detailed break-up of the number of queries processed ENVIS network during the last 4 years is given in Fig. 69. In some cases where substantive information was not readily available ENVIS provided referral service to the users in response to their queries.

#### **8.5.2.3 Abstracting Services**

The focal point continued its publication of the quarterly journal namely 'Paryavaran Abstracts' reporting information on environmental research in the Indian context. About 650 environmental related journals are referred to in the compilation of various abstracts for inclusion in the publication. These abstracts are arranged under the following major categories in the journal:

- Air Pollution
- Water Pollution
- Noise Pollution
- Ecology
- Environmental Management
- Nature and Natural Resources Conservation
- Health and Toxicology
- Wastes
- Forestry
- Wildlife and
- Energy

During the year, four issues of this journal containing more than 1200 abstracts were published. The journal is circulated to professionals, R&D institutions, research scholars, international organisations, universities and NGOs thereby disseminating descriptive and numerical information to all concerned. ENVIS continuously received requests from the user community of the above sectors for this journal and the user profile has continuously increased from 1470 in 1988 to 2120 in 1992.

#### **8.5.2.4 Establishment of new ENVIS Centres**

During the year, four new ENVIS Centres in the areas of Himalayan Ecology, Animal Ecology, Solid Wastes Disposal and Environmental Problems of Mining have been set up in G.B. Pant Institute of Himalayan Environment and Development, Almora, Zoological Survey of India, Calcutta, National Environmental Engineering Research Institute, Nagpur and Indian School of Mines, Dhanbad respectively. The focal point has thus covered 17 priority areas in environment associated fields to make the ENVIS network comprehensive. New areas are being identified to set up new ENVIS Centres in phases, so as to make the ENVIS Network comprehensive to cover all major areas related to environment.

#### **8.5.2.5 Networking of ENVIS Centres**

In order to develop a comprehensive data base on various priority subject areas and to access the ENVIS network partners for instantaneous information, networking of all the ENVIS Centres are being initiated through potential network. Various possibilities are being explored either through DIALUP facilities or through E-Mail service for networking these ENVIS Centres with the focal point. Necessary hardware and software support to all the Centres for these linkages have also been studied.

#### **8.5.2.6 Liaison with other Information System**

ENVIS continued its close liaison with various other national information systems like National Information System for Science and Technology (NISSAT), Bio-Technology Information System (BTIS), for exchange of environmental information and to avoid duplication of efforts in the concerned fields.

### 8.5.2.7 INFOTERRA/RSC Activities

ENVIS focal point continued its activities as a National Focal Point (NFP) as well as Regional Service Centre (RSC) of INFOTERRA network of the United Nations Environment Programme (UNEP). During the year ENVIS as RSC organised a Regional INFOTERRA Workshop where participants from South-Asia Sub-region countries attended and several modes for better communication and exchange of information were being recommended to INFOTERRA/PAC.

ENVIS also updated information on more than 250 Indian sources engaged in the environmental activities for inclusion in the International INFOTERRA Directory of Environmental Sources published by UNEP.

As NFP as well as RSC, ENVIS network responded to 4984 national and international queries and provided substantive information as far as possible to the users.

### 8.5.2.8 RENRIC activities

Information feed-back was also continued to be provided by ENVIS to Regional Environmental and Natural Resources Information Centre (RENRIC) Programme of SACEP with the objective of augmenting and updating its information resource base. During the year, ENVIS responded to several queries from RENRIC partner countries in environment and associated fields and provided substantive information as far as possible.

## 8.5.3 ACTIVITIES OF THE ENVIS CENTRES

All the ENVIS Centres continued their activities in information collection, collation, retrieval, storage and dissemination in their respective subject areas during the year. Apart from strengthening the information base in the focal point and responding to various national and international queries in the concerned subject areas, the ENVIS Centres undertook several activities so as to provide substantive information both description and numerical to its user groups. Some of the major programmes undertaken by these centres are as follows:

- The Centre at Industrial Toxicological Research Centre at Lucknow developed an information data base on 85 food additives/contaminants and prepared a toxicity profile of 75 chemicals.
- The ENVIS Centre at National Institute of Occupational Health, Ahmedabad, prepared monograph on acetone and carbon-di-sulphide as well as safety cards on benzene carbon tetrachloride, phenol, methyl alcohol and melathion.
- The ENVIS Centre at Centre for Ecological Sciences, Indian Institute of Science, Bangalore, developed a data base in

the subjects of ecology, biological diversity, eco-development and conservation of natural resource for providing substantive information to the users.

- The ENVIS Centre at Environmental Planning and Coordination Organisation (EPCO), Bhopal published 'Environmental Status of Mining Activities in Amarkantak', 'Environmental Status of River Kshipra - a preliminary study on problems and perspectives', and 'Ecology of *Parthenium hysterophorus* - an obnoxious weed of India' during the year. Besides, the Centre also undertook a study for preparation of a status report on lime kilns and cement plants in Madhya Pradesh.
- A revised edition of the directory of Environmental NGOs in India and three new directories viz., Pollution Monitoring Facilities and Campaign Support Services available with NGOs in India, Indian Expertise in the Environmental Science and Audio-visuals on Environment have been published by the ENVIS centre at World Wide Fund for Nature, New Delhi.
- 'Energy Environmental Monitor' - a bi-annual journal reporting information on energy and environment continued to be published by the ENVIS Centre at Tata Energy Research Institute, New Delhi.
- The ENVIS Centre at Development Alternatives continued to publish the Development Alternative's news letter, aimed at sharing information on issues related to sustainable development.
- A comprehensive data base on books, reports, monographs, thesis, etc. in the field of bio-degradation of wastes and environmental impact assessment was developed by the ENVIS centre at Anna University, Madras with the ultimate objective of disseminating information to the users in the concerned fields.
- The ENVIS Centre at Department of Geo-Engineering and Resource Development Technology, Andhra University, Visakhapatnam developed a documentary data base on Eastern Ghats with the ultimate objective of providing substantive information to the user groups.
- An information resource base in the subject areas of estuaries, mangroves, coral reefs and lagoons is being developed by the ENVIS Centre at Annamalai University, Tamil Nadu. The Centre has also started publishing a news letter during the year.
- A catalogue of the periodicals of the Central Library and a bibliography on desertification and soil conservation is being prepared by the ENVIS centre at Central Arid Zone Research Institute, Jodhpur.
- A data base on Environment Education resource material and related programme is being developed by the ENVIS Centre at Centre for Environment Education, Ahmedabad.

## 9. LEGISLATION AND INSTITUTIONAL SUPPORT

### 9.1 LEGISLATION

**9.1.1** Consequent upon the implementation of Environment (Protection) Act 1986, the Ministry of Environment & Forests has undertaken several steps to provide legal and institutional basis, which include framing of rules, notification of standards, delegation of powers, identification of agencies for hazardous chemicals management and setting up of Environmental Protection Councils in the States.

**9.1.2** Under the provisions of the Water (Prevention & Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 additional responsibilities have been placed on the Central & State Pollution Control Boards. Legal actions under these two acts are taken by the respective State Pollution Control Boards.

**9.1.3** Amendment of the Public Liability Insurance Act, 1991.

**9.1.3.1** The Public Liability Insurance (PLI) Act, 1991 has been amended to limit the liability of the insurer and to provide for creation of an environmental relief fund. A list of hazardous chemicals for which the PLI Act is applicable has also been notified. A scheme for operating an environmental relief fund is being formulated in consultation with the Members of the PLI Advisory Committee. The notification specifying the amount of money to be kept in a separate Public Liability Fund by some category of owners seeking exemption as per Section 4(3) of the Act has also been drafted.

**9.1.3.2** Powers under Sections 13 and 18 of the PLI Act are being delegated through a Gazette Notification. Necessary instructions to all State Governments and Pollution Control Boards have been issued to implement the Act. The guidelines of PLI Act are also being processed.

**9.1.4** Amendment of Hazardous Micro-organism/Genetically Modified Organisms or Cells Rules, 1989.

**9.1.4.1** The Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms, Genetically Modified Organisms or Cells, 1989 are under revision in the light of the comments of the Central Ministry, State Governments and discussions held with experts and field level officers in various regional meetings convened by the Ministry during the year. Actions are being taken to notify these Rules.

**9.1.4.2** The amendments of the Management, Storage and Import of Hazardous Chemical Rules, 1989 have been finalised. Steps have also been taken to notify these rules.

**9.1.5** Under the provisions of the Water and Air Act no person shall, without prior consent of the Central/State

Pollution Control Board, establish or operate any industrial plant. The consent format was prescribed separately in the Water & Air Act. A new format for the consent application and for authorisation which is required under the Environment (Protection) Act, 1986, has been developed and notified on 31st March, 1992. It also includes the 'authorisation' given to hazardous industries under the rules of the Environment (Protection) Act, 1986.

**9.1.6** The Water Prevention & control of pollution cess Amendment Act, 1991 was brought in to effect from 26th Jan. 1992 where by the cess charge on water consumption have been increased to encourage conservation.

**9.1.7** A Notification has been issued on 12th February, 1992 under the Environment (Protection) Act, 1986, according to which all the polluting units are required to meet the prescribed standards within a given time-frame. As per the given time-bound programme, all the units set up on or before 16th May, 1981 and after this date are to meet the prescribed standards latest by 31st December, 1993.

**9.1.8** The general effluent standard notified in September, 1988 has been amended through a notification dated 1st October, 1992 issued under the Environment (Protection) Act, 1986. The earlier notification was applicable only for those industries for which industry specific standards are not notified. The present amendment stipulates that the general standards are now applicable to all the industries and the State Pollution Control Boards may specify different standards for different receiving bodies.

**9.1.9** A Notification making Environmental audit mandatory was issued during the year. This requires all industries applying for a consent under the Water (Prevention & Control of Pollution) Act, 1974 or under the Air (Prevention & Control of Pollution) Act, 1981 or an authorisation under the Environment (Protection) Act, 1986 to submit an annual environmental audit report to the concerned State Pollution Control Board. The Department of Company Affairs has been moved to incorporate the requirements of Environmental Audit in the Companies Act, 1948.

**9.1.10** A Bill to provide assistance for the setting up of National Environment Tribunals and expeditious disposal of cases regarding compensation to the victims of accident occurring while handling hazardous substances has been introduced in the Parliament in August, 1992.

**9.1.11** A Notification incorporating various suggestions has been Gazetted on 7th May, 1992 for the districts of Gurgaon in Haryana and Alwar in Rajasthan for regulating the developmental activities in the Aravalli Range. The areas covered by the notification include reserved forests, protected forests or any other areas shown as forests in the land records maintained by the State Governments.

**9.1.12** A Notification making environmental impact assessment a statutory requirement for all projects both in the public and private sectors has been issued on 28th January, 1993.

**9.1.13** Rules for recognition of the Zoos to stipulate the standards for upkeep and maintenance and veterinary care of the Zoo animals were notified on 4th September, 1992.

The zoos are required to apply for recognition to the Central Zoo Authority by 4th August, 1993.

#### **9.1.14 Legal action against Polluting Industries**

**9.1.14.1** The Central and State Pollution Control Boards are responsible for carrying out the functions entrusted to them under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 respectively. Legal action under these two Acts is taken by the respective State Boards. The statewise information regarding the number of cases filed by the Central and State Pollution Control Boards is compiled and analysed on a quarterly basis.

**9.1.14.2** As on 31st December, 1992, 5630 cases have been filed by the State Pollution Control Boards under the

Water and Air Acts. Out of these, 1942 cases have been decided, 3479 are pending in various courts and 209 were dismissed.

## **9.2 INSTITUTIONAL SUPPORT**

### **9.2.1 Assistance to State Pollution Control Boards**

The Ministry has been providing financial support to strengthen the State Pollution Control Boards technical man power and to procure scientific equipments. During the Seventh Five Year Plan, a sum of Rs. 453.14 lakhs has been released to various State Pollution Control Boards for this purpose.

### **9.2.2 Assistance to State/UT Department of Environment.**

The scheme of providing assistance to the State/UTs Department of Environment for additional technical man power was continued during the year. A sum of Rs. 87.56 lakhs has been released to various State Departments of Environment during the Seventh Plan Period. An amount of Rs. 175 lakhs has been released by the Ministry to State Pollution Control Boards and State Departments of Environment under this scheme during the year.

# 10. INTERNATIONAL COOPERATION

## 10.1 INTRODUCTION

The Ministry of Environment and Forests is the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Cooperative Environment Programme (SACEP), and the International Centre for Integrated Mountain Development (ICIMOD). Annual financial contributions are made to the above organisations and efforts are made through active participation to obtain adequate benefits from them. The Ministry also functions as the nodal agency for the International Union for Conservation of Nature and Natural Resources (IUCN), and for participation in international agreements such as the Convention on International Trade in Endangered species, the Convention on Migratory species, the Ramsar Convention on Wetlands, the Basel Convention on Transboundary movement of Hazardous substances, the framework Convention on Climate change, the Convention of Conservation of Biodiversity, the Vienna Convention and the Montreal Protocol on the Substances that deplete the Ozone Layer. These International Conventions/Agreements are looked after by the concerned divisions.

## 10.2 THE UNITED NATION'S CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED)

**10.2.1** The UN Conference on Environment and Development was held in Rio de Janeiro, Brazil from June 3-14, 1992. The Indian delegation was led by the Minister for Environment and Forests. The Rio Conference has served to generate awareness about the inter-related concerns of environment and development and the need to integrate them in development policies. The linkages among poverty, consumption patterns, environment and development were better appreciated in the UNCED. The Conference has also widened the area of common understanding among various countries, paving the way for a global partnership.

**10.2.2** The specific outputs of Rio Conference are:

- The Rio Declaration of Environment and Development gives the elements of sustainable development in the form of a declaration of rights and obligations of States and individuals.
- Adoption of Agenda 21, which is a set of comprehensive programme of action for protecting the environment and reconciling it with development.
- The Agreement on non-legally binding authoritative Statement of Principles for a global consensus on the Management, Conservation and Sustainable Development of all types of Forests.
- The framework Convention on Climate Change and the Convention on Conservation of Biodiversity, though not

directly related to the UNCED, were also open for signature during the Rio Conference. India has signed both these Conventions in Rio de Janeiro.

**10.2.3** The Ministry played a crucial role in coordinating various activities, both at international and at national level, related to the UNCED and the Conventions on Climate Change and Conservation of Biological Diversity. Two publications for the UNCED entitled "Environment and Development-Traditions, Concerns and Efforts in India" and "Environment & Development-India's Approach" were brought out. The Ministry also organised a number of wide ranging consultations with Non-Governmental Organisations and experts, alongwith various inter-ministerial consultations to finalise our country's approach towards these negotiations.

**10.2.4.** During the Year, the Ministry also held preliminary discussions with U.K., Finland, Sweden and Germany in implementing the decisions arrived at UNCED.

## 10.3 PROTECTION OF OZONE LAYER

In order to strengthen global efforts for the protection of Ozone Layer, India has acceded to the Montreal Protocol on Substances that deplete the Ozone Layer and the provisions of the Montreal Protocol, as amended in London are effective for India with effect from 17.9.92. The Indian delegation participated actively in the Fourth Meeting of the Parties to the Montreal Protocol at Copenhagen in November, 1992. During the meeting the Minister for Environment & Forests has been elected as the Chairman of the Conference of the Parties to the Protocol. India now has access to the Multilateral Fund set up Under the Protocol and two projects have already been approved by the Fund Secretariat. Various other projects to phase out Ozone Depleting Substances within the country are being undertaken.

## 10.4 COOPERATION WITH MULTILATERAL AND BILATERAL AGENCIES

**10.4.1** The Ministry and its agencies have undertaken projects in collaboration with the World Bank, Food and Agriculture Organisation (FAO), United Nations Development Programme (UNDP), World Health Organisation (WHO), European Economic Community (EEC), South Asian Association of Regional Cooperation (SAARC), United Nations Environment Programme (UNEP), Canada, USA, Sweden, Norway, Denmark, UK, Netherlands, Germany etc. These include bilateral and multilateral agreements of cooperation. Liaison with the donor agencies for securing information on areas of donor's interest and presenting project ideas for consideration by the donors are part of the work of the International Cooperation Division of the Ministry.

A Task Force to determine the National Strategy on the phasing out of ozone depleting substances has been constituted by the Ministry. An Ozone Cell has also been set up.

**10.4.2** The details of various bilateral co-operation programmes are as follows:

#### **10.4.2.1 Australia**

Steps to extend Indo-Australian Development Cooperation Programme to the environment sector were initiated with the visit of an Australian Fact Finding Mission to India. After examining a few areas the Australian Mission has proposed a project for taking up eco-restoration of Hussainsagar lake in Hyderabad. An Australian Pre-Feasibility Mission visited the project location during the year. The report of the Mission has been considered and approved by the Government of India.

#### **10.4.2.2 Canada**

Canada has embarked up on a major programme of providing assistance to environment sector. A proposal for MOU was received from the Canadian side for an Indo-Canada Environment Facility Project to enhance the capacity of Indian institutions to promote and deliver sustainable development programmes. The project will involve a Canadian contribution of Commodities Worth Can.\$72 million which will be monetized in Indian Rupees through their proceeds realised from their disbursement in India. The monetized Indian Rupees would be diverted to support projects and programmes in environment and forestry sectors in India. The programmes to be supported under this facility would be in accordance with the priorities laid down in the National Conservation Strategy and Policy Statement on Environment and Development, the Policy Statement for Abatement of Pollution and the National Forest Policy, 1988. The MOU has been signed between the two Governments for two projects: 'Eco-restoration of Chilka Lake' and the 'Tree Growers Cooperative Projects' for implementation through National Dairy Development Board (NDDDB) and Indian Farmers Fertilizers Cooperation (IFFCO).

#### **10.4.2.3 Commonwealth of Independent States (CIS)**

A proposal for collaboration with the CIS Republic of Ukraine is under consideration. The Ministry has already requested the Ministry of External Affairs to appraise the Government of Ukraine of its priorities and programmes in the areas of conservation, pollution control, forestry and to draw up a programme with this CIS Republic. Similar initiatives are being undertaken for cooperation with Uzbekistan. Meanwhile cooperation with Russia in the field of environment continued through the Integrated Long-Term Programme (ILTP).

#### **10.4.2.4 Denmark**

Under the Indo-Danish bilateral programme, the following projects are under active consideration:

- (i) International Training Organisation in Karnataka Pollution Control Board.

DANIDA has offered to support a project for improvement of the capabilities of personnel involved in pollution control activities, through Karnataka Pollution Control Board.

- (ii) The Environmental Master Plan in South Kanara District:

The proposal for evolving a Master Plan for South Kanara District in Karnataka, envisages an integrated environmental management of the district taking into account the socio-economic and environmental profile of the area.

- (iii) Internal Training unit in Tamil Nadu Pollution Control Board:

An Internal Training Unit is proposed to be established within the existing Pollution Control Board, in which all the professional staff of the Board will be provided training in the areas of pollution control, effluent treatment in small scale, medium and large units. The proposal has been forwarded to the Department of Economic Affairs (DEA).

- (iv) Restoration of Hill-Lakes in Tamil Nadu:

A project pertaining to cleaning of two hill lakes viz. Ooty and Kodaikanal lakes had been posed to Danish Embassy for assistance. DANIDA had agreed to support the project and in the first phase of the project, 2 scientists from Tamil Nadu Government would be trained at Copenhagen, Denmark.

#### **10.4.2.5 France**

In pursuance of the Memorandum of Understanding signed between India and France for co-operation in Science and Technology, a proposal has been framed for French technical assistance for Water Quality Monitoring and Abatement of Pollution. It is envisaged that cooperation with France would receive further impetus in the light of the progress of the proposal made.

#### **10.4.2.6 Germany**

The Government of Germany provides about DM 85 million annually to India under the Capital Aid Programme for assistance to Rural Development and Environment Sectors. Of this, DM 15 million are earmarked for projects in forestry and environment sector.

Details of some of the FRG assisted Programmes are:

- Strengthening of the laboratories of the Pollution Control Boards:

The objective of this project is to improve the facilities of the laboratories of the Central & State Pollution Control Boards by providing equipments, training courses and short-term consultancies. Phase I of this project has been completed and steps have been initiated for the formulation of Phase II of the Project.

- Integrated Development of Changar Area in Himachal Pradesh:

Based on consultations with the evaluation mission for the Dhauladhar Project which was successfully completed in 1989, a similar project for the adjoining Changar area in Himachal Pradesh with an outlay of Rs. 18.71 crores has been agreed to be supported by Government of Germany. It has also been agreed that German assistance would be expanded to cover new areas such as forest research, clean production technologies and industrial pollution control.

#### 10.4.2.7 Japan

Japan has been steadily increasing its Official Development Assistance (ODA) in the environment sector through technical and financial cooperation.

In addition to the assistance provided through the Japanese International Co-operation Agency (JICA), Japan also provides long-term and low interest loans, which are disbursed through Overseas Economic Cooperation Fund (OECF). Details of projects in the Environment and Forestry sectors taken up under OECF assistance are as follows:

- Afforestation & Pasture Development along Indira Gandhi Canal in Rajasthan

The main objective of this project initiated in 1991 is protection of the canal, agricultural fields, etc., from the desert sands and to meet the local needs of fuel and fodder. The project would also provide employment to the local people. The total cost of the project is Rs. 107 crores, of which 85% will be met by OECF loan. An expenditure of Rs. 5.97 crores has already been incurred and an area of 5,662 ha. has been covered under this project.

- Afforestation Project for Aravalli Hills (Rajasthan)

The main objective of this project is to check desertification and restore ecological status by reafforestation and also to increase production of fuel wood, fodder, timber, etc. to meet the local needs. The project envisages an outlay of Rs. 167 crores which would be entirely provided by Japan under OECF loan. The project is in progress.

- Yamuna Action Plan

After a series of Government of Japan and OECF Missions, a soft loan of 17.77 billion Yen (equivalent to Indian Rs. 402

crores) has been pledged by the Japanese Government for pollution abatement of the river Yamuna. Abatement works covered under this programme are proposed to be taken up in six towns of Haryana and eight towns of Uttar Pradesh, besides Delhi. The programme comprises -(a) Sewerage works which include interception and diversion schemes and Sewage Treatment Plants and (b) Non-Sewerage works such as Low Cost Sanitation, Electric Crematoria, Afforestation, Bathing Ghats, etc.

#### 10.4.2.8 Netherlands

The Netherlands have provided an assistance of Guilders 50 million for 19 schemes in Kanpur-Mirzapur under the Ganga Action Plan in the last two years. A programme for training in Environment Impact Assessment and another project on 'Bio-monitoring of River Yamuna' are in progress. Assistance has also been provided for Water Quality Monitoring Stations at Wazirabad and Okhla. The major projects in the pipelines are, utilisation and disposal of fly ash pollution prevention in fertilizers, textiles, leather and paper sectors, strengthening of Kerala Pollution Control Board, Kallada River Action Plan, Bio-monitoring in Chaliyar in Kerala and in Tungabhadra in Karnataka, etc. It is also proposed to take up projects for support to Environment NGOs and pollution perception studies.

In the 4th Joint Working Committee meeting, it has been announced that projects relating to nature conservation particularly in the areas of buffer zone management around wildlife sanctuaries and biodiversity conservation would be considered under Netherland's global programme called "Spearhead Programme."

#### 10.4.2.9 Norway

Norway has earmarked NOK 10 million for assistance to projects in the field of environment. Norwegian assistance has been extended for a Comprehensive Environmental Project in Orissa involving industrial strengthening of State Pollution Control Board, Pollution Abatement and Waste Management Technologies with focus on Angat Talchar area, strengthening of the Disaster Management Institute in Bhopal and the G.B. Plant Institute of Himalayan Environment and Development. In addition, Norwegian assistance has also been extended for supply of equipments for fluoride emission monitoring in Aluminium industry and training in the areas of Natural Resource Accounting and Modelling and Surveillance of Dispersion and Movement of Pollutants.

#### 10.4.2.10 Sweden

Sweden, which is the major bilateral donor in forestry and wastelands development, is presently evaluating the Afforestation Projects being assisted by them in the States of Tamil Nadu and Orissa. During the year, an agreement was signed for SIDA (Swedish International Development



Agency) assistance for the Dungarpur Integrated Wasteland Development Project in Rajasthan. Under this project, SIDA will provide an assistance of SEK 73.5 million for promoting integrated land use in the district. The ongoing programme of Swedish Assistance for the Indian Institute of Forest Management, Bhopal is also being reviewed, for proposing new initiatives. The Swedish supported project for upgradation of the Environmental Protection, Training and Research Institute, Hyderabad has also become operational during the year.

#### **10.4.2.11 United Kingdom (UK)**

An agreement was signed with the ODA (U.K.) for launching projects one for rehabilitation and protection of environmental resources in the Western Ghat districts and the other on Western Ghats Forestry Projects in Karnataka. Negotiations are on for ODA assistance for similar Forestry Projects in Kulu and Manali Districts of Himachal Pradesh and the hill districts of Uttar Pradesh. ODA (U.K.) is also keen to assist India in Forestry Research, Training and Information Systems, by upgrading facilities in the different Institutions under the Indian Council for Forestry Research and Education (ICFRE). The ODA assisted project for "Environmental Improvement of Madras Waterways" entered its fourth year of operation. The project for assistance to the Ganga Action Plan also continued during the year. A proposal for ODA Assistance to India for development of CFC Substitute Technologies in accordance with the requirements of the Montreal Protocol, is also under consideration.

#### **10.4.2.12 USA**

Under the US-India Rupee Fund (USIF) Programme, various areas identified for collaborative research between India and USA are:

- Environmental Information Exchange.
- Pollution Prevention.
- Health and Ecological Risk Assessment.
- Biochemical Processes and Application of Modelling
- Conservation and Management of Wetlands.
- Conservation of Cultural and Biological Diversity.
- Human and Institutional Resource Development.

At present various project proposals drawn up by different Indian Research Institutes are being considered by the US side for funding in the forthcoming USIF funding cycle for the period 1992-96.

In addition, USAID is co-funding the National Forestry Project with SIDA in the States of Himachal Pradesh, Uttar Pradesh, Rajasthan and Gujarat.

### **10.4.3 DETAILS OF MULTILATERAL CO-OPERATION PROGRAMMES**

#### **10.4.3.1 Asian Development Bank (ADB)**

ADB has agreed to provide technical assistance in the form of foreign consultants for Environmental Management for

Coal Fired Power Stations. ADB has also offered assistance in the areas of Environmental Legislation, Environmental Impact Assessment and Energy Planning.

Countrywide study on the subject of climate change is being carried out by this Ministry under the ADB's programme of Regional Technical Assistance on Global Environmental Issues.

#### **10.4.3.2 Economic and Social Commission for Asia and Pacific (ESCAP)**

India has been contributing to the implementation of the Environmentally Sound and Sustainable Development Strategy drawn up by the ESCAP for the Asia and Pacific Region. The initiatives of the ESCAP for regional cooperation and coordination in the areas of natural resource development in the Asia and Pacific Region through the sharing of information on mutually agreed terms have also been supported by India. During the year, ESCAP organised a meeting to discuss the establishment of a Regional Network for developing the Environmentally Sound and Sustainable Development Strategy in which India participated. Follow-up action on the decisions of this meeting is being taken up.

#### **10.4.3.3 European Community (EC)**

The main ongoing project assisted by European Community relates to "Greening of Aravallis in Haryana" with a total outlay of Rs. 41.15 crores and it involves massive afforestation of common and wastelands in Haryana. Apart from this project, Indo-EC Cooperation is expected to expand environmental protection, pollution control, biodiversity conservation and other related areas once the Partnership Agreement for Cooperation and Development between EC and India comes into effect.

#### **10.4.3.4 South Asian Cooperative Environment Programme (SACEP)**

India continued to be involved in the programme of the South Asian Cooperative Environment Programme (SACEP) with its headquarter in Colombo. The Indian delegation to the 5th Governing Council Meeting of the SACEP held in Colombo, was led by the Minister (Environment & Forests). The Governing Council decided to emphasise on strengthening of SACEP programmes in the environment sector by identifying focal points for different subject areas.

#### **10.4.3.5 South Asian Association of Regional Cooperation (SAARC)**

The South Asian Association of Regional Co-operation (SAARC) had initiated a regional study on "Causes and Consequences of Natural Disasters and Protection and Preservation of Environment" in the year 1987. As a follow up the SAARC Council of Ministers set up a permanent

SAARC Committee on Environment in July 1992 for which a special Session was held in Pakistan during the year to give thrust and propose modalities for implementing 13 priority areas of cooperation for SAARC member countries for effective management of environment and natural disasters through mutually agreeable financial and institutional mechanisms. India participated in this Special Session.

#### **10.4.3.6 International Centre for Integrated Mountain Development (ICIMOD)**

India is a member of the Board of Governors of the International Centre for Integrated Mountain Development (ICIMOD) based in Kathmandu. The Centre aims at conducting projects and programmes in the areas of mountain development in the specific context of the Hindukush Himalayan region. India has been participating in the deliberations of the Board of Governors of the ICIMOD and the Ministry is presently working out the modalities for implementing ICIMOD programmes in India through the G.B. Pant Institute of Himalayan Environment and Development which has been designated as the focal point for the purpose.

#### **10.4.3.7 The World Bank**

**10.4.3.7.1** The World Bank is a major donor in environment and forestry sectors in India. Presently, six projects, as described below, in the environment sector are in operation with World Bank assistance.

- The Industrial Pollution Control Project with a total assistance of US \$155.6 million aims at achieving comprehensive Pollution Control and strengthening of the State Pollution Control Boards of Maharashtra, Gujarat, Tamil Nadu and Uttar Pradesh.
- Setting up of Common Effluent Treatment Plants (CETPs) is also a part of the above mentioned project. This scheme includes a 20% grant by the Central Government from IDA funds and a corresponding grant by the States concerned. Under the Ganga Action Plan, a project for Urban Development Programme in Hardwar, Kanpur and Allahabad in Uttar Pradesh and Pumping Station scheme in West Bengal with a total outlay of 86 crores is under implementation.
- The programme of organising workshops on Environmental Impact Assessment with reference to power, marine and forestry sectors continued.

**10.4.3.7.2** To avail the financial resources coming under the Global Environmental Facility (GEF) administered by the World Bank, the UNDP and the UNEP for resolving global environmental problems, proposals have been drawn up by the Ministry in the areas of eco-development, biodiversity conservation and petroleum safety.

**10.4.3.7.3** In the forestry sector, the World Bank (through its soft-lending affiliate IDA) assists the National Social Forestry Projects in the States of Gujarat, Himachal Pradesh, Rajasthan and Uttar Pradesh and the Social Forestry Projects in Kerala, West Bengal and Maharashtra. In addition, a project for "Forestry Research, Education and Extension in India" to be implemented by the ICFRE is also under consideration.

#### **10.4.3.7.4 Environment Action Programme**

In accordance with an agreement signed between the Department of Economic Affairs and the UNDP in November, 1991, an Environment Action Programme document is being compiled by the Ministry.

The document will cover the major areas of concern, viz. development of institutional structures, clean technologies, improved management of water quality, alternate energy plants, human resource development and forestry. The Ministry has been interacting with the following professional and research organisations for the finalisation of this document:

- National Environmental Engineering Research Institute, Nagpur, Madras Institute of Development Studies, Madras, Indira Gandhi Institute of Development Research, Bombay, Indian Institute of Technology, Bombay, Indian Institute of Public Administration, New Delhi, Tata Energy Research Institute, New Delhi, Indian Institute of Forest Management, Bhopal and Bombay Natural History Society, Bombay.

#### **10.4.3.8 FAO/UNDP**

FAO is providing technical assistance for drawing up the National Forestry Action Programme (NFAP) for India in pursuance of the Global Tropical Forestry Action Programme (TFAP). A project document has been drawn up for the NFAP and is under consideration.

In addition under the Technical Cooperation Programme of the FAO, an Agro Forestry Project titled "Agro Forestry Systems" has been approved under which FAO would be assisting the Government of India in introducing Agro Forestry Land Use System in Chindwara District of Madhya Pradesh.

#### **10.4.3.9 Nordic Agencies**

A project proposal had been received regarding industrial Pollution Control from Nordic Agencies which comprises of Nordic Investment Fund, Nordic Development Fund and Nordic Project Fund. The proposal is under active consideration.

# 11. ADMINISTRATION, PLAN CO-ORDINATION AND BUDGET

## 11.1 ADMINISTRATION

**11.1.1** The Strength of the Ministry including National Afforestation and Eco-Development Board (NAEB) and Ganga Project Directorate (GPD) at the Head Quarters is 1095 (Group 'A' 208: Group 'B' 316: Group 'C' 332: Group 'D' 239)

### 11.1.2 Personnel Policies

**11.1.2.1** In accordance with the revised recruitment rules for Group 'A' Scientific posts in the Ministry, direct recruitment to the post of Director, Zoological Survey of India was made. In addition, selections were made to two Group 'A' scientific posts in Ganga Project Directorate and one in State Forest Service College, Burnihat. Under the Flexible Complementing Scheme, 27 Group 'A' Scientific Officers were reviewed and 19 were promoted to the next higher grade w.e.f. 1.7.1992 and 1.1.1993.

**11.1.2.2** In accordance with the Government guidelines, representatives of Minorities/Scheduled Caste/Scheduled Tribes were associated with the Recruitment/Review Committees constituted by the Ministry for direct recruitment/promotion to Group 'A' Scientific Posts.

**11.1.2.3** The Recruitment Rules for Group 'A' Scientific posts in the Ministry and sub-ordinate offices are under review.

**11.1.2.4** With a view to familiarising the senior officers of various Government Departments with the basics of ecology and environment, sustainable development and to inculcate in them the attitudinal change necessary for conservation of natural resources and protection of environment, a 15 days full time training course on the

"Management of Natural Resources and Environment" has been finalised in consultation with the Department of Personnel and Training and has been conducted by the Indian Institute of Public Administration. New Delhi.

### 11.1.2.5 IFS Cadre management

During the year, 68 Direct Recruits were appointed to the Indian Forest Service. Of these 21 were on the basis of IFS examination, 1990 and 47 on the basis of IFS Examination, 1991. Cadre reviews in respect of the State of Maharashtra were also completed.

### 11.1.3 Reservation in service

**11.1.3.1** A statement showing the reservation of Scheduled Castes/Scheduled Tribes in the Ministry as on 31.12.1992 is given in the Table 8.

**11.1.3.2** A special drive to fill up backlog of SC/ST vacancies for Group 'A', 'B', 'C' and 'D' posts in the Ministry and its associated offices has been taken up. So far 118 vacancies have been identified for the drive and the necessary action initiated to fill up the same.

### 11.1.4 Grievance Cell

A Grievance Cell has been set up in a Ministry under the direct charge of Joint Secretary (Admn.) to receive public complaints on environment-related matters and to expedite their redressal. The commencement of the working of the cell has been widely publicised and its telephone number notified in major newspapers.

During the year, the Grievance cell dealt with 330 complaints received from various concerns.

Table 8

Statement Showing the total Number of Government Servants and the Number of SC and ST amongst them in the Ministry of Environment and Forests as on 31.12.1992

Sl. No.	Group	Sanctioned Strength	No. in position	Scheduled castes	% of the total Employees	Scheduled Tribes	% of the total Employees
1.	Group A	208	175	12	6.85	6	3.42
2.	Group B	316	241	26	10.7	4	1.65
3.	Group C	332	290	29	10.00	9	3.10
4.	Group D (Excluding Safaiwala)	211	229	67	29.25	19	8.29
5.	Group D (Safaiwala)	28	28	28	100.00	—	—
Total		1095	963	162	16.82	38	3.94

### 11.1.5 NGO Cell

Recognising the need for involving NGO's in a big way for the achievement of the objectives of the Ministry and with a view to make environment a people's movement, the Ministry has taken the initiative of opening an NGO Cell on 5th June, 1992, coinciding with the World Environment Day. The main objective is to involve more and more rural based grass root level NGO's in their mission to carry out the message of environmental protection to the tribals; scheduled castes, and the poorest of the poor in the rural areas. Programmes and activities of these NGOs would also help the village people improve their ecosystem and habitat, protect forests, and regenerate wastelands. The Cell is acting as a single window counter of the Ministry for Non-Governmental activities by facilitating more rural based NGO's for taking up work among the weaker sections of the society.

About 200 references on various issues concerning environmental protection relating to the NGO movement have since been received in the Ministry.

### 11.1.6 Joint Consultative Machinery

The Departmental Council of the Ministry set up under the Joint Consultative Machinery and Compulsory Arbitration of Central Government Employees continued its activities. During the year, three meetings were held to sort out the issues raised by the employees. The Office Council set up in the associated offices of the Ministry as well as the Regional Councils set up in BSI and ZSI continued to function regularly.

### 11.1.7 CGO Complex Coordination Committee

The Ministry took an active interest in improving the general environment and facilities available in and around the CGO Complex. The parking spaces within the complex have been clearly ear-marked, the traffic warden system has been instituted and cow-catchers are being installed to prevent the cattle entering into the complex. Work related to plantation of trees and shrubs were continued. The other matters actively being pursued include construction of a DTC terminal and setting up of a Centralised Canteen facility in the complex.

### 11.1.8 Use of Hindi

**11.1.8.1** Hindi as official language is being progressively used in the Ministry and its attached and Sub-ordinate Offices. The Hindi Salahkar Samiti - an advisory body for the Ministry on language policy, met twice during the year. The Official Language Implementation Committee of the Ministry also met regularly during the year.

**11.1.8.2** Inspection of Offices: In order to ensure effective implementation of the Annual Programmes and instructions on the use of Hindi, 11 offices under the Ministry were inspected during the year.

**11.1.8.3** Training in Hindi: During the year, three employees passed Hindi Typewriting, one Hindi stenography and one each in Hindi Prabodh, Praveen and Pragya examinations under the Hindi Teaching Scheme.

**11.1.8.4** Hindi Week: Hindi Week was organised from 14th-19th September, 1992, during which various competitions were held and prizes distributed to the winners.

**11.1.8.5** Incentives for Hindi Books on Environment: The prize scheme introduced in 1987 to encourage creative and original writing on topics relating to environment etc. in Hindi also continued during the year. Out of 10 entries received under this scheme, the following were awarded prizes:

- |  |                      |
|--|----------------------|
| — Hari Chadar<br>by Sh. Kuldeep Sharma                       | Rs. 10,000/- (First) |
| — Pradooshan Prithvi Ka Grahan<br>by Sh. Premanand Chandola  | Rs. 7,000/- (Second) |
| — Paryavaran Aur Samskrit Ka<br>Samkat by Dr. Govind Chatak. | Rs. 5,000/- (Third)  |

**11.1.8.6** Publication of Journal: The quarterly journal 'Paryavaran' in Hindi continued to be published by the Ministry with a view to encouraging creative writing in Hindi among its officers and employees.

### 11.1.9 Training Programme for Drivers

A part-time in-house training programme for the staff car drivers of the Ministry, Ganga Project Directorate and the National Afforestation and Eco-Development Board was organised from 14th to 16th September, 1992. The programme covered topics such as Traffic Rules, Break-down and Preventive Maintenance of vehicles and Environmental Awareness.

### 11.1.10 O&M Inspection

The O&M Inspection of sections of the Ministry was carried out in accordance with the Central Secretariat Manual of Office Procedure.

### 11.1.11 Study Team

Some of the Study Teams which were set up last year to carry out the review of all scientific and non-scientific posts in the Ministry, NAEB, GPD and in the associated offices of the Ministry are in the process of finalising their reports.

### 11.1.12 Environment and Parliament

During the year (upto 10th March, 1993) 936 Parliament questions pertaining to various aspects of matters were dealt by the Ministry and 471 questions in the Lok Sabha and 465 in the Rajya Sabha were answered. Industrial and vehicular pollution, deforestation, progress of afforestation, conservation and early clearance of developmental projects from environmental and forest angles were among the areas in which the Members of Parliament evinced keen interest.

### 11.2 CIVIL CONSTRUCTION UNIT (CCU)

**11.2.1** A Civil Construction Unit, headed by a Chief Engineer (Civil) was set up in the Ministry of Environment and Forests in August, 1987, for taking up the important building works of the Ministry on priority basis. These works relate to various units of the Ministry viz; Botanical Survey

of India, Zoological Survey of India, National Museum of Natural History, Indian Council of Forest Research Education, G.B. Pant Institute of Environment and Development at Almora, Indira Gandhi National Forest Academy, Forest Survey of India and National Zoological Park, New Delhi.

**11.2.2** The Unit has a sanctioned strength of 139 technical and administrative posts out of which 60 technical posts have been encadared with CPWD in 1989.

**11.2.3** The Civil Construction Unit has taken up 44 new schemes so far with total estimated cost of Rs. 40 crores. The works mostly consist of office-cum-laboratory buildings, herbarium. National Museums of Natural History, Forest Research Institutes. National Forest Academy. National Zoological Park and residential quarters for staff located all over India. Out of the above 24 works costing Rs. 26 crores are being directly executed by CCU for which Divisions and

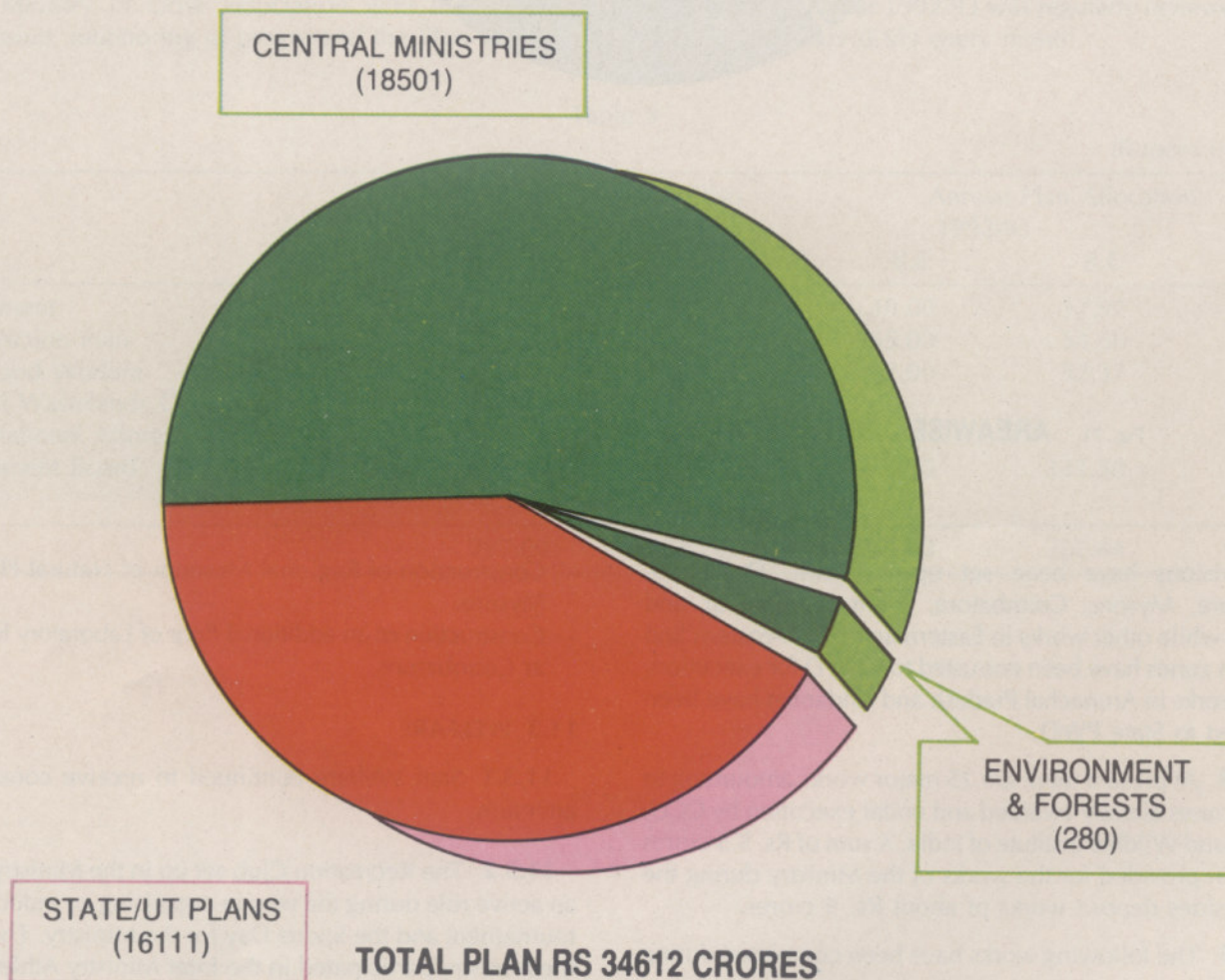


Fig. 70 Total Central Plan for 1992-93 (BE)

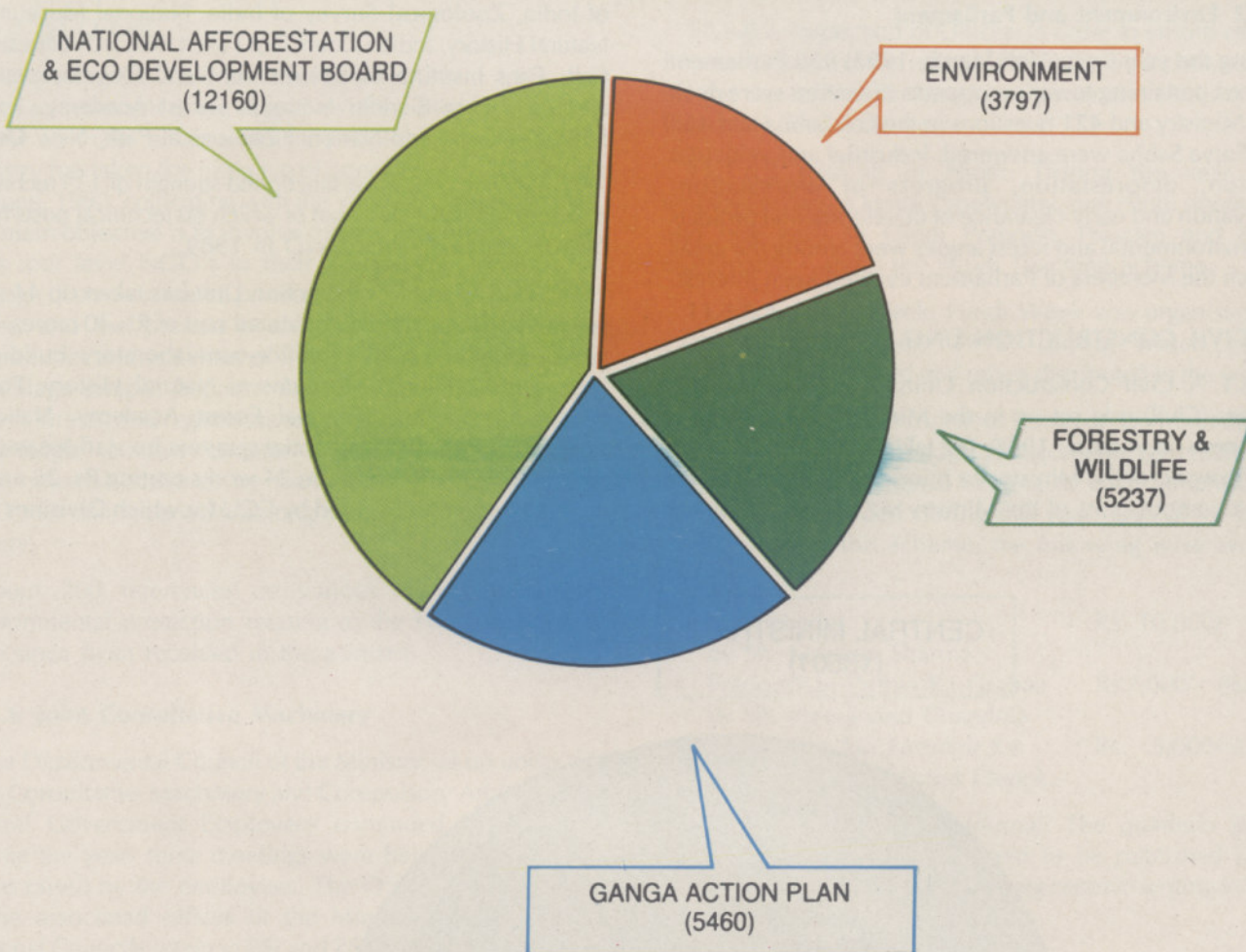


Fig. 71 AREAWISE DISTRIBUTION OF FUNDS FOR THE YEAR 1992-93 (RE)  
(in Rs Lakhs)

Sub-Divisions have been set up at Delhi, Dehradun, Bangalore, Mysore, Coimbatore, Jodhpur, Jabalpur and Almora while other works in Eastern and North-eastern and Western zones have been entrusted to CPWD for execution. A few works in Arunachal Pradesh and Andaman have been entrusted to State PWD.

**11.2.4** At present there are 25 major works amounting to Rs. 26 crores already awarded and under execution by CCU, CPWD and Wildlife Institute of India. A sum of Rs. 5.5 crores has been provided for the works of the Ministry during the year besides deposit works of about Rs. 9 crores.

**11.2.5** The following works have been completed during the year:

- Construction of 66 quarters in ICFRE at Dehradun.
- Construction of 18 quarters for ZSI at Dehradun.
- Construction of 44 quarters for ICFRE at Dehradun

- Construction of Regional Museum of Natural History at Mysore.
- Construction of an additional floor of Laboratory for ICFRE at Coimbatore.

### 11.3 WELFARE

**11.3.1** Staff Welfare continued to receive considerable attention.

**11.3.2** The Recreation Club set up in the Ministry played an active role during the year in organising an indoor games tournament and the Sports Day for the Ministry. The staff of the Ministry participated in the Inter Ministry Athletic Meet held in December, 1992. The Cricket Team of the Ministry entered the Super League leg of the Inter Ministerial Cricket Tournament, this year. One of the players of the Ministry's Cricket team has been selected by the Central Civil Services

Sports Board to represent its team in the All India Civil Services Cricket Tournament. The team of the ministry also participated in the First All India Forest Sports & Games, Meet and into the Track and Field Event & games such as Cricket, Chess, Carroms etc.

**11.3.3** A veteran athlete of this Ministry, participated in several athletic, meets winning positions and medals.

**11.3.4** The Annual Day of the Ministry was observed on 9th January, 1993. Several cultural activities were organised by the Ministry on this occasion and the winners were awarded the prizes.

#### 11.4 PLAN COORDINATION AND BUDGET

**11.4.1** The Plan Coordination function of the Ministry involves coordination of all Plan Schemes and programmes of the Ministry in close association with the Planning Commission, monitoring of progress of the Plan schemes,

preparation of Annual Action Plans, periodical progress reports and reports under the 20-Point Programme (Points 16 and 17).

**11.4.2** The Central Annual Plan for the year 1992-93 was Rs. 34,612 crores out of which the Annual Plan for the Central Ministries was Rs. 18,501 crores and that for the Ministry of Environment and Forests was Rs. 280.00 crores which is about 1.5% of the total allocation of the Central Ministries/Departments. The pictorial representation of the Annual Plan Allocation is given in Fig. 70.

**11.4.3** An amount of Rs. 1200 crores has been allocated to the Ministry for the VIII Five Year Plan 1992-97. The allocation in the Annual Plan 1992-93 was Rs. 280.00 crores (BE) as against Rs. 266.09 crores (RE) in 1991-92. The sectorwise break-up of the above allocation is given in Table 9.

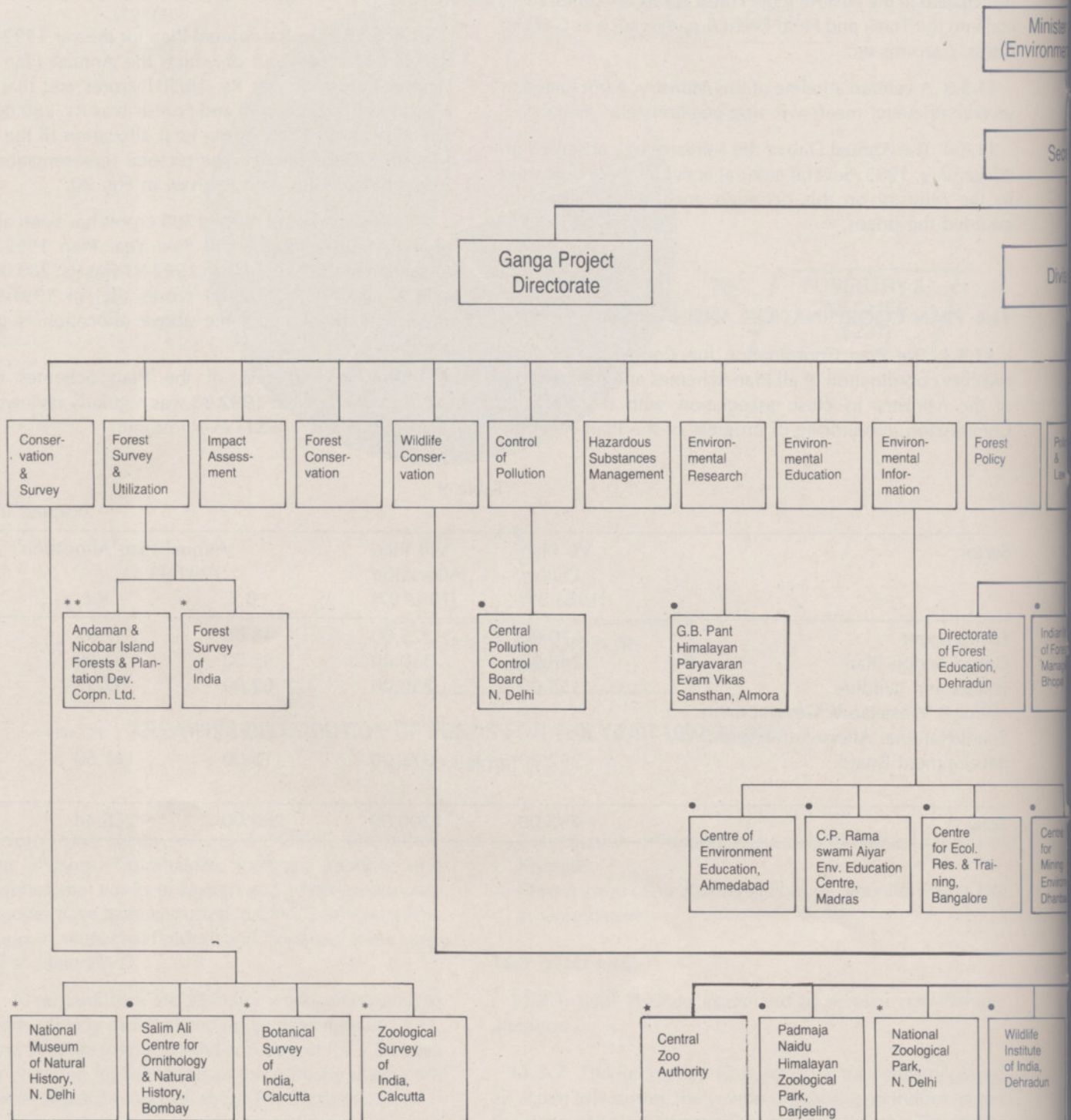
**11.4.4** The progress of the Plan Schemes of the Ministry for the year 1992-93 was regularly reviewed at the level of Secretary (E&F) every month.

Table 9

(Rupees in crores)

Sector	VII Plan Outlay (1985-90)	VIII Plan Allocation (1992-97)	Annual Plan Allocation		
			1992-93 B.E.	R.E.	1993-94 B.E.
Environment	110.00	325.00	48.00	37.97	70.00
Ganga Action Plan	240.00	350.00	55.00	54.60	65.00
Forests and Wildlife	155.00	250.00	62.00	52.37	85.00
National Wastelands Development Board/National Afforestation and Eco- development Board	292.00	275.00	115.00	121.50	98.00 (NAEB)
<b>Total</b>	<b>797.00</b>	<b>1200.00</b>	<b>280.00</b>	<b>266.44</b>	<b>318.00</b>

# ORGANISATION CHART OF THE MINISTRY

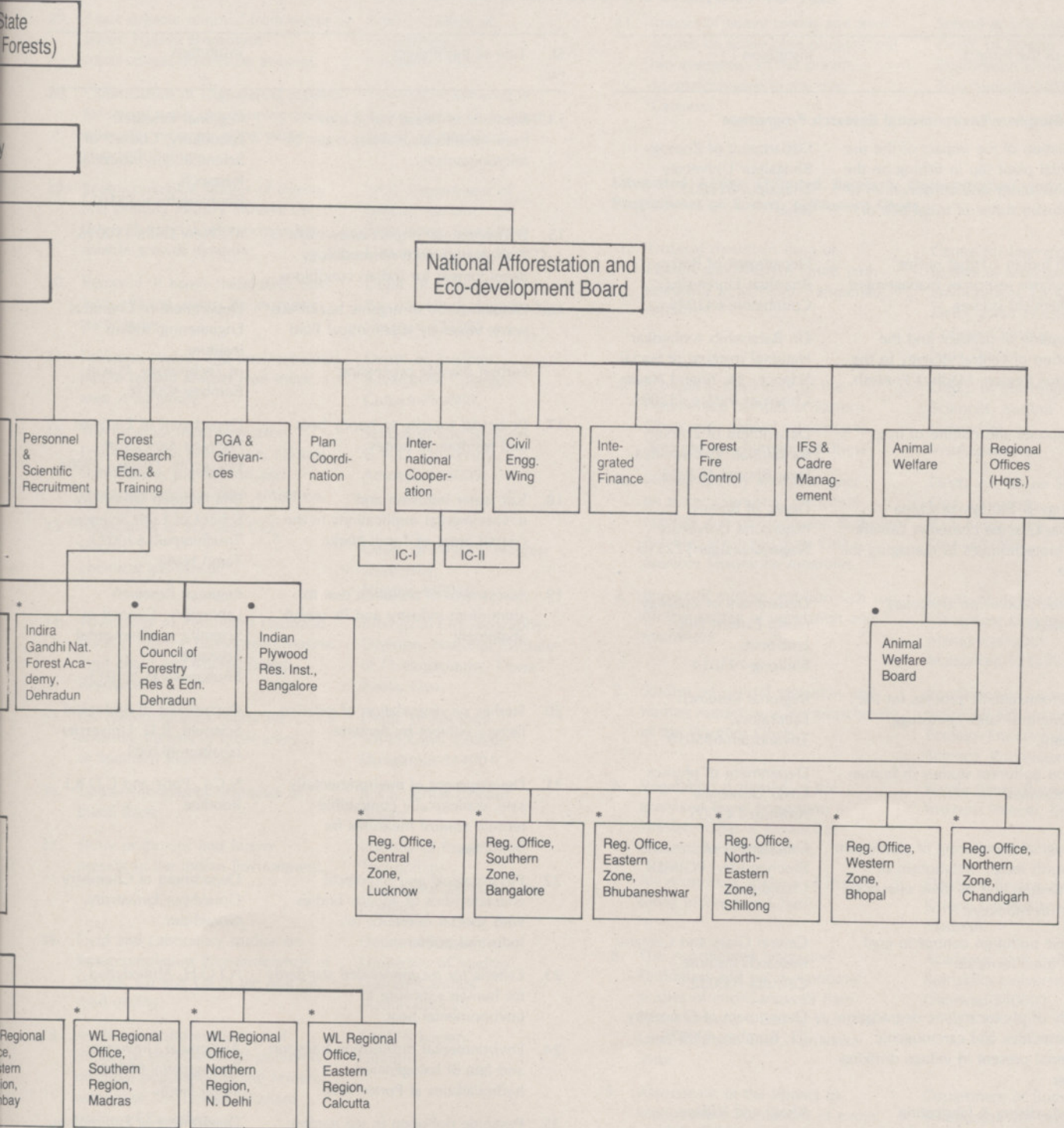


- Autonomous Agencies assisted by the Ministry.
- \* Associated Units under the administrative control of the Ministry
- \*\* Public Sector undertakings



Annexure I

MINISTRY OF ENVIRONMENT & FORESTS



## ANNEXURE II

## LIST OF PROJECTS SANCTIONED DURING 1992-93

Sl. No.	Title of the Project	Institution	Sl. No.	Title of the Project	Institution
<b>Man and Biosphere/Environmental Research Programme</b>					
1.	Evaluation of the impact of the use biocidal plant sap in fishing on the ecophysiology and conservation of hill stream fishes of tribal belt of Bihar	Department of Zoology Bhagalpur University Bhagalpur-812007 Bihar	14.	Removal of heavy metal ions from metallurgical waste water by microorganisms.	Regional Research Laboratory, Council of Scientific and Industrial Research, Bhubaneswar-751013
2.	South Indian - Tribal pulses germplasm resources management biochemical studies	Department of Botany Bharthiar University Coimbatore-641046	15.	Environmental impact assessment of Transport projects-Methodology development for Indian conditions.	IIT, New Delhi-110016
3.	Perception of drought and the adoption of central strategy in the Jhanbua Region, Madhya Pradesh.	Dr. Babasahib Ambedkar National Institute of Social Science, 54, Anand Nagar Chitawad Indore-452001.	16.	Detoxification of organic hazardous waste water by supercritical fluid carbon dioxide processing	Department of Chemical Engineering, Indian Institute of Technology, Powai, Bombay-400076.
4.	Ecobiology and culture of frogs	Department of Zoology Barkatullah Vishwavidyalaya, Bhopal-462026	17.	Pesticidal toxicity to honey bees and residues in honey	Department of Zoology Haryana Agriculture University, Hissar-125004.
5.	Ecology & Biology of China dodder- <i>Cuscuta chinensis</i> Lamark and biotechniques in managing the same.	Deptt. of Botany Nagarjuna University Nagarjunanagar-522510	18.	Salt water intrusion and environmental implications in the coastal areas of Tamil Nadu	Bharthidasan University School of Earth Sciences Tiruchirapalli-620023 Tamil Nadu.
6.	Genetic studies on chocolate Mahaseer.	Department of Zoology North Eastern Hill University, Shillong-793014	19.	Assessment of pollution due to aluminium industry and its useful abatement	Regional Research Laboratory, Council of Scientific and Industrial Research, Bhubaneswar-751013.
7.	Anaerobic/anoxic process for the treatment of latex centrifuge effluent.	Regional Research Laboratory, Trivandrum-695019	20.	Studies on degradation of gelatine factory effluent by bacteria.	Department of Biological Sciences, R.D. University Jabalpur-482001.
8.	Radon pollution studies in human environment	Department of physics GND University Amritsar-143005	21.	Development of environmentally safe, ecologically compatible termite control measures for buildings.	N.C.L. Pune and C.D.R.I. Roorkee
9.	Biological Monitoring of aluminium in North India, Metabolism of Aluminium and its toxic effects on brain in Monkeys.	Department of Biochemistry, PGIMER Chandigarh.	22.	Physiological and biological characteristics of aquatic bodies with special reference to Industrial pollution.	Department of Chemistry Gorakhpur University, Gorakhpur.
10.	Smoke pollution control in coal field glass furnace	Central Glass and Cemanic Research Institute Calcutta-700032.	23.	Criteria for recommended standards for human exposure to environmental heat.	N.I.O.H, Ahmedabad
11.	Study of photocatalytic degradation of pesticides and carcinogenic material present in village drinking water	Department of Chemistry IIT, Bombay-400076.	24.	Environmental distribution transport and fate of halogenated hydrocarbons at Porto-Novo.	Annamalai University Parangipettai-608502 Tamil Nadu.
12.	Standardising & fabricating household waste disposal unit as well as slurry auto and processing unit.	Khadi and Village Industries 65-B, Zakirnagar Kankarbag, Patna-800020	25.	Pesticide pollution in tea garden of Himachal Pradesh.	Department of Entomology H.P.K.V Palampur, Distt. Kangra-176062.
13.	Degradation of organic pollutants by ligniases of <i>Phanerochaete chrysosperium</i>	Department of Chemistry University of Gorakhpur Gorakhpur-273009	26.	Evaluation of the efficiency of the Stress protein response as a biochemical water quality bio-maker.	Department of aquatic Biology & Fisheries, University of Kerala, Trivandrum.;

Sl. No.	Title of the Project	Institution
27.	Toxic organic removal from waste water. Hybrid absorption super-critical desorption process	S.A.U. College of Engineering, Tirupati-517502.
28.	Optimisation of Engineering aspects for spend wash conditioning and resources recovery using water Hyacinth System	Shivasadan Renewable Energy Research Institute, Sangli, Maharashtra.
29.	Ecotoxicological studies of dyeing and printing industry effluent on fish with special reference to the muscle growth dynamic.	UGC Department of Special Assitance in Bioscience, Saurashtra University Rajkot-360005.
30.	Removal of heavy metal toxic ions from effluent waters by inorganic particulates.	Deptt. of Chemistry Banaras Hindu University Varanasi-221005.
31.	Pollution studies and environmental health hazard around lead mine area at Sargipalli.	Deptt. of Zoology Ravenshaw College, Cuttack-753003.
32.	Thermophilic Actinomycetes: Environmental prevalence, clinical significance, purification and characterization of their antigenes.	School of Life Sciences, G.N.D. University Amritsar-143005.
33.	Fabrication of SO <sub>x</sub> and CO <sub>x</sub> electro-chemical gas sensor	Deptt. of Physics, Nagpur University, Nagpur-440010.
34.	Toxicology of Petroleum Hydrocarbons in Marine Ecosystems: Marine food chain and Marine living Resources.	Biological Oceanography Division, National Institute of Oceanography, Dona Paula, Goa.
35.	An Epideimological study on endemic flurosis in tribal areas of Southern Rajasthan	Deptt. of Zoology S.B.P. Govt. College, Dungarpur-314001.
36.	Geo-environmental appraisal of Jhanji River	R.R.L. Jorhat-785006 Assam
37.	Study of dioxins and furens present in the Indian Environment.	Institute of Paper Technology, Saharanpur-247001, Uttar Pradesh.
38.	Field and Laboratory studies on Bioaccumulation Biotransference of Hg, As, Cu and Cd in the Marine food chains.	Deptt. of Botany University of Madras Guindy Campus Madras-600025.
39.	Assessment and evaluation of impact of environmental pollution on tribal population in the Mineral activity of TSP (Tribal Subplan) region of Rajasthan.	SARITA Society Udaipur
40.	Coal Mining and Environmental degradation in Meghalaya	Deptt. of Geography North Eastern Hill University, Shillong-14.

Sl. No.	Title of the Project	Institution
41.	Impact of heavy metals and toxic wastes on some physiological and bio energetics of the prawn, <i>M. malcomsoni</i> in the river Cauvery.	School of Life Sciences Deptt. of Botany Bhartidasan University Tiruchirapalli-620024.

#### Integrated Action Oriented Research Demonstration and Extension Programmes on Eastern & Western Ghats

1.	Tropical mountain flora of Eastern and Western Ghats with reference to its North Temperate Affinities.	Centre for Inter-disciplinary studies of Mountain Hill Environment, University of Delhi. Zakir Hussain College Campus, New Delhi.
2.	Ecological Resilience in the Fragmented habitats of Eastern Ghats with special reference to land use and human activities.	Deptt. of Environmental Sciences, Andhra University Vishkapatnam.
3.	Mining activity and its impact on water chemistry, microbial ecology and environment, Bicholim Talukas, Western Ghats Goa - possible restoration measures.	Deptt. of Marine Sciences Goa, University, P.O. Santa Cruz Goa -403005.
4.	Impact of mining and iron rich soil on the pattern of vegetation and microflora.	Deptt. of Applied Botany, Mangalore University, Mangalagangotri Mangalore-574199.
5.	Studies on natural resources and human impact in a microcatchment of the Western Ghats.	Pondicherry University Salim Ali School of Ecology Environmental Science, Pondicherry.
6.	Vegetation dynamics of the grassland forest ecosystem in Western Ghat of Kerala for afforestation Programme.	Kerala Forest Research Institute, Peechi, Kerala.
7.	An ecosystem analysis of Kodyar forest in Western Ghats.	Deptt. of Botany, Madurai Kamraj University, Madurai.
8.	The coordinated Integrated Ecological and socio-economic studies of mid-Gangavati river basin, forming a part of W. Ghat, Ultra Kannada Distt. Karnataka State	Academic Staff College Karnataka University Dharwad-580003.
9.	Assessment of the Impact of Monoculture Plantations of exotic species on Hill Stations of the Western Ghats of the Tamil Nadu with reference to the Management of Health Hazards.	Department of Botany Bhartidasan University Tiruchirapalli-620024 Tamil Nadu.

Sl. No.	Title of the Project	Institution
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### Mangroves

- |    |  |  |
|----|--|--|
| 1. | Taxonomic and Ecological survey of the Lakshadweep for Perumal Marine park.  | Deptt. of Marine Sciences<br>Goa University, Bambolim<br>Goa.  |
| 2. | Distribution, Ecology and Conservation of the Fauna of Ratnagiri Coast Mangroves (Maharashtra).  | Deptt. of Zoology<br>Marathwada University<br>Aurangabad and Director<br>Marine Biological Station<br>Ratnagiri. |
| 3. | Potentialities of Tidal Mangrove Forests of the Sunderbans with special reference of Estuarine Fisheries and Foresty.  | Economy Department<br>Central Inland Capture<br>Fisheries Research Station<br>Calcutta.                          |
| 4. | Enumeration and characterisation of mycoflora from Bhitarkanika mangrove vegetation and their impact on seed quality.  | P.G. Deptt. of Botany<br>Utkal University<br>Bhubaneshwar-751 004.   |
| 5. | Ecological status study and survey of plankton, benthic macro and meio fauna and ichthyco-fauna of Bhitarkanika mangrove estuaries of Mahanadi river system. | Regional College of<br>Education Bhubaneshwar.   |

Sl. No.	Title of the Project	Institution
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### Recomended Research Proposals

- |    |   |   |
|----|---|---|
| 1. | Cataloguing of insect herbivores and their relation to host plant phenologies in the Mangals of the Andaman and Nicobar Island. | Central Agricultural<br>Research Institute<br>Port Blair.   |
| 2. | Studies on the biodiversity of fungal decomposers involved in degradation processes of mangrove biomass in estuaries.           | C.A.S. in Botany<br>University of Madras<br>Guindy Campus<br>Madras-600 025.                          |
| 3. | Biology of micro-algae in South Indian Mangroves.   | Centre for Advanced<br>Studies in Botany<br>University of Madras<br>Guindy Campus,<br>Madras-600 025. |

### NNRMS

- |    |  |   |
|----|--|---|
| 1. | Landuse mapping of Coastal Zone (CRZ)  | Space Application Centre,<br>ISRO, Ahmedabad. |
| 2. | Wetland mapping  | Space Application Centre,<br>ISRO, Ahmedabad. |
| 3. | Identification of the landslide prone areas using remote sensing technology. | National Institute of<br>Hydrology, Roorkee.  |
| 4. | Geo-environmental Studies of Manipur River Basin                             | Manipur University<br>Imphal.                 |

### ANNEXURE III

#### LIST OF PROJECTS COMPLETED DURING 1992-93

Sl. No.	Title of the Project	Institution	Sl. No.	Title of the Project	Institution
<b>Man and Biosphere/Environmental Research Programme</b>			<b>Integrated Action Oriented Research Demonstration and Extension Programmes on Eastern Ghats</b>		
1.	Cause for failure of crop Productivity and root nodulation in cement exhaust dust polluted soil.	Deptt. of Botany Bharthidasan University Tiruchirapalli-620024 Tamil Nadu.	1.	Natural resource data management system of the Eastern Ghats.	Institute for Coastal and Offshore Research Vishakapatnam.
2.	All India Coordinated Research Project on Ethnobiology (Phase II)	Regional Research laboratory, Canal Road Jammu Tawi, Jammu.	2.	Establishment of Technical Secretariat for eco-development of Eastern Ghats.	-do-
3.	To study the effect of brick making on the soil, loss and deteriorating and find methods of utilisation of the affected land.	Deptt. of Chemistry Bareilly College, Bareilly.	3.	Natural resource data management system at microwatershed level in the Eastern Ghat.	-do-
4.	Environment, human settlement and human activities in J&K with special reference to Ladakh.	Deptt. of Anthropoogy University of Delhi Delhi-110007	4.	Environmental aspects of pollination and seeding in some timber plant species of Eastern Ghats	Andhra University, Vishakapatnam
5.	Environmental effects of energy production, transformation and consumption of the National Capital Region.	T.E.R.I New Delhi-110003.	5.	Ecological studies on the Grassland communities of southern Orissa.	Berhampur University Berhampur
6.	Heavy metal pollution in the coastal sedimentary environment of Cochin.	Cochin University of Science and Technology Cochin.	6.	Environmental restoration of Ooty Lake	C.A.S. in Botany, University of Madras, Guindy Campus Madras.
7.	Identification, prevention and control of the ill effects of fluoride above the tolerance limit in all the villages of Anna Madurai Distt. of Tamil Nadu.	Deptt. of Chemistry, Gandhigram Rural Institute, Gandhigram Tamil Nadu.	7.	A peoples' project on Agro Forestry alternatives for soil conservation	Environment Centre, Kerala Sahitrya Parishad, Kerala.
8.	Epidemiological environmental and cytotoxicological studies on atmospheric pollution due to coal combustion with particular reference to fly ash.	I.T.R.C. Lucknow-226001.	8.	Regeneration studies on some important trees in a natural moist deciduous forest ecosystem.	Kerala Forest Research Institute, Peechi, Trichur.
9.	Studies on biological and physiological factors influencing degradation using model system.	Deptt. of Biochemistry School of Biological Sciences, Madurai Kamraj University Madurai.	<b>NNRMS</b>		
10.	Biochemical and Biological evaluation of Alage inhabiting wild water in North Bihar	Deptt. of Botany Bihar University Muzaffarpur, Bihar.	1.	Environmental Impact of Iron Ore Mining in Goa through Remote Sensing.	Centre of Studies in Resources Engineering, IIT, Bombay.
			2.	Environmental Impact of Iron Ore Mining in Bailadila, Baster District, Madhya Pradesh through Remote Sensing.	Centre of Studies in Resources Engineering, IIT, Bombay & Remote Sensing Application Centre, MAPCOST, Bhopal.

## ANNEXURE IV

### Externally Aided On-going Projects in the Environment and Forest Sectors

Sl. No.	Title of the Project and Duration	Donor Agency/ Agencies	Outlay (Rs. in crores)	Sl. No.	Title of the Project and Duration	Donor Agency/ Agencies	Outlay (Rs. in crores)
1.	Social Forestry Project Kerala (1984-85 to 1992-93)	World Bank	59.91	13.	Afforestation of Aravali Hills, Rajasthan, (1992-93 to 1996-97)	Japan	166.90
2.	Forestry Development Project, West Bengal (1992-93 to 1996-97)	World Bank	114.70	14.	Afforestation along Indira Gandhi Canal, Rajasthan, (1990-91 to 1994-95)	Japan	107.50
3.	Forestry Sector Project Maharashtra (1992-93 to 1997-98)	World Bank	431.51	15.	Aravali Hills Afforestation, Haryana (1990-91 to 1997-98)	EEC	48.15
4.	Ganga Action Plan - STPs in Kanpur, Haridwar, Allahabad and 12 Pumping Stations in West Bengal (1987-1996)	World Bank	86.00	16.	Strengthening of Central/State Pollution Control Board Laboratories. (1989-1992)	Germany	2.30
5.	Industrial Pollution Control Project (1991-1997)	World Bank	404.56	17.	Ganga Action Plan Technical Assistance and Equipments, (1986-1992)	U.K.	4.00
6.	Ganga Action Plan, Integrated Sanitation Works in Kanpur and Mirzapur (1987-1993)	The Netherlands	60.00	18.	National Social Forestry Project, (Gujarat, Himachal Pradesh, Uttar Pradesh and Rajasthan) (1985-86 to 1992-93)	World Bank/ USAID	387.29
7.	Environment Impact Assessment Workshops Phase I (1989-92)	The Netherland	0.15	19.	Ecology of Endangered Grasslands & thier Fauna (1990-95), BNHS	USA	0.54
8.	Social Forestry Project, Tamil Nadu (1988-89 to 1992-93)	Swedish International Development Agency (SIDA)	85.40	20.	Ecology of Indian Elephant, (BNHS) (1987-1992),	USA	0.14
9.	Social Forestry Project, Orissa (1988-89 to 1992-93)	SIDA	78.34	21.	Faculty Development of Wildlife Institute of India (1988-93)	USA	0.87
10.	Dungarpur Integrated Wasteland Development project, Rajasthan (1992-93 to 1996-97)	SIDA	28.14	22.	Ecology of Large Carnivores of Nagarhole National Park (1988-1993)	USA	0.10
11.	Strengthening of Indian Institute of Forest Management, Bhopal (1988-1993)	SIDA	3.18	23.	Western Ghats Forestry and Environment Project	ODA	84.20
12.	Environment Protection Training and Research Instt., Hyderabad (1991-1996)	SIDA	6.00				

## ANNEXURE V

### LIST OF REGIONAL OFFICES/ASSOCIATED UNITS/AUTONOMOUS AGENCIES/ENVIS CENTRES/CENTRES OF EXCELLENCE ETC. OF THE MINISTRY OF ENVIRONMENT AND FORESTS.

#### Regional Offices

1. Regional Office,  
North East Zone  
Ministry of Environment and Forests  
Upland Road  
Leitumkhra  
Shillong-793 003.
2. Regional Office  
Central Region  
Ministry of Environment & Forests  
B-1/72 Sector Aliganj  
Lucknow-226 020
3. Regional Office  
Northern Region  
Ministry of Environment and Forests  
1812, Sector 33-D  
Chandigarh.
4. Regional Office  
Western Region  
Ministry of Environment and Forests  
E-3/24, Arera Colony  
Bhopal-664 016.
5. Regional Office  
Southern Region  
Ministry of Environment and Forests  
493, 1st Main  
III Block, III Stage  
Basaveswar Nagar  
Bangalore-560 079.

#### Regional Office

6. Eastera Region  
Ministry of Environment and Forests  
194, Kharavel Nagar  
Bhubaneshwar-751 001.

#### Centres of Excellence

1. Centre for Environment Education  
Nehru Foundation for Development  
Thaltej Teka  
Ahmedabad-380 054.
2. C.P.R. Environmental Education Centre  
1A, Eldams Road  
Madras-600 018
3. Ecological Research & Training Centre  
Indian Institute of Science  
Bangalore-560 012.
4. Centre for Mining Environment  
Indian School of Mines  
Dhanbad-826 004.
5. Salim Ali Centre for Ornithology  
and Natural History (SACON)  
Kalam Palayam  
Coimbatore-641010.

#### Regional Centres of National Afforestation & Eco-Development Board (NAEB).

Address	Area of Operation
1. Coordinator (SFSO: Regional Unit) University of Agricultural Sciences, Department of Economics, GKVK Cempus (P.B. No. 2477) Bangalore-560 065. (Karnataka)	Andhra Pradesh, Karnataka, Tamil Nadu and Kerala
2. Coordinator (SFSO: Regional Unit) Dr. Y.S. Parmar University of Horticulture and Forestry College of Forestry Nauni, Solan-173 230 (Himachal Pradesh)	Jammu & Kashmir, Himachal Pradesh, Punjab and Delhi
3. Coordinator (SFSO: Regional Unit) Agricultural Finance Consultants Limited, Chhatrapati Shivaji Maharaj Marg, Bombay-400 039 (Maharashtra).	Rajasthan, Uttar Pradesh and Haryana
4. Coordinator (SFSO: Regional Unit) Indian Institute of Forests Management, Nehru Nagar Bhopal-462 003. (Madhya Pradesh).	Maharashtra and Orissa
5. Coordinator (SFSO: Regional Unit) Indian Institute Of Management, Sastrapur Ahmedabad-380 015. (Gujarat)	Gujarat, Madhya Pradesh and Goa
6. Coordinator (SFSO: Regional Unit) North-Eastern Hill University Lower Lachumiene Shillong 793 001 (Meghalaya).	Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland and Tripura.
7. Coordinator (SFSO: Regional Unit) Jadavpur University Post Box 17026 Calcutta-700 032 (West Bengal).	Bihar, West Bengal and Sikkim

#### Autonomous Agencies

##### a) Environment Wing

1. Central Pollution Control Board  
Parivesh Bhawan  
CBD-cum-Office Complex  
East Arjun Nagar  
Delhi-110 032.
2. Gobind Ballabh Pant Institute  
of Himalayan Environment and  
Development, Kosi, Katarmal  
Almora-263 643 (U.P.)

#### b) Forest Wing

1. Andaman and Nicobar Islands  
Forests and Plantation Development  
Corporation Ltd., Van Vikas Bhawan  
Port Blair  
Andaman and Nicobar Islands.
2. Indian Institute of Forest Management  
Nehru Nagar  
Bhopal-462 003.
3. Indian Plywood Research Institute  
Tumkur Road  
Bangalore-560 022.
4. Indian Council of Forestry Research Education  
P.O. New Forests  
Dehra Dun-248 006.

#### c) Wildlife Wing

1. Wildlife Institute of India  
P.O. New Forests  
Dehra Dun 248 006.
2. Animal Welfare Board of India  
4th Street, Abhiramapuram  
Madras 600 018 (Tamil Nadu).

#### Associated Units

##### a) Environment Wing

1. Botanical Survey of India  
P-8 Brabourne Road  
Calcutta-700 001.
2. Zoological Survey of India  
M-Block, New Alipur  
Calcutta-700 053.
3. National Museum of Natural History  
FICCI Building  
Barakhamba Road  
New Delhi-110 001.

##### b) Forest Wing

1. Forest Survey of India  
25, Subhash Marg  
Dehra Dun-248 006.
2. Indira Gandhi National Forest Academy,  
Academy, P.O. New Forests  
Dehra Dun 248 006  
(U.P.)

3. Forest Research Institute  
P.O. New Forests  
Dehra Dun 248 006  
(U.P.)

4. Institute of Forests Genetics and Tree  
Breeding Forest College Campus  
P.B. No. 1031, R.S. Puram, H.P.O.  
Coimbatore-641 002  
(Tamil Nadu).

5. Institute of Wood Science and  
Technology, 18th Cross, Malleswaram  
Bangalore-560 022  
(Karnataka).

6. Institute of Arid Zone Forestry Research,  
12/10, Chopasani Housing  
Scheme, Jodhpur 342 008  
(Rajasthan).

7. Institute of Deciduous Forests  
P.O. RFRC, Mandla Road,  
Jabalpur 482 021  
(Madhya Pradesh)

8. Institute of Rain and Moist Deciduous  
Forest Research, Jorhat (Assam).

##### c) Wildlife Wing

1. National Zoological Park  
Mathura Road,  
New Delhi-110 003

#### Regional Offices

1. Wildlife Preservation  
Western Region  
11 Air Cargo Complex  
Sahar, Bombay-400 099.

2. Wildlife Preservation  
Eastern Region  
Nizam Palace  
6th Floor, MS Building  
234/4, A.J. C. Bose Road  
Calcutta-700 020

3. Wildlife Preservation  
Northern Region  
Bikaner House, Shahjahan Road  
New Delhi-110 011.

4. Wildlife Preservation  
Southern Region  
2C/5, Brownstone Apartments  
Mahalingapuram  
Madras-600 034.



## ENVIS CENTRES

### Institution

### Area

- |   |   |  |
|---|---|--|
| <p>1. Dr. K.R. Khan<br/>Member Secretary<br/>Central Pollution Control Board<br/>Parivesh Bhawan<br/>CBD-cum Office Complex East<br/>Arjun Nagar, Delhi-110 092.</p>  | <p>Control of Pollution (Water &amp; Air)</p>   | <p>Tel: (011) 2217013, 2217079,<br/>2204948, 2217078<br/>Grams: CLEANENVIRON</p> <p>Telex: 031-66440 PCO-IN</p>  |
| <p>2. Dr. P.N. Vishwanathan<br/>Sr. Assistant Director<br/>Industrial Toxicology Research Centre<br/>Mahatma Gandhi Road<br/>Lucknow-226001<br/>(U.P.)</p>  | <p>Toxic Chemicals</p>  | <p>Tel: (0522) 248227, 248228,<br/>247586, 240106<br/>Telex: 535-456 ITRC IN<br/>Grams: INTOXI, LUCKNOW</p> <p>Fax: (0522) 248227</p>  |
| <p>3. Dr. Ashok Khosla<br/>President<br/>Development Alternatives<br/>B-32 Institutional Area<br/>Tara Crescent, New Mehrauli Road,<br/>Hauz Khas, New Delhi-110016.</p>                                      | <p>Environmentally Sound &amp; Appropriate<br/>Technologies.</p>                              | <p>Tel: (011) 665370, 65793<br/>Telex: 031-73216 DALI IN<br/>DELHI<br/>Fax: 91 + 11 + 686-6031</p>   |
| <p>4. Dr. R. Pitchai,<br/>Director<br/>Centre for Environmental Studies<br/>College of Engineering<br/>Anna University<br/>Madras-600025 (T.N.).</p>  | <p>Biodegradation of Wastes and Environmental<br/>Impact Assessment.</p>                      | <p>Tel: (044)2351723/Extn. 3</p> <p>Grams: ANNATECH,<br/>MADARS<br/>Telex: 041-21077 ANNU IN</p>   |
| <p>5. Dr. R.K. Pachauri,<br/>Director<br/>Tata Energy Research Institute (TERI)<br/>102, Jor Bagh<br/>New Delhi-110003.</p>   | <p>Renewable Energy and Environment.</p>  | <p>Tel: (011)4625296</p> <p>Grams: TERINST<br/>Telex: 31-61593 TERI IN<br/>Fax: 91-11-4621770</p>  |
| <p>6. Prof. Raghvendra Gadagkar<br/>Chairman<br/>Centre for Ecological Sciences<br/>Indian Institute of Science<br/>Bangalore-560 012<br/>(Karnataka).</p>  | <p>Western Ghats and Biological Diversity</p>   | <p>Tel. (91-812) 340985,<br/>344411/2506<br/>Grams: "Science"<br/>Malleswaram, Bangalore.<br/>Telex: 0875-8349<br/>Fax 91-812-341683<br/>E-Mail: Cesgre@ces, iscernet.in</p> |
| <p>7. Dr. Thomas Mathew,<br/>Secretary-General<br/>World Wide Fund for Nature-India<br/>172 B, Lodi Estate,<br/>Max Mueller Marg<br/>New Delhi-110003.</p>  | <p>Non-Government Organisations, Media and<br/>Parliament Matters related to Environment.</p> | <p>Tel: (011)616532, 693744,<br/>4627586<br/>Grams: PANDAFUND,<br/>Delhi<br/>Fax: 91(11) 462 6837</p>  |
| <p>8. Shri Swadeep Singh<br/>Executive Director<br/>Environmental Planning and Coordination Organisation<br/>(EPCO) Paryavaran Parisar<br/>E-5 Sector Arera Colony<br/>Bhopal-462 016<br/>Madhya Pradesh.</p> | <p>Environmental Management related to the State<br/>of Madhya Pradesh.</p>                   | <p>Tel: (0755) 565868, 566970,<br/>564501</p>  |
| <p>9. Prof. R.V. Rama Rao,<br/>Head<br/>Deptt. of Geo-Engineering and Research Development<br/>Technology College of Engineering, Andhra University,<br/>Visakhapatnam-530 003 A.P.</p>                       | <p>Eastern Ghats</p>  | <p>Tel: (0891)54279</p>  |
| <p>10. Dr. S.K. Bhattacharya<br/>Deputy Director<br/>National Institute of Occupational Health (NIOH),<br/>Meghani Nagar<br/>Ahmedabad-380 016<br/>Gujarat.</p>   | <p>Occupational Health</p>  | <p>Tel: (0272) 67351 67352,<br/>67359, 67361, 67371<br/>Grams: NIOHEALTH<br/>Telex: (81) 121-6471<br/>NIOH IN<br/>Fax: (91)/272 866630</p>                                   |

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|---|---|--|
| 11. Shri D.C. Ojha<br>Senior Librarian<br>Central Arid Zone Research Institute (CAZRI),<br>Jodhpur-342 003, Rajasthan.  | Desertification                               | Grams: SUSKHSHETRA   |
| 12. Dr. K. Krishnamurthy,<br>Director<br>Centre for Advanced Studies in Marine Biology,<br>Annamalai University, Parangipettai-608 502, Tamil Nadu.                         | Mangroves, Estuaries Lagoons and Coral Reefs. | Tel: 23  |
| 13. Shri Karthikeya V. Sarabhai<br>Director,<br>Centre for Environment Education (CEE),<br>Nehru Foundation for Development,<br>Thaltej Tekra<br>Ahmedabad-380 054 Gujarat. | Environmental Education                       | Tel: (0272)442642, 442651<br><br>Telex: 81-121-6779 CEE IN<br>Fax: 91-272-467342<br>91-272-468201    |
| 14. Dr. A.K. Ghosh,<br>Director,<br>Zoological Survey of India<br>Prani Vigyan Bhawan,<br>M-Block, New Alipore<br>Calcutta-700 053.   | Animal Ecology                                | Tel: (033) 494893, 493383<br><br>Grams: Zoology, Calcutta  |
| 15. Dr. S.P. Banerjee<br>Prof. and Head,<br>Indian School of Mines<br>Dhanbad-826 004<br>Bihar  | Environmental Problems of Mining              | Tel: (0326) 32040,<br><br>822187, 822176<br>Grams: SCOLOMIN<br>Telex: 0629-214<br>Fax: (0326) 832040 |
| 16. Dr. T. Chakraborty<br>Head, RIHW Division,<br>National Environmental Engineering Research<br>Institute (NEERI), Nehru Marg<br>Nagpur-440 020, Maharashtra               | Solid Wastes including Hazardous Wastes       | Tel: (0712)526071-526075<br><br>Grams: NEERI<br>Telex: 0715-233<br>Fax: 523893                       |
| 17. Dr. A.N. Purohit,<br>Director,<br>G.B. Pant Instt. of Himalayan<br>Environment and Development<br>Kosi-Katarmal-263 643<br>U.P.   | Himalayan Ecology                             | Tel: (05962) 3314, 3311<br><br>Grams: HIMVIKAS<br>Telex: 05802-201 IHED IN<br>Fax: (05962) 2100      |

## ANNEXURE VI

### LIST OF FILMS PRODUCED BY THE MINISTRY

1. An Interview—Dr. Jodhu - on drought.
2. Mycorrhizae—A wonder root-fungus association (English).
3. Drying watershed Wilderness Lost (Environmental Problems of the Palani Hills and the nearby plains) (Tamil).
4. Anokhi Hartal
5. Plant Conservation Education Project
  - a) Whose life is it anyway
  - b) Dharti kin Pukaar.
6. Ganga
7. Indian desert
8. Van vanita
9. Karkaash
10. Television shot on Conservation of Trees.
11. Automobile emission: Air pollution study of Bombay
12. Hamsini
13. Automobile Emission: Air Pollution Study of Calcutta
14. Conserving our water resources.
15. Exhibition-India-Nature's bounty
16. Aspirations.
17. Meghdoot—part I and II
18. National Environmental Awareness Campaign.
19. Wrath of nature—Part 2 - Drought 1987.
20. Whose Forests? (Lowband)
21. A docu-drama an Environmental Awareness Campaign
22. Vanvanita (Highband)
23. Whose Forests? (Highband)
24. Floods.
25. Vanashri
26. Trust for Environmental Education-Crocodiles (16MM)
27. Pelicans of Neelpattu (16MM)
28. Birds of the Indian Monsoon.
29. Paryavaran Bachaieye—(one minute twenty second.)
30. Rebirth—(twenty five - minutes.)
31. Ek Ped Aap Bhi—(one minute six second and one minute 15) second.
32. Industrial Pollution—(two minutes 14 seconds.)
33. Neat & Clean—(two minute 14 seconds.)
34. Maut ka Farishta—(one minute 40 seconds.)
35. Samjdhari—fourteen minutes.
36. Best friend (3.20 minutes)
37. Overloading of Horses (Hindi) (2.0 minutes.)
38. Kya Yeh Theek Hai (Hindi) (2.0 minutes.)
39. Jan Inki Bhi Hai (Hindi) (2.0 minutes.)
40. Kanton Bhari Dager (Hindi) (2.0 minutes.)
41. Sewage Water Utilisation (Swachch Vatavaran - EK Naya Prayog)
42. Sand Dune Stabilisaion (Rait se Aage)
43. Seed to seedling
44. Pole Planting
45. Agroforestry
46. Regeneration of Shivaliks
47. Joint Management of Forests - West Bengal Experience (ARABHARI)
48. Hare Bhare Pedo Ko
49. Parti Dharti/Andha Dhund Ped
50. Pahele Ghar Ke Pass

