Annual Report 1991-92

सत्यमेव जयते

MINISTRY OF ENVIRONMENT AND FORESTS
GOVERNMENT OF INDIA

CONTENTS

1. INTRODUCTION

1.1 ROLE AND ORGANISATION

The Ministry of Environment and Forests serves as the Focal Point in the administrative structure of the Central Government for planning, promotion and coordination of environmental and forestry programmes. The main activities include conservation and survey of flora, fauna, forests & wildlife; prevention and control of pollution; afforestation and regeneration of degraded areas; and protection of environment. These tasks are being fulfilled through environmental impact assessment; eco-regeneration; assistance to organisations implementing environmental and forestry programmes; promotion of environmental and forestry research, extension, education and training to augment the requisite manpower: dissemination of environmental information; international co-operation and creation of environmental awareness at national level.

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, mangroves and coral reefs, but excluding marine environment on the high seas;

— Botanical Survey of India;

— Zoological Survey of India;

— National Museum of Natural History;

— The Water (Prevention & 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 Environment (Protection) Act, 1986;

— Biosphere Reserve Programme;

— National Forest Policy and forestry development in the country, including social forestry;

— Forest Policy and all matters relating to forest 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;

— Fundamental research including coordination thereof and higher education of forestry;

— Padmaja Naidu Himalayan Zoological Park;

— National Land Use and Wastelands Development Council;

— National Wastelands Development Board;

— National Assistance to Forestry Development Schemes;

— Central Ganga Authority;

— Prevention of Cruelty to animals; and

— Indian Plywood Industries Research Institute, Bangalore.

1.1.2. Organisation

The organisational structure of the Ministry showing various Divisions and 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 the priority areas of Andaman and Nicobar Islands, Manipur, Assam Nagaland, South Western Ghats and Western Himalayas were undertaken by the Botanical Survey of India and about 2500 plant specimens were collected during the surveys. A critical study and description of about 1285 species collected from the States of Himachal Pradesh, Jammu and Kashmir, Mizoram, Nagaland, Manipur and Assam was completed.

— Editing and scrutiny of 225 Red Data Sheets on rare, vulnerable and endangered species have been completed and being processed for publication.

— Manuscripts of the taxonomic revision of the families consisting of Tamaricaceae, Hypericaceae, Sonneratiaceae and Goodeniaceae are being scrutinised for publication of "Fascicle 21" of the Flora of India.

— State Flora of Kerala, Rajasthan (Vol. II & III), Manipur (Vol.I) and Mizoram (Vol.I) are being published.

— District flora of Silent Valley in Palghat District of Kerala and that of Nasik District of Maharashtra have been published.

— Ethno-botanical studies on plants used by the tribals in Tamil Nadu, Karnataka and plains of Uttar Pradesh have been initiated under the All India Coordinated Research Project on Ethno-biology.

— Collection and compilation of data in respect of five less known economic plants of India were completed.

— Multiplication through tissue culture technique of some selected endangered orchid species has been undertaken and a tissue culture laboratory has been set up.

Fauna

— A total of 80 surveys covering 65 districts falling under different eco-systems all over the country were conducted by the Zoological Survey of India.

— Faunal studies in the States of Meghalaya, Tripura, Uttar Pradesh, Tamil Nadu and those of Himalayan Eco-system, Bio-sphere Reserves and National Parks were undertaken.

— Status survey of Capped Langur and Hoolock Gibbon was conducted in Meghalaya.

— The National Zoological collections were enriched by the addition of 56,243 identified specimens pertaining to 2889 species. In addition 879 zoological specimens pertaining to 290 species were identified.

Forest Survey

— Forest Survey of India completed 3rd assessment of forest cover in India and the draft report 1991 has been prepared.

— Thematic maps of 213 sheets covering the States of Bihar, Madhya Pradesh, Maharashtra, Rajasthan, Haryana, Punjab, Uttar Pradesh and West Bengal have been completed.

— The inventory of forest resources in Nagaland, Manipur, Meghalaya, Assam and Mizoram has been completed and the inventory report of Nagaland has been published.

1.2.2. Conservation of Natural Resources

Forest Conservation

— Guidelines have been framed under the Forest (Conservation) Act, 1980, to facilitate speedier clearance of the proposals received from the State Governments and the project authorities.

— The Regional Chief Conservator of Forests have been delegated with powers to clear proposals involving forest land less than 1 ha.

— Out of 4661 proposals received under Forest (Conservation) Act, 1980, 2348 proposals have been approved.

— Regional Offices of the Ministry located at Bangalore, Bhopal, Bhubaneshwar, Chandigarh, Lucknow, Shillong have been delegated powers to process proposals for diversion of forest land for non-forest uses up to 1 ha.

— A new scheme has been formulated providing 100% central assistance to the State Governments for protection and regeneration of degraded forests through tribal people and other poor people living near forests who in turn will receive more than half of the share of the forest produce thereby creating sustainable economic base to these people through forestry.

— A set of six guidelines have been issued to the State Governments to provide benefits to the tribal people at the forest-tribal interface.

— In view of the new National Forest Policy, 1988, the on-going forestry practices and programmes have been re-oriented to meet the objectives.

— In order to reduce the illegal felling and to strengthen the efforts of the State Governments, a scheme on "Development of Infrastructure for Protection of Forests from Biotic Interferences" has been initiated on 50:50 sharing basis.

Wildlife Conservation

— The Wildlife (Protection) Amendment Bill, vetted by Parliament has been promulgated as an Act No. 44 of 1991 after it has received the ascent of the President w.e.f. 2nd Oct, 1991.

— Financial assistance was provided to 28 National Parks and 123 Sanctuaries for conservation programme.

— Eighteen Tiger Reserves in 13 States covering over 28600 sq. kms. forest area have been established so far in the country. During the year, an amount of Rs. 6 crores has been provided as central assistance for the maintenance and development of these Tiger Reserves.

— A Nature Interpretation Centre at Melghat Tiger Reserve has been completed. Setting up of such Centres at Buxa, Nagarjunasagar and Corbett Tiger Reserve have been taken up with the central assistance.

— The Project Elephant is being launched with the objective of ensuring long term survival of identified viable population and to tackle the problematic elephant population that are causing serious depredation.

— The National Zoological Park presently displaying 1143 animals comprising of 71 species of mammals, 88 species of birds and 5 species of reptiles continued its captive breeding programmes of rare and endangered species of wild animals.

— Six States have so far notified the formation of State Advisory Boards for their Animal Welfare activities under the Prevention of Cruelty to Animals Act, 1960.

Bio-sphere Reserves

— Comprehensive guidelines have been finalised for effective implementation of the Bio-sphere Reserves programme and based on these guidelines Action Plans

have been approved for five Bio-sphere Reserves viz Nilgiri, Nanda Devi, Nokrek, Gulf of Mannar and Sundarbans.

Wetlands, Mangroves, Coral Reefs

— Management Action Plans for four wetlands viz Wular, Harike, Kanjli and Renuka have been sanctioned.

— Chilka, Keoladeo Ghana National Park, Harike, Loktak, Sambhar, and Wular wetlands have been designated as wetlands of International importance under Ramsar Convention.

— Out of the 15 identified Mangrove areas, management Action Plans for the five areas, namely, Bhitar Kanika, Mahanadi, Sundarbans, Goa Mangroves and Achra/Ratnagiri have been sanctioned.

— Taking into consideration the importance of coral reefs and factors responsible for their deterioration, the Ministry has identified Gulf of Mannar, Gulf of Kutch, Andaman and Nicobar Islands and Lakshadweep Islands as country's four coral reefs.

National Conservation Strategy and Policy Statement on Environment and Development

— A document entitled 'National Conservation and Policy Statement on Environment and Development' covering various environmental problems and its regulatory and promotional measures, development of policies from environmental perspectives, international cooperation, policy and instrumental support for the implementation of the strategy etc. has been prepared.

Bio-diversity conservation

— A new scheme on 'Bio-diversity conservation' has been initiated to ensure proper coordination among various agencies concerned with issues relating to conservation of Bio-diversity and to review, monitor and evolve adequate policy instruments.

Assistance to Botanic Gardens and Field Centres

— A scheme has been initiated to augment the activities for conservation and protection of plant genetic resources in different regions of the country through a network of botanic gardens and field centres.

1.2.3. Environmental Impact Assessment

— The Ministry has developed guidelines for preparation of Environmental Impact Assessment along with questionnaires and checklists for various sectors like Industry and Mining, Thermal Power, River valley, Rails, Road and Highway projects, Ports and Harbours, Airport, Communication Projects, New Towns and parameters for determining ecological fragility.

— Out of the 201 projects appraised in various sectors during the year for environmental clearance, 92 projects were granted clearance, 63 projects were rejected and additional information was sought for remaining projects.

— A notification under Environment (Protection) Act, 1986, declaring the coastal stretches as Coastal Regulation Zone and imposing graded restrictions on industrial operations and processes in the zone has been issued by the Ministry. The coastal states are to prepare necessary Coastal Management Plans so that the imperatives of environmental conservation are internalised in the development process.

— In order to cover all development projects under the purview of the environmental assessment and provide statutory backing a draft notification has been prepared and to be gazetted shortly.

— A notification on Aravalli range covering Gurgaon District of Haryana and Alwar district of Rajasthan has been issued on January 9,1992 with the intention to protect Aravalli range for the indiscriminate onslaught of the development.

— In view of the conservation of environment as well as raw materials, work has been initiated to identify "State of the Art Technologies" for implementation of the programmes for renovation and modernisation in different sectors of industry.

— Island Development Authority provided guidelines for ensuring the optimal use of the natural resources of Andaman and Nicobar and Lakshadweep Islands without creating adverse environmental impacts.

— Studies have been carried out on the human exposure to selected pollutants like lead, cadmium, DDT, oxides of nitrogen etc., under Human Exposure Assessment Location Project (HEAL).

1.2.4. Control of Pollution

Control of Water, Air and Noise Pollution

— To augment the resources of the Pollution Control Boards, the Water (Prevention and Control of Pollution) Cess (Amendment) Bill, 1991, has been passed in both the houses of Parliament.

— Seventeen problem areas have been identified on the basis of the survey and reports of the Central and State Pollution Control Boards and time targetted Action Plans for controlling pollution in nine of these areas have been finalised.

— A scheme for setting up of common effluent treatment plants in all clusters of small scale industries/industrial estates with a central subsidy of 25% of the capital cost has been launched.

— In order to assess the pollution load and various other activities responsible for it, studies on Narmada, Tapti and Brahmaputra rivers have been completed.

— Thirty new inland water quality monitoring stations have been identified for establishment under 'Assessment of Pollution by Monitoring' scheme.

— Under Indo-Dutch bilateral programme, two automatic water quality monitoring stations have been installed on the river Yamuna at Delhi.

— Thirty new stations have been identified for establishment, in phases, for monitoring of ambient air quality under 'National Ambient Air Quality Monitoring Programme'.

— Pollution control status of 17 categories of industries in 23 States/UTs including all major industrial estates has been prepared. Defaulting units have been identified and actions are being initiated against these units.

— Noise limits have been prescribed for automobiles, domestic appliances and construction equipments to be adopted at the manufacturing stage.

— Codes of practice for controlling noise from sources other than industries and automobiles like public address system, aircraft operation, railway operation, bursting of crackers etc. have been evolved.

— Standards for effluents and air emissions for the industries like Natural Rubber and Processing, Dairy, Ceramic, Bagasse-fired Boilers and Tannery have been finalised.

— The Central Pollution Control Board (CPCB) has been empowered to enter any place or inspect any equipment, industrial plant, record, register etc., and to take samples of air, water, soil or any other substance for the purpose of analysis from any factory premises or other places under the rules of Environment (Protection) Act, 1986.

— Environmental Audit has been proposed to be made compulsory in the companies so that brief particulars of compliance with environmental law are reported in the reports of their Board of Directors.

— The Scheme of "Labelling of Environment Friendly Products" has been notified during the year.

— Out of identified 16 consumer product categories, criteria for two product categories viz. toilet soaps and detergents have been notified.

Management of Hazardous Substances

— Guidelines on siting of hazardous wastes treatment, disposal facilities and identification and assessment of abandoned hazardous wastes sites have been prepared and circulated to the concerned agencies.

— Vulnerability analysis of eight extremely hazardous substances viz. Hydrogen Cyanide, Carbon-di-sulphide, Thionyl chloride, Phosgene, Ammonia, Chlorine, Oleum and Hydrogen Fluoride was completed.

— Off-site/on-site emergency preparedness plan has been prepared for Vadodara with the objective of analysing hazards present and to plan mitigative measures in terms of response time, resource mobilisation and effectiveness in case of accidents.

— In order to ensure the effective implementation of, the rules prepared to regulate the handling of hazardous chemicals, hazardous micro-organisms/genetically engineered organisms and wastes, regional meetings were held at different places with implementing agencies, associations and industries to find out problem in implementation and take remedial measures. 4 such meetings have so far been held at Bombay, Madras, Bhopal and Calcutta and based on the information obtained in these meetings the rules are proposed to be amended.

— The Red book entitled 'Central Crisis Group Alert System' was updated.

— Guidelines on Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and a set of rules for classification, labelling and packaging of hazardous chemicals have been prepared and circulated to all concerned.

— Efforts have been made to maximise utilisation of fly ash and urban wastes in order to minimise their environmental hazards.

1.2.5 Regeneration and Development

— In the first phase of the Ganga Action Plan (GAP), 870 mld of sewage generated in 25 class I towns along the river is proposed to be intercepted, diverted and treated. By December, 1991, 405 mld of waste water had been diverted.

— Out of the 261 schemes sanctioned at a revised total cost of Rs. 361.72 crores covering the States of Uttar Pradesh, Bihar and West Bengal under Ganga Action Plan, 173 schemes have been completed so far. Among the completed schemes, 77 are in U.P., 31 in Bihar and 65 are in West Bengal.

— Out of the sanctioned 88 sewage interception and diversion schemes in the three States, 53 schemes have been completed so far.

— A total of 39 out of 43 schemes involving construction of 2743 toilet complexes and 43,927 individual pour flush latrines have been completed under "Low Cost Sanitation Programme"

— Out of the 28 schemes of electric crematoria, 19 schemes involving constructions of 22 electric crematoria have been completed.

— Under the programme for construction of re-development of ghats etc.,' out of 35 river front development schemes involving 122 ghats, 30 schemes involving 92 ghats have been completed.

— As a result of legal and administrative measures taken under the Environment (Protection) Act, 1986 and Water (Prevention and Control of Pollution), Act 1974, 51 industries out of identified 68 gross polluting industries along the river Ganga have installed their Effluent Treatment Plants (ETPs). A new technology for sewage treatment and a new method for afforestation with raw sewage have been developed. In addition, a Chrome recovery plant to stop the inflow of harmful Chromium to the river has been set up in a pilot tannery in Jamau area of Kanpur.

— During the year, special attention was given to peoples participation through voluntary agencies/NGOs, students, youth etc., by organising exhibitions, melas etc., under the Ganga Action Plan.

— A National River Action Plan (NRAP) has been proposed to take up works in other grossly polluted stretches of major rivers of the country.

Wastelands Development

— The National Wastelands Development Board (NWDB) has adopted a mission approach for enlisting peoples' participation, harnessing inputs of science and technology and achieving interdisciplinary coordination in the planning and implementation of the wastelands development programmes.

— Various centrally sponsored and Central Sector schemes to promote afforestation and wastelands development, to check land degradation, to raise minor forest produce, to regenerate inaccessible areas and develop people's nursery etc., were continued.

— Apart from continuing the greening programme, the concept of 'Smritivans' has been introduced with the twin purpose of planting trees as life memorial in perpetuating the memory of departed ones and greening the lands for maintenance of ecological balance. During the year 'Rajiv Smriti Van' was inaugurated.

— A pilot project of the tree growers' cooperative has been taken up in five states in collaboration with the National Dairy Development Board and 102 Cooperatives have so far been registered with a total membership of 11,046.

— Realising the role of communications in sensitising people to social development, NWDB prepared a paper on 'Communications Strategy and circulated to all concerned.

— A National Fund for Afforestation and Wastelands Development has been set up to regenerate degraded areas/wastelands. Donations towards this fund are 100% exempted from income tax under the relevant provisions.

— Nine pilot projects are being implemented in different agro-climatic zones with a view to promote the use of Geographical Information System (GIS) technology for land use management and the wastelands development.

— Seven Regional Centres, set up by the NWDB in different Universities and National level institutions of the country, continued to provide technical and extension support to State Forest Departments in preparing projects for wastelands development and afforestation with people's participation.

Other activities on Eco-regeneration

Field Demonstration Projects

— Nine field demonstration projects sanctioned earlier to various academic institutions, professional bodies and NGOs located in several States continued during the year.

Eco-Task Forces

— Activities of the three Eco-Task Forces deployed in the States of Uttar Pradesh, Rajasthan and Jammu and Kashmir were continued during the year in the fields of plantation, mined area reclamation, protection of area etc.

1.2.6 Research

Environmental Research

— During the year two research projects under Environmental Research Scheme and Man and Biosphere Programme were sanctioned while 26, sanctioned earlier were completed.

— An All India Coordinated Programme for studies on 'Sea Level Rise' continued at 10 different institutions of the country and a new project on 'National Methane Campaign' for actual methane measurement has been initiated.

— Under the Integrated Action Oriented Research, Demonstration and Extension Programme on Eco-

Development, 21 projects under 'Himalayan Region', 19 under 'Western Ghats' and 12 under 'Eastern Ghats' remained operational while six projects sanctioned earlier in 'Himalayan Reigon' and nine in 'Western Ghats' were completed.

— Salient findings of the programme on river Cauvery in respect of bio-monitoring and physio-chemical profiles of the river water, pollution status of the tributaries and different species of fauna in the river basin have been recorded.

— During the year, monitoring of the progress of 57 research projects under Environmental Research Scheme, Man and Biosphere Programme, Western Ghats and Eastern Ghats has been conducted.

— The G.B. Pant Institute on Himalayan Environment and Development, an autonomous organisation of the Ministry was provided 35,844 ha. of land, free-of-cost, at Kosi-Katarmal, Almora, by Government of U.P. for the construction of the building 'Genebank' and 'Arboretum'.

— The research and development activities of the Institute were extended on major themes of land and water resource management, sustainable development and rural eco-system, conservation of biological diversity and ecological economics and environmental impact analysis. The Institute also continued eight research projects, sanctioned earlier, during the year.

— Thirty research papers have been published by the Institute in various journals, books etc., and a video film highlighting the scope of medicinal plant cultivation were produced.

Research on Wetlands

— Research on various aspects of wetlands was promoted through Universities and other research institutions in the country. In addition to the 20 ongoing research projects, one new project on 'conservation and management of wetland-Kabar Lake' was sanctioned during the year.

Research on Mangroves

— In order to provide scientific input for conservation and management of mangroves in the country, 14 research projects have been supported under various nodal research institutions. In addition, during the year, one research project on "Nutrient Dynamics on Pichavaram Mangroves" in Tamil Nadu to M.S. Swaminathan Foundation was sanctioned.

Research on Biosphere Reserves

— Research of various aspects on Biosphere Reserves was promoted through academic and research institutions in the country. Four research projects sanctioned earlier were completed.

Forestry Research

— The Indian Council of Forestry Research and Education (ICFRE) being the nodal agency to organise direct and manage research and education in the field of forestry, identified research priorities on forestry for providing financial support to forestry research projects undertaken by various universities/institutions in the country.

— During the year, 22 Forestry Research Projects at 13 various universities were supported by ICFRE.

— ICFRE was notified as an autonomous body under the Ministry on 1st June, 1991.

— Eight research institutions under the Council, namely, Forest Research Institute, Dehra Dun, Institute of Forest Genetics and Tree Breeding, Coimbatore, Institute of Wood Science & Technology, Bangalore, Institute of Deciduous Forests, Jabalpur, Institute of Rain and Moist Deciduous Forest Research, Jorhat, Institute of Arid Zone Forestry Research, Jodhpur, Conifers Research Centre, Shimla and Advanced Centre of Productivity, Ranchi, continued various projects in the field of forestry and its related areas.

Wildlife Research

— Wildlife Institute of India continued 14 studies covering high altitude outer Himalaya, Terai, moist-Peninsular forest and arid desert and river eco-system as the major research activity in the field of wildlife research.

— Four new research projects covering studies of Montane grass lands in the High Altitude Himalayas, Western Ghats and Endangered Smaller Animals have been taken up by the Institute.

— During the year, the institute also initiated two research projects covering investigations on diseases and monitoring techniques for determining status of wildlife health.

— Under the Indo-US Rupee-Fund Programme, seven research projects were continued by Bombay Natural History Society, Bombay, during the year.

National Natural Resources Management System (NNRMS)

— Six projects out of 11 sanctioned earlier have been completed under NNRMS Programme so far. Two more new projects under this scheme were sanctioned during the year.

Research in the Ganga Action Plan

— In the Ganga Action Plan Research Programme, 48 projects by the 14 universities and colleges have been completed. A document covering baseline information and biological and physio-chemical features of the river Ganga and the impact on human activities has been published.

— Projects for rehabilitation of Scavenging Turtles through captive breedings in the Ganga at Varanasi have been taken up. Besides, studies on non-point pollution monitoring of pesticides as well as conservation of endangered Gangetic Dolphins and Turtles have been initiated.

1.2.7 Education and Information

Forestry Education and Training

— The Indian Council of Forestry Research & Education (ICFRE), an autonomous organisation of the Ministry, continued to provide financial assistance to various Universities in improving their courses both at Graduate and Post Graduate levels. Forest Research Institute, Dehradun, a research institutions under the Council, has been notified as a deemed University by the Department of Education.

— The Indian Institute of Forest Management, Bhopal organised two one-week course for IFS Officers and conducted Management Development Programmes on issues related to social forestry, rehabilitation of degraded eco-systems, forestry administration, etc. during the year.

— The Indian Plywood Industries Research Institute, Bangalore, an autonomous organisation of the Ministry, organised 17 short-term courses in the areas of Saw Doctoring, Saw Milling, Plywood manufacturing, Log-grading, etc., during the year. The institute also conducted a one-week course for IFS Officers on 'Wood Panel Technology'

— Forty seven IFS probationers and two foreign trainees from Bhutan were provided in-service training by Indira Gandhi National Forest Academy (IGNFA), Dehradun.

— Three State Forest Service Colleges located at Dehradun, (U.P.), Burnihat (Assam), and Coimbatore (T.N.), continued to impart initial two-year in-service training to the officers of the State Forest Services (SFS).

— Eastern Forest Rangers' College, Kurseong organised a two-year training course for 93 Ranger Trainees,.

— About 1200 IFS Officers attended the compulsory training orientation programme organised by the Ministry.

Wildlife Education and Training

— The Wildlife Institute of India (WII), Dehra Dun, oganised nine-month Post-Graduate Diploma and three month Certificate courses on Wildlife for Protected Area Managers at the professional and field technician's level. Ninteen Officer Trainees including one from Lao, PDR graduated in XII Diploma Course, conducted by the Institute.

— A Zoo Management Course for the middle-level managers and technicians and a four-week course for 16 trainees from Zoos and Wildlife Organisations from different States were organised by the Institute during the year.

— The IUCN recognised WII as a Regional Centre for Wildlife Training and provided fellowships for Diploma and Post Graduate Students.

— Under the Indo-US Project, the Institute conducted a 10 day training workshop on Wildlife Interpretation and Conservation, Education as well as an One-week field training workshop on 'Chemical Restraint Techniques' for Capture of Wild Animals.

Environmental Education and Awareness

— The National Environmental Awareness Campaign (NEAC), 1991 was organised with the major theme "Peoples Participation in Global Environmental Concerns". More than 550 organisations comprising NGOs, Schools, Colleges, Universities, Research Institutions, Professional Bodies, Women and Youth Organisations, Government Departments, etc., from various States and UTs were involved in organising several programmes such as seminars, training camps, public meetings, rallies padyatras, jathas, display of posters, dramas, folk dances, street theatres, tree plantation drives, audio-visual/film shows, essays/debates/painting competitions for school children, and preparation and distribution of environmental education resource materials to create environmental consciousness. Various target groups like students/youth, teachers, women, tribals, administrators, professionals, legislators, industrial workers, voluntary workers, armed forces and the general public were covered under the campaign.

— The Centre for Environmental Education (CEE), Ahmedabad, continued its activities to strengthen the NGOs and the school clusters to ensure consolidation and continuation of the achievements made during the previous campaigns.

— The CPR Environmental Education Centre, Madras organised a variety of programmes under the campaign for spreading awareness and interest among the public especially, the youth and the children on all aspects of

environment and ecology with the purpose of promoting conservation of nature and natural resources.

— The National Museum of Natural History (NMNH), an associated organisation of the Ministry conducted a large number of in-house and field activities to promote environmental awareness under the campaign.

— During the campaign, Door Darshan continued to telecast fortnightly programmes on environment and related areas in the national network and a variety of programmes were broadcast by All India Radio. The Regional Centres of Door Darshan also telecast several programmes in various regional languages during the campaign.

— The Ministry, during the year, provided financial assistance in setting up of eco-clubs in schools, production of audio-visuals and documentary films, organisation of training programmes, etc., to several educational institutions, professional bodies, non governmental organisations, with the ultimate objective of spreading the message of environmental conservation and sustainable development among the public.

— Two Centres of Excellence on environment education, namely, Centre for Environment Education, Ahmedabad and CPR Environmental Education Centre, Madras, continued their activities relating to the development of environmental education resource materials, organisation of training and interpretation programmes and creation of environmental consciousness among the children and the general community. During the year, CEE, Ahmedabad also initiated a locale specific environmental education programme under IDRC assistance and CPR Environmental Education Centre, Madras, undertook a project on "Women in Wastelands Development". The Centre selected six districts as well as identified local NGO Groups to implement the various phases of the wastelands development project.

— The Ecological Research and Training Centre, Bangalore and Centre for Mining Environment, Dhanbad, and other Centres of Excellence, continued their activities during the year with specific attention to the research projects in the field of ecology and environment of Western Ghats and environmental problems in mining areas respectively. The Centre for Mining Environment also introduced a 3-Semester M.Tech. Programme in Environmental Sciences & Engineering.

— A new Centre of Excellence, viz Salim Ali Centre for Ornithology and Natural History (SACON) has been approved to be set up during the year to develop and conduct research in all aspects of ornithology and natural history of other life forms.

— Three exhibits, one in the introductory gallery, one in the ecology gallery and the other in the conservation gallery were updated by the National Museum of Natural History (NMNH). A new exhibit on "Landmarks of Biological Studies" was also added by the Museum in the Cell Gallery during the year.

— Two temporary exhibitions, one on "Endangered Animals of India" and the other on "The Scourage and the State of India's Deadly Waters" were organised by the NMNH apart from a special exhibition namely "You and the Environment" dealing with environmental issues and focussing attentions of what an individual can do to promote environmental conservation.

— The NMNH also continued its regular educational activities, summer programmes, special programmes on quiz, declamation contests for teenagers, school children and the handicapped children. In addition, the NMNH also conducted a three week internship training in environmental education for students at Graduate level.

— Construction of the building of the first Regional Museum of NMNH at Mysore was completed during the year and various exhibit galleries are being housed in the building.

— The Museum also brought out several environmental education resource material in the form of work books for children and popular literature for the general public.

— During the year, Indira Gandhi Paryavaran Puraskar for the years 1989, 1990 and 1991; Indira Priyadarshini Vriksha Mitra Awards for 1990; and National Awards for Prevention and Control of Pollution, 1991 were announced and awards given away to the awardees by the Prime Minister in a special function.

Environmental Information

— The Environmental Information System (ENVIS) continued its activities of collection, collation, storage, retrieval and dissemination of environmental information to all concerned.

— Three new ENVIS Centres in the field of 'Desert Ecology', "Estuary, Mangroves, Corals and Lagoons" and "Environmental Education" have been set up during the year, thus increasing the number of ENVIS network partners from 10 to 13.

— ENVIS enriched the existing documentation base by procuring several documents on environment and its related areas for dissemination of environmental information to the user groups.

— During the year, ENVIS network both as National Focal Point (NFP) and Regional Service Centre (RSC) of

INFOTERRA/UNEP responded to more than 4100 National and International queries and provided substantive information to the users. Out of these queries, the ENVIS focal point in the Ministry alone responded to 1554 queries of which 1493 were National and 61 were International.

— The quarterly abstracting journal entitled "Paryavaran Abstracts" continued to be published. During the year, four issues of the journal containing about 1000 abstracts were published.

1.2.8 Legislation and Institutional Support

— With a view to provide immediate relief to the victims of accidents arising due to handling of hazardous substances, the Public Liability Insurance Act has been made effective and the main rules under the Act have been notified during the year. An ordinance restricting the liability of the insurer has also been issued.

— A set of rules on the transportation of hazardous chemicals by road has been notified under the Motor Vehicle Rules, 1989.

— A notification restricting the use of benzidine and benzidine based dyes in the country has been issued.

— On initiation of the Ministry, a notification banning the use of Penta Chlorophenol (PCP) which has adverse environmental effects has been issued.

— A Notification under the Environment (Protection) Act, 1986 declaring the coastal stretches as Coastal Regulation Zone (CRZ) and imposing graded restrictions on industrial operation and process in these zones, has been issued.

— The Water (Prevention and Control of Pollution) Cess (Amendment) Bill 1991 has been passed by both the Houses of Parliament.

— Wildlife (Protection) Amendment Bill 1991 has been promulgated as Act No. 44 of 1991.

— During the year, 5242 cases were filed by the State Pollution Control Boards under the Water and Air Act out of which 1696 cases have been decided, 3350 are pending in various courts and 196 were dismissed.

— Assistance was provided to State/UT Departments of Environment and the State Pollution Control Boards to strengthen their activities.

1.2.9 International Cooperation

— The Ministry continued to function as the nodal agency for participation in various international agreements and participated in several intergovernmental negotiating committees for 'Convention of Climate Change' and 'Bio-diversity' during the year.

— The Asian Development Bank (ADB), under the Indo-ADB collaboration programme provided assistance for a project on 'Review of Environmental Laws in India'.

— One ambient air quality monitoring station in Delhi has been installed under the Indo-EEC collaboration programme.

— Under Indo-Dutch bilateral programme, basic training on sampling and analysis was provided under the project "Monitoring of the River Yamuna".

— Two seminars on administrative development in forestry sector have been held under the Indo-Sweden Collaborative Programme.

— An agreement was signed with the World Bank for a major project on Industrial Pollution Control. Three Sewage Treatment Plants in U.P. and 12 Pumping Stations Schemes in West Bengal are being executed with World Bank assistance under the Ganga Action Plan.

— The Ministry has set up an Inter-Ministerial Group (IMG) to consider various issues related to United Nations Conference on Environment & Development (UNCED) being held in Brazil in June, 1992. The IMG held a number of meetings during the year. The Ministry also held consultations with selected NGOs and Experts to coordinate the preparation for the UNCED Conference.

— Two publications one on "Environment & Development: Traditions, Concerns and Efforts in India" and the other on "An Overview of India's Approach to Environment & Development" are also being prepared by the Centre for Environment Education, Ahmedabad, a Grants-in-Aid institution of the Ministry for the UNCED conference.

— With a view to obtain expert advice on impact of global changes on earth's environment, and to promote and coordinate various multi-institutional & multi-disciplinary studies and research projects in these areas the Ministry constituted an Expert Advisory Committee (EAC) on Global Environmental Issues. On the recommendations of EAC, an all India co-ordinated programme on Sea level rise along the Indian coast and a National Methane Campaign have been launched by the Ministry.

— The Ministry participated in the on-going negotiations under the aegis of UNEP in the Global Convention on Conservation of Bio-diversity.

— The Ministry actively participated in the Vienna Convention and other meetings related to various aspects of the Montreal Protocol. During the year, drafting of a strategy for reduction and eventual phase out of ozone depleting substances has also been initiated.

— A Global Environment Facility (GEF) has been jointly established by the World Bank, UNDP and UNEP and the Ministry has co-ordinated within the Government in dealing with the GEF

1.2.10 Administration, Plan Co-ordination and Budget

Administration

— In accordance with the revised recruitment rules for Group 'A' Scientific posts direct recruitment of 13 Group 'A' scientific posts in the Ministry and its associated offices was made.

— Under the Flexible Complementing Scheme, 10 Group 'A' Scientific Officers were promoted to the next higher grade.

— Action has been initiated for recruitment of 66 vacancies in a special drive to fill up the backlog of SC/ST vacancies for Group A,B,C& D posts in the Ministry and its associated offices.

— A Central Grievances Cell has been set up to receive various complaints on several aspects of environment.

— The Ministry has initiated to improve the environment in and around the CGO complex and to provide general facilities to a number of Central Govt offices located in the complex.

— On the recommendations of the Union Public Service Commission, 74 Indian Forst Service (IFS)officers were appointed.

— During the year, 15 employees of the Ministry were nominated for Hindi Training, 12 for Hindi Typing and 6 for Hindi Stenography Training.

— Hindi week was organised from 9 to 13 September, 1991, during which, various competitions in proficiency and use of Hindi were held and prizes distributed to the winners.

— A quarterly Hindi Journal 'Paryavaran' continued to be published during the year to encourage creative writing in Hindi among the officers and the employees of the Ministry. In addition, two in-house part time training programmes were also organised.

— The O&M Inspection of the various sections of the Ministry was carried out in accordance with the Central Secretariat Manual of Office Procedure.

— The Civil Construction Unit (CCU) of the Ministry undertook 25 major works of construction amounting to Rs. 26 crores.

— During the year, the CCU also completed the constructions of Herbarium-cum-office and 'Reptile House' at National Zoological Park, New Delhi.

— During the year as a Major Welfare Activitity, a medical check-up of the employees of the Ministry was conducted.

— The Recreation Club of the Ministry continued its several programes to promote sports, cultural and recreational activities.

— Various competitions and the Cultural Programmes were organised during the celebration of the Annual Day of the Ministry on 4th January, 1992.

Plan Co-ordination and Budget

— The Budget Estimate (Plan) and Revised Estimate (Plan) of the Ministry during 1991-92 was Rs. 300.44 crores and Rs. 266.44 crores respectively. The Budget Allocation for the Annual Plan 1992-93 of the Ministry has been decided as Rs. 280.00 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 objectives of surveying and identifying the plant resources of the country. The Survey has its headquarters at Calcutta and nine Circles located in different phyto-geographical regions of the country.

2.1.2 The activities of B.S.I. during the year were as follows:

2.1.2.1 Survey and Taxonomic Studies

Intensive Survey work was taken up in priority areas in order to collect, identify and document the plant resources. During the year the following areas were surveyed:

— Andaman & Nicobar Islands, Great Nicobar, North Andaman, Saddle Peak, Inturico Island;
— Manipur
— Assam
— Nagaland
— Subansiri District
— South Western Ghats
— Western Himalayas: Cold Desert Areas.

Fig 1: *Arisaema wallichianum*—a threatened aroid

Fig 2: Fruits of *Arbus precatorius*

During the year, five major exploratory tours and two short duration tours were undertaken in the priority areas. About 2500 plant specimens were collected during these surveys and the process of mounting and identification of these specimens is in progress. Some interesting live specimens particularly of rare and orchid plants have been collected and were introduced in the gardens and National Orchidaria at Shillong and Yercaud of the Botanical Survey of India.

A critical study and description of about 1285 species collected from the States of Himachal Pradesh, Jammu and Kashmir, Mizoram, Nagaland, Manipur and Assam was completed.

2.1.2.2 Rare and Endangered Species

Editing and scrutiny of 225 Red Data Sheets on rare, vulnerable and endangered species have been completed and being processed for publication of the Red Data Book Vol. 4.

2.1.2.3 National Flora and State Flora

National Flora

Manuscripts of the Taxonomic revisions of the families consisting of Tamaricaceae, Hypericaceae, Sonneratiaceae, Goodeniaceae are being scrutinised for publication of Fascicle 21 of the Flora of India. Compilation work on the Florae Indicae Enumeration Vol. 2: (Dicotyledons) is under progress. Revisionary accounts of 275 species belonging to 43 genera under different families and editing of manuscripts for Flora of India Vols. I & V have been completed.

State Flora

Flora of Kerala (Grasses) and Flora of Rajasthan (Vol. II) have

Fig 3: *Amaranthus sp.*—a pseudo cereal commonly consumed by the people in the Himalayas

been published. Floras of Manipur (Vol. I), Mizoram (Vol. I) and Rajasthan (Vol. 3) are being published. Besides, Volume I of Floras of West Bengal, Madhya Pradesh and Maharashtra are also being processed for publication. Compilation of State Floras of Arunachal Pradesh, Assam, Nagaland, Manipur, Sikkim, Mizoram, Andaman & Nicobar Islands and Pondicherry is under progress.

District Flora

Flora of Silent Valley in Palghat District of Kerala and Flora of Nasik District of Maharashtra have been published. Floras of Bilaspur district of Madhya Pradesh (Vol. II), Panchgani, Mahabaleshwar and Satara District, Maharashtra are also being published.

Fig 5: *Rhododendron arboretum*—Himalayan Pride

Fig 4: *Nepenthes khasianum*—an insectivorous plant from Meghalaya

2.1.2.4 National Data Base

— Data on Type collections (of *ca* 700) in the Central National Herbarium (Vol. 2) has been published. Further listing of types in B.S.I. herbaria is under progress.

— Listing of 650 live collections in the B.S.I. and other major gardens has been completed.

— Distribution data and nomenclature of species of Dicotyledons have been compiled.

2.1.2.5 Studies on Selected Fragile Eco-systems

— Manuscripts on the Mangroves of Goa, Godavari & Krishna Deltas (A.P.), Pichavaram (Tamil Nadu), Vembanad Lake (Kerala), have been finalised.

— Identification and writing of descriptions of plants of Indravati Tiger Reserve (M.P.) is under progress.

2.1.2.6 Ethnobotanical Studies

Under Phase II of the All India Coordinated Research Project on Ethnobiology (AICRPE), ethnobotanical studies on plants used by the tribals in Tamil Nadu, Karnataka and plains of Uttar Pradesh have been initiated.

Fig 6: *Cypripedium himalaicum*—an endangered orchid from valley of flowers

2.1.2.7 Geo-botanical Studies

With collaboration of Geological Survey of India the work on Geo-botany of Singhbhum District (Bihar) was taken up. During the year, 60 plant specimens were collected for chemical analysis. Preliminary reports on the Geo-botanical aspects in Singhbhum (Bihar) and Khetri belt (Rajasthan) have been prepared.

2.1.2.8 Useful Plants

Collection and compilation of data in respect of five less known economic plants of India were completed.

2.1.2.9 Captive Breeding

Multiplication through tissue culture technique of some selected endangered orchid species has been undertaken and a tissue culture laboratory has been set up for continuing the work at Barapani Experimental Garden of the Eastern Circle of B.S.I.

2.1.2.10 Other Activities

— Apart from maintaining the National Collection of herbarium specimens, rendering identification/technical advisory services, data on distribution and cultivation of plant species, living and preserved plant materials for research, BSI participated in the environmental awareness campaign programmes.

— Palynology Unit of Central National Herbarium continued work on pollen morphology.

— Ecology Section completed survey of mangrove areas in the Godavari & Krishna estuaries. Compilation work on Coastal Ecosystem is in progress.

— Cryptogamic Section continued work on Pteridophytic flora of N.E. India, Mosses of Western Himalaya and higher fungi in the hills of Uttar Pradesh.

— Cytology Section continued its work on Karyotype studies on palms of the Indian Botanic Garden along with the work on Chromosome numbers in flowering plants of India.

— Economic Botany Section completed the work on the Ethno-botany of Darjeeling, Nagaland and Sikkim areas.

Fig 7: *Huperzia squarrosa*—a rare epiphytic pteridophyte

— Industrial Section continued its maintenance activities of the exhibits in the gallaries in the Indian Museum.

— Indian Botanic Garden continued its work on the maintenance of all live plants, seed collections and introduction of new/rare plants, during the period.

2.1.2.11 Publications

— Type collections of Central Herbarium Vol. 2.

— Flora of Rajasthan Vol. II.

— Flora of Nasik District.

— Flora of Kerala—Grasses.

— Vanaspati Vani (Hindi)—Vol. 2.

— Bulletin of the Botanical Survey of India. Vol. 31 (in Press).

— Sea grasses of Coromondal Coast (in press).

— Bladderworts of India (in Press).

Fig 8: *Philanthus* sp from Tamil Nadu

— Economic plants of India Vol. 2 (in Press).

— Flora of Rajasthan Vol. 3 (in Press).

— Flora of Taroba National Park (in Press).

— Flora of Bilaspur Vol. 2 (in Press).

— Annual Report (1988-89).

2.2 SURVEY OF FAUNA

2.2.1 The Zoological Survey of India (ZSI) was established in 1916 with the main objective of carrying out faunistic studies. The Survey with its head quarters at Calcutta has 15 regional/ecological/field stations located in different parts of the country.

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

2.2.2.1 Exploration and Survey of Faunal Resources

A total of 80 surveys covering 65 districts falling under different ecosystems of the country were conducted.

— Himalayan Eco-system: Surveys were conducted in Uttar Pradesh (Nainital Dist.), Himachal Pradesh (Simla, Sirmur, Bilaspur, Chamba and Kangra districts), Sikkim and Arunachal Pradesh (Subansiri Dist.).

— Desert Eco-system: Surveys were conducted in Rajasthan (Jodhpur Dist.) and Gujarat (Ahmedabad, Gandhinagar, Kheda, Surendranagar, Bhuj, Bhavnagar, Jamnagar, Junagadh, Mehsana and Rajkot).

— Tropical Rain Forest Eco-system: Surveys were undertaken in parts of Meghalaya, Mizoram, Nagaland, Tripura and Sikkim.

— Wetlands: Surveys were conducted in Ashtamudi lake (Kerala); Kabar lake (Bihar).

— National Parks and Bio-sphere Reserves: Surveys were undertaken in the Nagarhole National Park (Karnataka) Eravikulam National Park (Kerala) and Andaman and Nicobar Group of Islands (Little and Middle Andaman, Havelok Island and Marine National Park) Kanha National Park (Madhya Pradesh), Nanda Devi Biosphere Reserve (Uttar Pradesh), Nilgiri Biosphere Reserve (Tamil Nadu) and Sundarban Reserve Forests (West Bengal).

— Other surveys: The survey of U.P. covering Districts Agra, Aligarh, Basti Deoria, Etah, Mainpuri, Mathura and Gorakhpur was conducted. Surveys were also undertaken in Bihar (Palamau, Ranchi, Singhbhum, Dhanbad, Giridih, Hazaribagh and Begusarai); West Bengal (Howrah and Sundarban Reserve Forest) and Madhya Pradesh (Raigarh, Sarguja, Chhindwara, Mandsor and Ratlam).

Fig 9: BHARAL *(Pseudois nayaur)* in Ladakh

Fig 10: Darter—an Indian Snake bird of marsh lands

2.2.2.2 Faunistic Studies

— Fauna of Meghalaya: The material brought through recent surveys has been entrusted to various specialists for study. Studies on Insecta (Diptera and Orthoptera), Oribatid mites, Mollusca and Mammalia were conducted.

— Fauna of Tripura: Studies have been undertaken on the insect fauna belonging to Orders Odonata, Lepidoptera, Isoptera, Coleoptera and Orthoptera.

— Fauna of Uttar Pradesh: Studies were conducted on Pisces, Insects (Lepidoptera, Odonata and Isoptera) and Chilopoda (Scolopendridae).

— Fauna of Madhya Pradesh: Studies on Insects (Lepidoptera), Tetranychid mites, Aracnnida, Mollusca, Pisces and Amphibia are in progress.

— Fauna of Tamil Nadu: Studies were continued on aquatic Hemiptera and Pisces. As a result of studies on *Ichnofossils Haentzschelinia vyalov,* found in the Ariyalur stage of Trichirapalli Upper Cretaceaous beds, is the first record of the genus from India.

— Fauna of Himalayan Ecosystem: Studies were conducted on Annelida, Chilopoda, Insecta (Odonata, Isoptera, Lepidoptera and Coleoptera) and Pisces and Amphibia from hills of Western Himalayas (U.P.).

Fig 11: Phayre's Leaf Monkey—an endangered primate in India only found in Tripura

— Besides, adhesive mechanism of four species of fishes from the area was also studied.

— Fauna of Biosphere Reserves and National Parks: Studies were conducted on lepidoptera of Nanda Devi Biosphere Reserve, Insecta (aquatic Heteroptera), Chilopoda, Pisces, Amphibia and Aves of Nilgiri Biosphere Reserve; Coleoptera (Scarabaeidae) of Manas Tiger Reserve; Pisces of Melghat Tiger Reserve; Rotifera and Crustacea of Nagarhole National Park and Pisces of Dudhwa National Park.

— Fauna of Wetland: Rotifera, Insecta (aquatic Hemiptera, Coleoptera) and Crustacea (Cladocera) of Ujani Wetland were studied.

— Fauna of Marine Ecosystem: Studies were conducted on Coelenterata (Chirodopidae and Catostylidae), Crustacea (Copepoda and Cladocera), Insecta (Coleoptera and Diptera) and Pisces of Mangrove areas of Andaman and Nicobar Coast.

— Fauna collected during Cruises of Sagar Sampada: Studies were undertaken on plankton belonging to Salpidae, Doliolidae and Oikopleuridae, Chaetognatha and Protochordata.

Fig 12: Marmot—a common Rodent found in Himalayas

2.2.2.3 Status Survey of Endangered Species

Status Survey of Capped Langur and Hoolock Gibbon was conducted in Meghalaya. Besides the status survey of large mammals, the Tiger Reserves of Sariska and Ranthambhore were also explored.

2.2.2.4 Development of National Zoological Collections

National Zoological Collections were enriched by the addition of 56,243 identified specimens pertaining to 2889 species. These include 73 type specimens belonging to 14 new species.

Fig 13: Himalayan Brown Bear—the largest among the bears occuring in the country

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 Departments and individuals. During the year 879 zoological specimens pertaining to 290 species were identified.

In addition, 193 other enquiries of scientific and technical nature requiring information and advice on various zoological and allied problems were also attended to.

2.2.2.6 Other activities

— Wild Life Week was inaugurated on the 3rd October, 1991 in the auditorium of the Zoological Survey of India, Calcutta.

— An In-House Symposium organised by the Survey was held at Calcutta on the 26th April, 1991, to discuss areas of diversification for future research.

— A Training course on collection, preservation and identification of Insects and Mites of Economic Importance was organised at Calcutta from 7-15th February, 1991. Fifteen trainees from various Institutes, Universities and the Regional Stations of ZSI participated.

— An exhibition in connection with the Platinum Jubilee Celebrations, depicting 75 years of progress of the Zoological Survey of India, was organised on 28th June, 1991.

2.2.2.7 Publications

— Rec. Zool. Surv. India, Occ. Pap. Nos. 102, 126, 130, 135, 137, 138 & 141.
— Snails Flukes and Man, 116 pp.

— Faunal Resources of Ganga, Pt. I, 145 pp.
— Snakes and Human Welfare, 82 pp.

— Animal Resources of India (Protozoa to Mammalia)

— State of the Art, 720 pp.

— Prani Jagat No. 3 (Hindi), 80 pp.

— Bibliography of Indian Zoology, Vol. 25.

2.3 FOREST SURVEY

2.3.1 The Forest Survey of India (FSI), Dehradun, is involved in the following activities:

— Preparation of State of Forest Report

— Vegetation Mapping
— Thematic Mapping on 10 year cycle

— Digital Image Processing

— Forest Resources Inventory—Data Processing

— Forestry Training and Special Studies

Fig 14: An aerial view of the Rain Forest in Western Ghats

Fig 15: Evergreen Forest Canopy at Namdhapa

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 Forest Survey of India prepares the State of Forests Report once in every two years based on visual interpretation of satellite imageries. It has completed third assessment of forest cover in India and the draft report 1991, containing an analytical study of forest cover, the statistical data for making an assessment of forests in the country and state-wise and district-wise forest areas etc., has been prepared. The final report will be brought out soon.

2.3.2.2 Vegetation Mapping

The FSI is preparing forest vegetation maps on 1:250,000 scale for the entire country on two year cycle. The target for 1991-92 is 132 sheets covering the States of Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Bihar, Haryana, Himachal Pradesh, Punjab, Jammu and Kashmir and Goa. Work on interpretation of these sheets will be completed by March 1992.

2.3.2.3 Thematic Mapping

The FSI is preparing maps on 1:50,000 scale by interpreting details of aerial photographs for various forest types, crown density, species composition and other land uses. These thematic maps are being prepared for the entire country on 10 year cycle. Every year about 5,000 aerial photographs

Fig 16: Temperate Forest—Dachigam

corresponding to 260 photographic sheets are interpreted. During the year, 213 sheets covering the States of Bihar, Madhya Pradesh, Maharashtra, Rajasthan, Haryana, Punjab, Uttar Pradesh and West Bengal have been completed.

2.3.2.4 Digital Image Processing

FSI is already in possession of Digital Image Processing System configured around VAX-780. Digital Cartography system and map production facilities are also being procured and contract for acquisition and establishment of digital cartography system and map production facilities has been awarded to CMC on turn key basis.

2.3.2.5 Inventory of Forest Resources

The Forest Survey of India is making a detailed forest inventory in North Eastern Region since 1976. The inventory of forest resources in Nagaland, Manipur, Meghalya, Assam and Mizoram has been completed. The inventory report of Nagaland has also been brought out.

2.3.2.6 Publications

— Report on Upper Subansiri District of Arunachal Pradesh.

— Lungli and Chimupui district of Mizoram.

— Report on Forest Resources of Lower Subansiri District of Arunachal Pradesh.

— Report on Forest Resources of Manipur.

— Report on Forest Resources of Aizawal Distt. of Mizoram.

3. CONSERVATION OF NATURAL RESOURCES

3.1.1 Implementation of Forest (Conservation) Act, 1980.

3.1.1.1 The Forest (Conservation) Act, 1980 was enacted with a view to checking indiscriminate dereservation and diversion of forest land for non-forest purposes. Under this Act, prior approval of Central Government is required before any reserved forest is declared or forest land is diverted for non-forest purposes. The Act was amended in 1988 to make the existing provisions more stringent.

3.1.1.2 Under this Act, the State Governments/UTs have to submit formal proposals of forest land and diversion of forest land for non-forest purposes for the approval of the Ministry. The Regional Chief Conservator of Forests have been delegated with powers to clear proposals involving forest land less than 1 ha. Proposals involving diversion of more than 10 ha. of forest land are required to be placed before the Advisory Committee constituted under the Act.

3.1.1.3 Guidelines have been framed under the Forest (Conservation) Act, 1980 to facilitate speedier clearance of the proposals received from the State Governments and Project Authorities. However, proposals which do not contain requisite information are referred back to the concerned State Governments for furnishing necessary details.

The present status of 4661 proposals received under the Forest (Conservation) Act, 1980 during the year is as follows:

Approved	2348
Not approved	678
Rejected for nonfurnishing of information	1337
Withdrawn by State Governments/UTs	111
Pending for final decision	187

3.1.2 Regional Offices for Monitoring of Conditions/Safeguards

3.1.2.1 Six Regional Offices have been established at Bangalore, Bhopal, Bhubaneshwar, Lucknow, Shillong and Chandigarh to monitor the implementation of the conditions imposed while conveying approval for diversion of forest land for non-forest use and also to evaluate on-going forest development projects and schemes.

Regional Offices have been delegated powers to process proposals for diversion of forest land for non-forest use upto 1 ha. The State Governments are requested to submit such proposals to the concerned Regional Offices.

3.1.2.2 Region-wise targets for monitoring of cases under Forest (Conservation) Act and Environment (Protection) Act

Fig 17: Snow covered Himalayan Mountains

Fig 18: Mahua Flower Collection—the major source of livelihood for Tribals of Bastar

and their achievements during the year are given in the table I.

3.1.3 Forest Legislation

3.1.3.1 The Indian Forest Act, 1927, is being amended with a view to bring it in confirmity with the new National Forest Policy. The draft of the amended Act has been prepared and circulated to the State Governments. It is also being examined from constitutional angle and in the light of the recommendations of the Sarkaria Commission, before it is presented to the Parliament for enactment.

3.1.3.2 A Committee was constituted to study the existing legislative situation and suggest improvements in view of the fact that the bulk of the forests are not owned by the States of North Eastern Region. The Committee has since finalised their report and is being examined.

3.1.4 Involvement of Village Communities and Voluntary Agencies for Regeneration of Degraded Forest Lands

The Government of India has issued guidelines to the State Governments to formulate specific schemes on involvement of village communities, voluntary agencies and Non-Government Organisations for the protection and re-generation of degraded forests on the basis of sharing of forest produce. As a follow-up of these guidelines, States of Bihar, Rajasthan, Gujarat, Madhya Pradesh, Orissa, West Bengal, Himachal Pradesh & Haryana have either finalised their schemes or are at a finalising stage.

3.1.5 Association of Tribals and Rural Poor in Regeneration of Degraded Forests

3.1.5.1 A new scheme has been formulated by Government of India and has been proposed to be implemented during VIII Five Year Plan. Under this scheme 100% assistance will be provided to State Governments for protection and regeneration of degraded forests through tribal people and other poor people living near forests, who in return will receive more than half the share of the forest produce. This scheme thus aims to create sustainable economic base to these people through forestry.

3.1.5.2 A set of six guidelines as given below was issued to the State Governments to provide benefits to the Tribal people at the forest-tribal interface:

— Regularisation of encroachments on forest lands

— Review of disputed claims over forest land arising out of forest settlement

— Disputes regarding Pattas/leases/grants involving forest land-settlement thereof

— Elimination of intermediaries and payment of fair wages to the labourers on forest work

— Conversion of forest villages into revenue villages and settlement of other old habitations

– Payment of compensation for loss of life and property due to predation-depredation by wild animals

3.1.5.3 During the year, regular monitoring continued to oversee the implementation of these guidelines by the States.

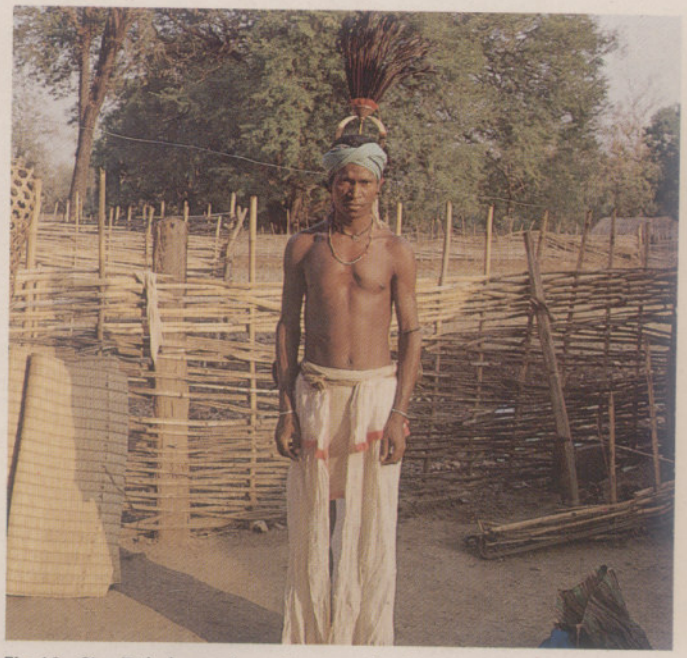


Fig 19: Sira Tribal man from Bastar with tribal dance costume

Table I

Regional Office	Forest (Conservation) Act		Env. (Protection) Act	
	(No. of cases) Target	Achievement (up to Oct. 1991)	(No. of cases) Target	Achievement (Up to Oct. 1991)
Bangalore	175	74	80	35
Bhopal	175	86	80	36
Bhubaneshwar	175	61	80	41
Lucknow	175	56	80	53
Shillong	120	52	45	20
Chandigarh	80	72	35	25
Total	900	401	400	210

3.1.5.4 Suitable steps are being undertaken to mitigate difficulties of the tribal people and to seek their cooperation in forest conservation, after a detailed discussion with the members of Parliament, representing tribal people.

3.1.6 National Forestry Action Programme

3.1.6.1 In view of the new National Forest Policy, 1988, the on-going forestry practices and programmes have been re-oriented to meet the objectives. An integrated perspective programme for 20 years and action programme for 5 years are being prepared covering all the aspects.

3.1.6.2 Discussions on implementation of various forestry programmes were held with the Forest Secretaries and Principal Chief Conservator of Forests of the States and Union Territories to understand the field difficulties and to take corrective steps for implementation of the National Forest Policy.

3.1.7 Development of Infrastructure for Protection of Forests from Biotic Interferences

3.1.7.1 In order to reduce the illegal felling and strengthen the efforts of the State Governments, the scheme on "Development of Infrastructure for Protection of Forests from Biotic Interferences" has been initiated on 50:50 sharing basis with the following objectives.

— To protect the forests from illicit cutting, encroachments, fire grazing and shifting cultivation.

— To develop a network for speedy flow of information and data for future planning and

— To improve forest productivity.

3.1.7.2 Under this Scheme, assistance has been provided to States/UTs, Governments for selected non-recurring items.

3.1.8 Introduction of Modern Forest Fire Control Methods

Based on the encouraging results on 'Modern Forest Fire Control Project' launched during the VII Plan period, it has been proposed to continue the project as a Centrally Sponsored Scheme with 100% assistance in all the States by selecting most fire prone districts.

Fig 20: Tribal Welfare—one of the objectives of the National Forest Policy

Fig 21: Shola Forest Pockets of Annamalai Hills

3.2 WILDLIFE CONSERVATION

3.2.1 The activities to implement the National Wildlife Action Plan were continued during the year. These include:

— Establishment of network of protected areas by Governments to cover representative samples of all major wildlife ecosystems comprising of 416 Wildlife Sanctuaries and 73 National Parks.

— The development of appropriate management systems for protected areas, including a Professional Cadre of personnel fully trained in all aspects of Wildlife and Sanctuary Management as well as the provision of proper orientation of all officers concerned with wildlife

— The review and updating of statutory provisions providing protection of wildlife and regulating all forms of trade, so as to ensure their effectiveness.

— Support for management of Botanical and Zoological Parks and gardens.

— Participation in international conventions designed to prevent the depleting of the Wildlife resources and to provide protection to migratory species.

— Control of domestic and international trade in wildlife and its products.

Fig 22: Ramganga River at Corbet National Park

3.2.2 Indian Board of Wildlife

Indian Board of Wildlife has been re-constituted during January, 1991, under the Chairmanship of the Prime Minister. The functions of the Board are as follows:

— To advise the Central and State Government on ways and means of promoting conservation and effectively controlling poaching of wildlife through coordinated legislative and administrative measures;

— To advise on the setting up of national parks, sanctuaries and zoological gardens;

— To advise the Government on policy regarding export of living animals, trophies, skins, furs, feathers and other products of wildlife;

— To review from time to time the progress in the field of wildlife conservation in the country and suggest such measures for improvement as are considered necessary;

— To promote public interest in wildlife and on the need for its preservation in harmony with natural and human environment;

— To assist and encourage the formation of wildlife societies and to act as a Central Coordinating Agency for all such bodies;

— To perform such other functions as are germane to the purposes for which the Board is constituted;

Fig 23: Wild Buffalo in Kaziranga National Park

Fig 24: A view of the Kedarnath Wildlife Sanctuary

Fig 25: Grassy Hillocks at Thallakaveri

— To advise the Cenral Government on any matter that it may refer to the Board, provided the subject matter of the reference falls within the prescribed functions of the Board; and

— To do all such other things either alone or in conjunction with others or on the direction of the Government of India, which the Board may consider necessary, advisable or conducive to the preservation and conservation of wildlife or for other similar purposes for which it is constituted, including those mentioned herein.

3.2.3 Enforcement of Wildlife (Protection) Act, 1972 and Amendment of the Act

3.2.3.1 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 are 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 Custom Departments. Several cases of poaching and illegal trade in wildlife products were detected.

3.2.3.2 The Wildlife (Protection) Amendment Bill, 1991, was passed by the Parliament and Promulgated as Act No 44 of 1991, after it has received the ascent of the President of India, w.e.f. 2nd October, 1991. The new provisions of the Act regarding setting up of the Zoo Authority, protection of rare and endangered species of plants and empowering of individuals to file complaints against offenders would be enforced after the required rules have been framed under the Act.

3.2.4 Conservation Programme

— Financial Assistance was provided to 28 National Parks and 123 Sanctuaries during the year. Under Centrally Sponsored Scheme, assistance for development of National Parks was provided at the rate of 100% on selected items of capital expenditure and 50% for selected items of recurring nature. In the case of sancturies assistance was provided for works of non recurring nature only.

— Financial assistance has also been made available to the State Governments on a 50% sharing basis, under the Centrally Sponsored Scheme "Control of Poaching and Illegal Trade in Wildlife" mainly for strengthening, antipoaching and enforcement activities outside protected areas as well as for getting intelligence regarding poachers and illegal trade.

— Realising the importance of sustainable development around wildlife protected areas, a separate plan scheme namely "Eco-development around National Parks and Sanctuaries" has been launched during the year.

— Under the Scheme "Conservation of Rhinos in Assam", financial assistance was provided to the Government of Assam for strengthening the management of the habitats of Rhinos in Assam as well as upgradation of anti-poaching infrastructure.

— Provision of setting up of a "Central Zoo Authority" for monitoring and regulating the management of zoos in the country has been made in the Wildlife (Protection) Act. The Authority would also be responsible for providing financial assistance for development of various zoos in the country.

3.2.5 Project Tiger

3.2.5.1 The Centrally Sponsored Plan Scheme "Project Tiger"was launched on 1st April 1973 to achieve the following objectives:

— To ensure maintenance of viable population of the 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.

3.2.5.2 To achieve these objectives, 18 Tiger Reserves have so far been established in 13 States, covering over 28600 Sq. Kms. forest area. The following table gives the distribution of areas of Tiger Reserves in the country.

3.2.5.3 A Steering Committee functioning under the Chairmanship of the Prime Minister provides guidelines for the management of the Tiger Reserves. The non official members of the Steering Committee (Project Tiger) and four scientific institutions nominated by the Steering Committee (Project Tiger) review the Project Tiger bi-annually.

3.2.5.4 During 1991-92, an amount of Rs. 6 crores has been provided as Central assistance for the maintenance and development of the existing 18 Tiger Reserves. The total expenditure during 1991-92 including both Central and State share, on the Project Tiger scheme was about Rs. 9 crores.

Table-2

Sl. No.	Name of the Tiger Reserve	Area (in Sq. Kms.)		
		Core	Buffer	Total
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	1289	1597
6.	Palamau (Bihar)	213	715	928
7.	Ranthambhore (Rajasthan)	392	433	825
8.	Similipal (Orissa)	845	1905	2750
9.	Sundarbans (West Bengal)	1330	1255	2585
10.	Periyar (Kerala)	350	427	777
11.	Sariska (Rajasthan)	498	302	800
12.	Buxa (West Bengal)	315	444	759
13.	Indravati (Madhya Pradesh)	1258	1541	2799
14.	Nagarjunasagar (Andhra Pradesh)	1200	2368	3568
15.	Namdhapa (Arunachal Pradesh)	1808	177	1985
16.	Dudhwa (Uttar Pradesh)	648	163	811
17.	Kalakad Mundanthurai (Tamil Nadu)	571	229	800
18.	Valmiki (Bihar)	336	504	840
	Total	12343	16266	28609

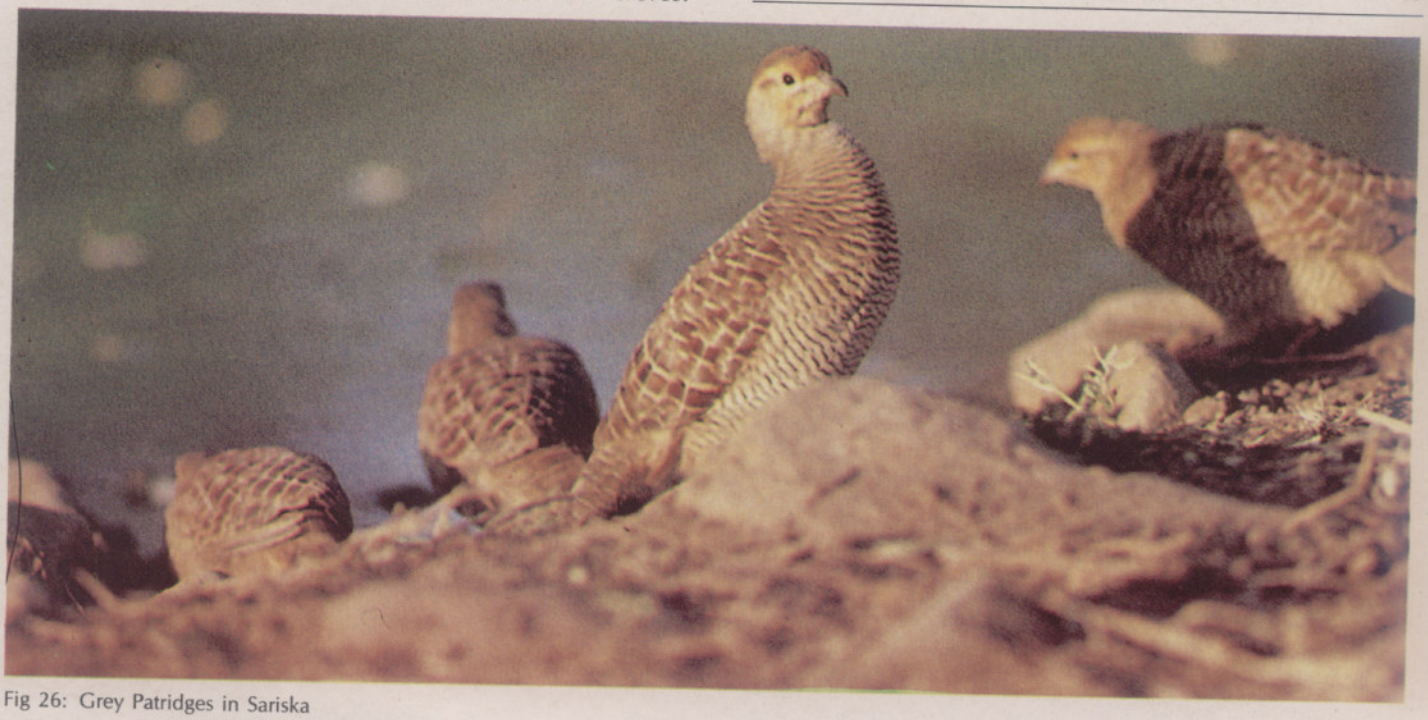


Fig 26: Grey Patridges in Sariska

Fig 27: Project Tiger—a testimony for successful conservation efforts

3.2.5.5 Eco development plan for 11 Tiger Reserves is being processed during the year.

The programme aims at the following:

— Meeting the local demand of fuelwood and fodder due to the ban on removal of the same from the core areas.

— Harnessing the local resources and encouraging ethnic vocations for the economic upliftment of the local people.

— To popularise the use of non-conventional energy like solar power for lighting the peripheral areas to ward off tiger straying in the localities.

— Use of smokeless chulhas for reducing the fuel consumption and also providing improved varieties of fruit seedlings to take care of the nutritional need of the local people.

3.2.5.6 During the year, the following developmental activities were undertaken in various Tiger Reserves:

— The Management Plan of Nagarjunasagar Tiger Reserve has been finalised.

— Rs. 50 Lakhs has been provided for the various eco-development works to Ranthambhore, Kanha, Buxa, Sundarban, Nagarjunasagar, Bandipur and Kalakad Mundanthurai Tiger Reserves.

— Rs. 6.60 Lakhs has been provided for the works of computerisation for monitoring various activities of Kanha, Ranthambore, Sundarban, Melghat and Dudhwa Tiger Reserves.

— Rs. 10 Lakhs has been provided for the preservation of the endangered animal Barasingha in the Kanha Tiger Reserve.

— The Nature Interpretation Centre has been completed in Melghat Tiger Reserve. The setting up of Nature Interpretation Centre at Buxa, Nagarjunasagar and Corbett Tiger Reserves has been taken up with central assistance of Rs. 10.97 Lakhs. Assistance of Rs. 2 Lakhs has been provided for the renovation of the Nature Interpretation Centre at Sundarban Tiger Reserve.

— The conference and field visits of all Field Directors were organised at Kanha and Bandhavgarh National Park.

— Financial assistance was provided for the construction/strengthening of the various buildings, roads, anicuts, check dams and purchasing of arms and ammunition, scientific equipments, wireless equipments etc. to all Tiger Reserves.

3.2.6 Project Elephant

The Project Elephant is being launched during this year, with the aims at ensuring long term survival of identified viable populations and to tackle the problematic elephant population that are causing serious depredation. The project provides for restoring the lost and degraded habitats of elephants including creation of corridors for migration 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.

3.2.7 Zoological Parks

3.2.7.1 The National Zoological Park, New Delhi, displays presently 1143 animals comprising of 71 species of mammals, 88 species of birds and 5 species of reptiles. On an average about 16 to 17 lakhs people visited the Zoo.

— During the year, construction of Reptile House was completed and renovation and improvement of various enclosures were taken up. The main thrust of the management of the zoo was on creation of awareness amongst the visitors regarding nature conservation. A new lecture room has been provided for the purpose.

— The Zoo continued to contribute incaptive breeding of rare and endangered species of wild animals like Thamin deer, Swamp deer and Sloth bear through successful breeding.

3.2.7.2 Padmaja Naidu Himalayan 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. During the year the Park continued its activities including research on the behaviour and breeding biology of the fauna of the East Himalayan Region and provided visitors an opportunity to learn about the high altitude fauna and flora.

3.2.8 Animal Welfare

3.2.8.1 Efforts are being made by the Ministry to establish State Advisory Boards, so that the States could be actively involved in the Animal Welfare activities as well as the implementation of the Prevention of Cruelty to Animals (PCA) Act, 1960. Six states have so far notified the formation of such Advisory Boards. A Committee under Section 15 of the Act has been constituted with the following objectives:

— To supervise and control the experiments on animals

— To provide guidelines for formation of Ethics Committee

Fig 28: Elephants in the Rajaji National Park

— Guidelines for the codes of practices and

— Issue of licences etc.

3.2.8.2 Animal Welfare Board of India

Under the provision of PCA Act, 1960, the Animal Welfare Board of India has been set up 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 the voluntary Animal Welfare Organisations for animal population and Anti-rabbies programme, rescue homes and shelters, instigation 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.

— During the year a provision of Rs. 72 Lakhs has been made as Grants-in-aid to the Animal Welfare Board by the Ministry.

3.3 BIOSPHERE RESERVES

3.3.1 Biosphere Reserves are multipurpose protected areas to preserve the genetic diversity in representative eco-systems. The major objectives of 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.

3.3.2 As per the recommendations of a Core Advisory Group set up by the Government of India in 1979, 14 potential sites were identified for setting up of Biosphere Reserves in the country. So far the following seven Biosphere Reserves have been set up:

— Nilgiri (Karnataka, Kerala and Tamil Nadu)

— Nanda Devi (U.P.)

— Nokrek (Meghalaya)

— Great Nicobar (A&N Islands)

— Gulf of Mannar (Tamil Nadu)

— Manas (Assam)

— Sundarbans (West Bengal)

3.3.3 Comprehensive guidelines have been finalised for effective implementation of the Biosphere Reserve programme with the emphasis on the following:

— Preparation of Action Plans for Research Studies and establishment of Research Station for management of Biosphere Reserves

— Formulation of eco-development and demonstration project

— Conservation plans for key species

— Development of data-base and implementation of social welfare activities.

3.3.4 Based on these guidelines, Action Plans have been approved for the following Biosphere Reserves.

— Nilgiri

— Nanda Devi

— Nokrek

— Gulf of Mannar and

— Sundarbans

3.3.5 Project documents for the remaining six sites except Rann of Kutch have been prepared and are under active consideration of the respective State Governments.

3.4 WETLANDS, MANGROVES AND CORAL REEFS

3.4.1 Wetlands

3.4.1.1 Wetlands are transitional areas between aquatic and terrestrial eco-systems where water table is usually at or near the surface of the land is covered by shallow water. They include marshes, swamps, flood plains, bogs, peatlands, shallow ponds, littoral zones of large water bodies, tidal marshes, etc. India is very rich in wetland resources and exhibits significant ecological diversity primarily because of variability in climatic conditions and changing topography.

Wetlands play an important role in flood control, recharging of aquifers, regulating water quality, pollution abatement and as potential sites for aquaculture and breeding grounds for waterfowl etc.

3.4.1.2 Realising the importance of wetlands, a National Wetland Management Committee was constituted to advise the Government on policy guidelines for implementing programmes of conservation, management and research on wetlands. The Committee has identified sixteen wetlands for conservation, and management on priority basis and identified the components of action plan for selected wetland ecosystems as follows:

Fig 29: Wetland Eco-system – a unique waterfowl habitat

— Survey and demarcation

— Notification

— Weed control

— Control of siltation

— Pollution abatement

— Development of fisheries and

— Promotion of environmental awareness for rational use of wetlands.

3.4.1.3 In order to implement these action plans State level Steering Committees have been constituted. As per the recommendations of the Committee, management action plan for following wetlands have been sanctioned during the year:

— Wular (Jammu & Kashmir)

— Harike (Punjab)

— Kanjli (Punjab)

— Renuka (Punjab)

3.4.1.4 India is a signatory to Ramsar Convention, under which following wetlands have been designated as wetlands of international importance:

— Chilka

— Keoladeo Ghana National Park

— Harike

— Loktak

— Sambhar

— Wular

3.4.1.5 In order to provide scientific inputs for conservation and management of wetlands in the country, nodal research institutions have been identified and various research projects have been sponsored by the Ministry.

In addition, environmental awareness programme for use of wetlands has also been supported.

3.4.2 Mangroves

3.4.2.1 Mangroves are salt tolerant forest eco-systems found mainly in tropical and sub-tropical, inter-tidal regions of the world. They support numerous terrestrial arboreal, benthic and aquatic organisms. Mangroves play an important role in stabilising the shore line and act as a bulwork against the encroachment by the sea. They also sustain rich biological diversity which provides the source of livelihood for the people around.

Fig 30: Bharatpur Wetland—breeding arena for Painted Storks

3.4.2.2 In India the total area of Mangroves is approximately 6700 sq. kms. which comprises about 7% of the World's total mangrove area and harbours approximately 59 species of 41 genera belonging to different families.

3.4.2.3 Realising the importance of mangroves, a National Mangrove Committee was constituted to advise the Government on appropriate policies and action programmes for conservation and management of mangroves. The Committee identified 15 mangrove areas in the country and the components for the preparation of Action Plans for selected mangroves eco-systems on the following aspects:

— Natural regeneration

— Raising of nurseries and afforestation

— Notification of the areas and

— Protection and conservation through education and awareness.

State level Steering Committees have been constituted in order to implement conservation programmes in the concerned States, along with the Action Plan for typical mangrove ecosystems with the following objectives:

— Natural regeneration,

— Afforestation

— Raising of nurseries

— Protection and

— Education and awareness.

3.4.2.4 Out of 15 identified mangrove areas, Management Action Plans for following mangroves have been sanctioned during the year:

— Bhitarkanika (Orissa)

— Mahanadi (Orissa)

— Sundarban (West Bengal)

— Goa mangroves (Goa)

— Achra/Ratnagiri (Maharashtra)

3.4.2.5 In order to provide scientific inputs for conservation and management of mangroves in the country, Nodal Research Institutions have been identified and various research projects have been sponsored by the Ministry.

3.4.3 Corals and Coral Reefs

3.4.3.1 The 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

Fig 31: Corals—one of the priority areas for conservation

fauna and flora, complex food web and trophic organisation. Coral reefs in India are limited to Palk Bay, Gulf of Mannar, some islands in Gulf of Kutch, Goa, Lakshadweep and Andaman and Nicobar Islands.

3.4.3.2 Corals and coral reefs in India are facing serious problem from human pressure including settlement, industry, over-exploitation of fish resources, pollution, reclamation of wetland and mangrove areas and deforestation, resulting in wide spread deterioration of reefs on mainland and some of the off-shore islands. Dredging of coral sands for the cement industry has caused considerable loss of flora and fauna.

3.4.3.3 Taking into consideration, the importance of coral reefs and factors responsible for their deterioriation, the Ministry has identified following coral areas in the country:

— Gulf of Mannar (Tamil Nadu)

— Gulf of Kutch (Gujarat)

— Andaman and Nicobar Islands (Andaman & Nicobar) and

— Lakshadweep Islands (Lakshadweep).

Concerned State/UT Governments have been requested to prepare Management Action Plans and to constitute Steering Committees at the State/UT level for its conservation.

3.5 NATIONAL CONSERVATION STRATEGY AND POLICY STATEMENT ON ENVIRONMENT AND DEVELOPMENT

3.5.1 The report of the Core Committee, set up by the Ministry to recommend the tramework for formulating the National Conservation Strategy, was circulated among the Ministries/Departments at the Centre and at the State level, Universities, Academic Institutions and Non-Governmental Organisations for their comments and suggestions.

3.5.2 A document entitled "National Conservation and Policy Statement on Environment and Development" covering following aspects has been prepared.

— An over-view of environmental problems:

— Action taken through various regulatory and promotional measures;

— Constraints and agenda for action;

— Priorities and strategies for action;

— Development of policies from an environmental perspective with particular reference to some of the key sectors such as agriculture and irrigation, animal husbandry, forestry, energy generation and use, industrial development, tourism, transportation and human settlements;

— International cooperation, and

— Support policies and systems required for implementation of the strategy.

3.5.3 The document has been submitted to Cabinet for approval so as to implement the conservation strategy through various Ministries/Departments at the Centre and State levels.

3.6 BIO-DIVERSITY CONSERVATION

3.6.1 A new scheme on bio-diversity conservation has been initiated to ensure proper coordination among various agencies concerned with issues relating to conservation of bio-diversity and to review, monitor and evolve adequate policy instruments for the same.

3.6.2 An In-House Committee has been constituted to serve as a common forum and working linkage among the various agencies. This Committee has constituted two sub-groups for the following:

— To review and identify the gaps in the existing protected area network, its requirements and related management issues and

— to review the existing status and needs for scientific research related to bio-diversity conservation.

The reports of these sub-groups have been finalised.

3.6.3 As per the recommendations of the In-House Committee "A Statue Report on Bio-diversity Conservation" is being finalised.

3.7 ASSISTANCE TO BOTANIC GARDENS AND FIELD CENTRES

3.7.1 A new scheme has been 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. The specific activities to be supported through the scheme are as follows:

— Ex-situ and in-situ conservation and propagation of rare and endangered endemic plant species;

— Conservation of germplasm, establishment of seed banks, pollen banks, tissue culture, arboretta and mist propagation facilities; and

— Education and public awareness of endemic plant species.

3.7.2 Proposals have been invited from various research institutes/Universities/ State Governments for strengthening their Botanic Gardens and an Expert Group has been constituted for screening, implementing and monitoring of these proposals.

4. ENVIRONMENTAL IMPACT ASSESSMENT

4.1 INTRODUCTION

4.1.1 The Ministry has been assigned the responsibility for carrying out environmental impact assessment of developmental projects in various sectors such as multipurpose river valley and irrigation projects, thermal and atomic power, industries, mining, ports & harbours, transport etc.

4.1.2 In order to ascertain the impact of various developmental projects both on the society as well as on land, water, air, flora and fauna etc., the developmental projects are required to prepare an Environmental Impact Statement (EIS) covering the followings:

— Effect on land including land degradation and subsistence,

— Deforestation and compensatory afforestation,

— Air and water pollution including ground water pollution,

— Noise pollution and vibrations,

— Flora and fauna and loss of biological diversity,

— Socio-economic impact including human displacement, cultural loss and health aspects,

— Risk analysis and disaster management,

— Recycling and the reduction of waste,

— Efficient use of inputs.

4.2 COVERAGE OF PROJECTS

The projects in the following sectors are being assessed for environmental impact by the Ministry:

— Industry and Mining.

— Irrigation and Power.

— Transport and Communication

The coverage of the project generally include:

— Those requiring clearance from the Public Investment Board,

— Requiring international funding,

— Projects referred by State Governments or Administrative Ministries,

— Projects in sensitive areas,

— Projects on which there are public complaints.

Besides, projects in certain special areas such as Doon Valley, Agra-Mathura Trapezium and Tourism projects which fall under the guidelines of the Ministry and all projects being put up before Cabinet Committee on Economic Affairs (CCEA) or Public Investment Board such as Ports and Harbours, Communication Projects etc. are assessed.

The environmental impact assessment of development projects has so far been done on the basis of "Executive Order" issuing the provisions of the Environment (Protection) Act, 1986, to ensure implementation of the suggested safeguards. This procedure, however, does not cover private sector projects. In order to bring all projects under the purview of environmental impact assessment and to provide statutory backing, a draft notification has been prepared and to be gazetted shortly.

4.3 NOTIFICATION ON ARAVALLI RANGE

A notification on Aravalli Range covering Gurgaon District of Haryana and Alwar District of Rajasthan has been issued on January 9, 1992, with the intention to protect Aravalli range for the indiscriminate onslaughts of development.

4.4 PROCEDURE FOR ENVIRONMENTAL IMPACT ASSESSMENT

4.4.1 The Ministry has developed guidelines for preparation of environmental impact assessment statement along with questionnaires and checklist for the following

— Industry and Mining,

— Thermal Power,

— River Valley,

— Rail, Road, Highway Projects,

— Ports and Harbours,

— Airport,

— Communication Projects,

— New Towns,

— Parameters for determining ecological fragility.

4.4.2 The projects 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 are made by the technical staff of the Ministry. After ensuring the prima-facie assessment, it is placed before the Advisory Committee. The Advisory Committee discusses the impact of the project with the project authorities and if necessary, site visits are made for on-the-spot assessment of environmental aspects. Based on their examination, the Appraisal Committee make their recommendations for approval or rejection of a particular project.

4.4.3 While recommending approval of a project the Committee also suggests certain safeguards in specific cases.

In cases where the Appraisal Committee are not satisfied about the environmental action plans incorporated in the EIS/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.

4.5 APPRAISAL COMMITTEES AND STAGES OF ENVIRONMENTAL CLEARANCE

4.5.1 The following Environmental Appraisal Committees have so far been constituted:

— River Valley, Multipurpose Irrigation and Hydro-electric Projects,

— Mining Projects,

— Industrial Projects,

— Thermal Power Projects; and

— Atomic Power and Nuclear Fuel Projects.

4.5.2 In addition to the above mentioned Committees Specific Groups/Committees and Task Forces are constituted from time to time for appraisal of major projects referred to the Ministry.

4.5.3 A two stage clearance procedure has been adopted considering the site specific nature of a large number of projects. This clearance is essential for the following types of projects:

— Mining,

— Pit Head Thermal Power Stations,

— 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 investments.

4.6 STATUS OF APPRAISAL OF DEVELOPMENT PROJECTS

During the year, 116 projects were received for environmental appraisal. Required information was also received in respect of 118 projects pending at the beginning of the year. 201 projects were appraised during the year, out of which 92 projects were granted environmental clearance and 63 projects were rejected either due to environmental incompatibility or due to non furnishing of the required information by the project authorities. Additional information has been sought on 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.

4.6.1 Nuclear Power and Nuclear Fuel Complex Projects

During the year one project was received for environmental appraisal. Required information was also received in respect of five pending projects at the beginning of the year. All the six projects were appraised, out of which three projects were granted environmental clearance, and additional information was sought for remaining three projects. While according environmental clearance, various aspects related to safety, contamination of air, water and soil, risk associated with the handling, storage and transportation of hazardous material, waste disposal, deforestation, raising of green belt, and rehabilitation of project oustees etc. have been considered.

The Environmental Appraisal Committee for Nuclear Power and Nuclear Fuel Complex was strengthened by including Expert members in the field of risk assessment and sociology.

Table 3

Development	Projects pending at the beginning of the year	Projects Received	Projects Appraised	Projects Cleared	Projects Rejected	Additional Information Sought
Mining	40	11	50	21	12	18
Industries	41	29	42	29	14	27
Atomic Power	5	1	6	3	Nil	3
Thermal Power	14	23	37	16	13	8
River Valley Projects	4	17	17	3	12	6
Other Sectors (including Transport, Tourism, Ports, Harbours, Airports, Highways, Communication Projects etc.)	14	35	49	20	12	17
Total	118	116	201	92	63	79

4.6.2 Thermal Power Projects

During the year, 23 projects were received for environmental clearance. Required information was also received in respect of 14 projects pending at the beginning of the year. 37 projects were appraised out of which 16 projects have been granted environmental clearance while 13 projects were rejected either due to environmental incompatibility or due to non-furnishing of information. Additional information of remaining eight projects were sought. While according clearance, stipulations were made to provide pollution control measures such as electrostatic precipitators (ESPs), tail stack and ambient air quality monitoring system, dust separation and control equipments, raising of green belts around power plants etc. Further emphasis has been laid on full utilisation of fly ash for construction purposes by making bricks, blocks, building materials and manufacture of cement etc.

4.6.3 Industrial Projects

4.6.3.1 During the year 29 projects were received for environmental appraisal. Required information was also received in respect of 41 pending projects at the beginning of the year. 42 projects were appraised, out of which 29 projects were granted environmental clearance while 14 projects were rejected. Additional information was sought for remaining 27 projects. While according environmental clearance necessary safeguards of pollution control measures were stipulated for avoiding adverse impacts on the environment. 50 cleared projects were monitored during the year.

4.6.3.2 Government of India in July 1991, liberalised industrial licensing policy in order to accelerate industrialisation process. The revised industrial policy lays emphasis on proper zoning, land use and overriding environmental concensus for location of industries. In order to facilitate these objectives, this Ministry has formulated guidelines to be gazetted shortly. A draft notification to this effect has since been published on 29th January 1992.

Fig 32: Rehabilitation of Rock Phosphate Mines, Dehradun—reforestation efforts

4.6.4 Mining Projects

During the year 11 projects were received for environmental appraisal. Required information was also received in respect of 40 projects pending at the beginning of the year. 50 projects were appraised, out of which 21 projects were cleared and 12 projects were rejected. Additional information was sought for the remaining 18 projects. The environmental clearance were accorded to the project imposing safeguards like mechanical and biological reclamation of quarried land and over burden dumps, management of subsided area, rehabilitation of affected families, air and water pollution control measures. About 50 cleared projects were monitored during the year.

4.6.5 River Valley Projects

During the year 17 projects were received for environmental appraisal. Required information was received in respect of 4 pending projects at the beginning of the year. 17 projects were appraised, out of which 3 projects were granted environmental clearance and 12 projects were rejected either due to environmental incompatibility or due to non furnishing of information. Additional information was sought for the remaining 6 projects. 300 cleared projects were monitored during the year.

4.6.5.1 Narmada Sagar and Sardar Sarovar Project

Narmada Sagar and Sardar Sarovar are the major reservoir schemes proposed in Narmada Basin, which had been accorded conditional environmental approval in 1987 with

Fig 33: Rehabilitation of Rock Phosphate Mines, Dehradun—reclaimed areas with dense diverse vegetation

the provision that the Environmental Action Plans will be formulated and implemented pari-passu with the engineering works. To ensure effective implementation of environmental safeguard measures, the scope of the Narmada Control Authority had been enlarged by creating two additional Sub-Groups to deal with the problems of rehabilitation of oustees and the environmental issues. Various studies and surveys on environmental aspects have been initiated by the concerned States with the help of Universities and Research Institutes. These studies are at various states of progress and are likely to be completed in the next two years period. Keeping in view the necessity of implementation of environmental mitigative measures with the construction work, the Narmada Control Authority has been requested to synchronize the construction activities with the implementation of environmental mitigative measures.

4.6.6 Other Sectors (including Transport, Tourism, Ports and Harbours, Airports, Highways and Communication Projects).

During the year 35 projects were received for environmental appraisal. Required information was also received in respect of 14 projects pending at the beginning of the year. Fortynine projects were appraised, out of which 20 projects were cleared and 12 projects were rejected. Additional information was sought for the remaining 17 projects.

4.6.7 Monitoring

The environmental clearance of development project is often accompanied by conditions and safeguards to be implemented under the provisions of the Environment (Protection) Act, 1986. The procedure followed is as follows:

— Project authorities are required to report back every six months the progress of implementation of 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 proposals to find solution.

— In case of poor or no response, 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.

4.7 COASTAL AREA MANAGEMENT

4.7.1 A notification under Environment (Protection) Act, 1986 declaring the coastal stretches as Coastal Regulation Zone (CRZ) and imposing graded restrictions on industrial operation and processes in the CRZ was issued by the Ministry. As per the Notification, the entire coastal stretches have been devided into four categories as follows:

— CRZ-I : Ecologically sensitive areas;

— CRZ-II : Areas developed upto or close to the shore line having drainage, approach and other infrastructure facilities;

— CRZ-III : Relatively undisturbed areas in the rural and within municipal limits where substantial developments have not taken place; and

— CRZ-IV : Coastal stretches in A & N, Lakshadweep and other small islands.

4.7.2 While no constructions are permitted within 500 m of the High Tide Line (HTL) in CRZ-I, in CRZ-II, buildings are now permitted on the landward side of the existing or proposed roads or on the landward side of the existing structure. In CRZ-III areas, upto 200 m of the HTL are to be earmarked as no development zone and no construction is permitted, while development between 200 m-500 m of the HTL, for construction of beach resort/hotels are permitted in accordance with the guidelines stipulated in the notification. In the CRZ-IV, no construction of buildings is permitted within 200 m of the HTL in A & N islands. For permitting construction of buildings in Lakshadweep and small islands, the distance from the HTL will be decided depending on the size of the islands.

4.7.3 The Notification clearly lists out activities which are prohibited within 500 m of the HTL as well as the projects that are required to be referred to the Ministry for clearance.

4.7.4 The coastal States and Union Territories Administration have been asked to prepare Environment Management Plan for their respective coastal stretches incorporating the provisions of the Notification and get it vetted with the Ministry. The approved Environmental Management Plans would form a part of the local statutes for enforcing the norms and provisions of the CRZ Notification.

4.7.5 The Ministry has also sponsored studies relating to preparation of Environmental Management Plans for the following four coastal stretches:

— Puri-Konark in Orissa;

— Dwarka Jodyia in Gujarat;

— Digha in West Bengal; and

— Madras Mahabalipuram in Tamil Nadu.

The studies have been completed and their findings will help to prepare Environment Management Plans for these areas.

4.8 CLEAN TECHNOLOGY

In view of the need for conservation of environment as well as raw materials and crucial inputs such as water, electricity and minerals etc., and to take measures to prevent pollution rather than abate it after it occurs. Work has been initiated to identify State of the Art Technologies related to process of manufacturing or production for implementation of the programmes for renovation and modernisation in different sectors of the industry. As part of the programme the Ministry along with UNCSTD, Anna University, Madras & M.S. Swaminathan Foundation Co-sponsored an International Conference in Clean Coal Technologies in January, 1992.

4.9 ISLAND DEVELOPMENT AUTHORITY (IDA)

4.9.1 The Island Development Authority (IDA), set up in August, 1986 has been reconstituted during the year. The Authority decides on policies and programmes for an integrated development of the Islands keeping in view of all aspects of environmental protection as well as the special technical and scientific requirements of the Andaman, Nicobar and Lakshadweep Islands. It also reviews progress of implementation and impact of the programmes of development of these islands.

4.9.2 IDA has provided guidelines for ensuring the optimal use of the natural resources of A & N and Lakshadweep Islands without creating adverse environmental impacts.

4.10 CASE STUDIES

4.10.1 Mining

The case study of environmental management plan of Dhanpuri Coal Mines is in progress.

4.10.2 Industries

A Committee was constituted to suggest suitable guidelines as well as to study the impact of development of limestone mining and cement industry in the vicinity of Dharlaghat Bird Sanctuary in Himachal Pradesh.

4.11 HUMAN EXPOSURE ASSESSMENT LOCATION (HEAL)

4.11.1 The Human Exposure Assessment Location (HEAL) project has been developed as a part of health related monitoring programme by World Health Organisation (WHO) in co-operation with United Nations Environmental Programme (UNEP). The Indian programmes are being overseen by this Ministry.

4.11.2 The objectives of the project are as follows:

— To provide comparable and valid assessment of human exposure to selected environmental pollutants;

— To improve, field tests, harmonize and demonstrate methods for the integrated monitoring and assessment of human exposure to environmental pollutants;

— To promote the assessment of human exposure to pollutant as a basis for development of environmental control strategies for the protection of Public Health;

— To provide an overview of existing exposure of selected populations to pollutants on a regional and global basis and, if possible, observe trends in this regard; and

— To improve national capabilities for environmental monitoring and human exposure assessment.

4.11.3 The project is being implemented in the following three phases:

— Training phase;

— Pilot monitoring phase, and

— Definite monitoring phase.

4.11.4 Studies have been carried out on the Human Exposure to selected pollutants such as Lead (Pb), Cadmium (Cd), DDT and Hexachlorobenzene (HCB) and Oxides of Nitrogen (No_x). In the final study, Chembur area of Bombay City has been considered as HEAL site and various environmental samples have been collected from this site. The participating institutions in this study are as follows:

— National Institute of Occupational Health, Ahmedabad.

— Maharashtra Pollution Control Board, Bombay.

— Air Quality Monitoring and Research Laboratory, KEM Hospital, Bombay.

— Municipal Corporation, Bombay.

4.12 TRAINING PROGRAMMES

At the request of the Ministry, a five day training programme on Environmental Impact Assessment of Thermal Power Projects was organised at Jawaharlal Nehru University (JNU), in March, 1991 by the School of Environmental Sciences, JNU, New Delhi.

5. CONTROL OF POLLUTION

5.1 POLICY STATEMENT

A policy statement on abatement of pollution for preventing deterioration of the environment has been approved. The policy seeks to effect implementation of pollution abatement techniques specially in the critically polluted areas. The complexities are considerable because of the involvement of the number of industries, organisations and Government Bodies. However, use of legislation and regulation, fiscal incentives, voluntary agreements, educational programmes and dissemination of information would be made to achieve the objectives of the policy statement.

5.2 WATER CESS

Water Cess is levied under the Water (Prevention and Control of Pollution) Cess Act, 1977, and collected by respective State Pollution Control Boards in the States and Central Pollution Control Board in the Union Territories. The amount so collected is shared between Centre and States. Centre's share of the cess is disbursed to State Pollution Control Boards to augment their resources in order to meet the requirements/functions assigned to them under the Pollution Control Laws. During the year, Rs. 637 Lakhs have been reimbursed to the State Pollution Control Boards and Union Territories.

The Water (Prevention and Control of Pollution) Cess (Amendment) Bill, 1991 has been passed by both the Houses of Parliament. The amendments have been proposed with a view to augment the resources of the Pollution Control Boards, lacunae in the Act and to provide rebate to the industries for complying with the consumption and effluent quality standards.

5.3 CRITICALLY POLLUTED AREA

An integrated approach involving gross polluting industries has been taken up for environmental management. Seventeen problem areas have been identified on the basis of the survey and reports of the Central and State Pollution Control Boards and time targetted Action Plans for controlling pollution in nine of these areas have been finalised.

During the year, activities to control pollution in the following five problem areas have been undertaken:

— Vapi in Gujarat

— Pali in Rajasthan

— Chembur in Maharashtra

— Korba in Madhya Pradesh; and

— Gobindgarh in Punjab.

In addition to the above, a preliminary survey of Dhanbad has also been completed.

5.4 SCHEME ON PROMOTION OF CONSTRUCTION OF COMMON EFFLUENT TREATMENT PLANTS (CETP's) FOR CLUSTERS OF SMALL SCALE INDUSTRIAL UNITS (SSIs).

5.4.1 In view of the significant adverse impact of effluents on the environment from the clusters of small scale industrial units, implementation of pollution control measures has been decided.

5.4.2 A scheme for setting up of Common Effluent Treatment Plants (CETP) has been launched by the Ministry from June, 1990. Under the scheme, a subsidy of 25% of the capital cost of the CETP, upto a maximum of Rs. 50 Lakhs, could be given to a cluster of small scale industries (SSIs), provided that the concerned State Government also puts in matching contribution. The scheme is applicable to all clusters of SSIs/industrial estates which were established before 1/1/1980.

5.4.3 Under the World Bank aided Industrial Pollution Control Project, loan upto 40% of the capital costs of the plant is available to the project proponents. This scheme has been merged with the Central Sector Scheme from November 6, 1991.

5.4.4 During the year, a total of 46 proposals have been received by this Ministry under this scheme.

5.5 ASSESSMENT OF POLLUTION BY SURVEY

5.5.1 Problem Areas

On the request of Himachal Pradesh and Haryana State Pollution Control Boards, the areas of Parvanoo and Kala-amb have also been included in the list of problem areas. From Inter-State Pollution point of view between two States, detailed survey of these two areas have also been completed and reports are under preparation.

5.5.2 Rapid Assessment of Pesticides and Pharmaceutical Industries

Rapid assessment of pollution control status of pesticide and pharmaceutical industries in the country has been taken up. The objectives of this programme are:

— To identify the industries and their location

— The variations in products and process technologies adopted

— The waste-water and emission characteristics

— Treatment/pollution control systems provided and

— The waste disposal patterns.

Suitable action plans for the prevention and control of pollution in these industries would be framed.

5.5.3 River Basin Studies

5.5.3.1 There are 14 major, 44 medium and 55 minor river basins in the country. As a logical step towards controlling pollution in the river basins intensive surveys are conducted to assess the pollution load and the various other activities responsible for it. So far reports have been published on Yamuna sub-basin, Ganga, Subarnarekha, Brahmani-Baitarani, Sabarmati and Krishna Basins. The preparation of reports on Cauvery, Mahanadi, Mahi and Godavari is in the final stage. The studies on Narmada and Tapi have been completed. The report on Indus in the State of Punjab and in Himachal Pradesh is under preparation while the study in the State of Jammu and Kashmir is yet to be completed.

5.5.3.2 The studies on Brahmaputra have been completed and the report is under preparation. In addition to major river basins, a study on medium river basin of Ulhas has been initiated during the year.

5.6 ASSESSMENT OF POLLUTION BY MONITORING

5.6.1 Inland Water Quality Monitoring

Under the Global Environmental Monitoring Systems (GEMS), Monitoring of Indian National Aquatic Resources (MINARS) and Ganga Action Plan (GAP) Programmes and monitoring of rivers, groundwaters and lakes are being continued. A network of 450 water quality monitoring stations has been established. Of these 51 stations are being monitored under GEMS Programme, 372 under MINARS programme and 27 under Ganga Action Plan (GAP). The network covers all the 14 major river basins, 16 medium rivers and 18 minor rivers, ground waters & lakes.

During the year 30 new stations have been identified for establishment.

5.6.2 Water Quality Status of the River Ganga

The major findings of the analysis reveals;

Fig 34: Solid waste disposal causing water pollution

— A stabilising trend at around 1000 MPN/100ml has been observed at Rishikesh, Haridwar, Garhmukteshwar in Uttar Pradesh and Patna (U/S and D/S) and Rajmahal in Bihar besides the stations on the tributaries of river sone and river Ganghara in Bihar. A decreasing trend was observed at Kanpur U/S, Allahabad U/S and at Buxar (Bihar).

— An over all improvement of the critical stretch between Kanpur to Tarighat with respect to the primary parameters (PH, DO, BOD, and total coliforms).

— Deterioration of the overall water quality at Garmukteshwar,

— No improvement of D.O. at Haridwar and an increasing trend for chlorides at Rishikesh.

5.6.3 Automatic Water Quality Monitoring Stations on River Ganga

Nine Automatic Water Quality Monitoring Stations are being established (AWQMS) on river Ganga at nine locations as follows:

— Kannauj (1)

— Kanpur (2)

— Allahabad (3)

— Varanasi (1)

— Patna and (1)

— Calcutta (1)

These river based AWQMS are to be installed on fibre glass floating platforms. These AWQMS would continuously monitor dissolved oxygen (D.O.), temperature, pH, conductivity and turbidity.

5.6.4 Automatic Water Quality Monitoring Stations on River Yamuna

During the year two automatic water quality monitoring stations have been installed in Wazirabad and Okhla on river Yamuna at Delhi under the framework of Indo-Dutch Bilateral Programme. The basic objectives are:

— To continuously monitor the quality of river water
— To provide warning of sudden change in water quality due to effluent discharges upstream.

The Stations have been equipped with Computer support to control data storage, data recording and data transmission, in the relevant area.

5.6.5 Coastal Water Quality Monitoring

5.6.5.1 Water Quality at 173 stations over the entire coast line has been monitored under extensive Coastal Monitoring programme.

Out of these 173 stations, the Central Pollution Control Board is coordinating the network of 107 stations through five participating agencies viz., the State Boards of Gujarat, Maharashtra, Kerala and Tamil Nadu and the East Zonal Office of the Central Pollution Control Board, Calcutta.

5.6.5.2 The analysis of the data collected so far reveal the following:

— In general the coastal water quality of West Bengal and Orissa is good and comes under the designated-best-use class-SQ I through out the entire study stretch. There are two sensitive eco-systems, viz. Chilka lake and Sundarbans Mangrove which require specific and intensive studies specially with regard to heavy metals content in sediment and possible implications.
— The coastal water quality along the Tamil Nadu coast, i.e. from Ennore to Kanyakumari, is found to be at a safe level in almost all stations except, Ennore, Coovum and Adyar inland stations which receive large quantities of domestic sewage.
— The coastal waters of Kerala under study fall under the designated-best-use class SW I. But actual quality is much degraded to conform only to criteria for harbour use (class-SW-IV). This study area is also receiving effluents from the biggest industrial belt of the State and is a hot spot with regard to pollution. In addition to these, presence of Petroleum Hydrocarbons at an objectionable level has also been observed.
— From the results of monitoring at 20 Stations spread over the coast of Maharashtra, it has been observed that a few points in the coastal waters are more polluted due to the discharge of untreated industrial and domestic wastewaters. Wastewater discharges at Thane Creek, Bassien Creek, Tarapur and Dharmtar have deteriorated the sea water quality. It has also been observed that water quality is better from Revdanda to Malvan because of less urbanisation and industrialisation of the area.
— The coastal waters of Gujarat are found to be at safe level except for Dams Tapi (inland), North of Dandi Midhola and Machiwad (inland) where the total coliforms ranged between 2,300-9,000 MPN/100 ml indicating domestic sewage discharges into the coastal waters.
— Municipal Corporation, Howrah, is the only location where sulphur dioxide concentration violated both the 24 hourly average standard (24% times) and the annual average standard.
— Anantpura, Kota is the only location where nitrogen dioxide con. violated 24-hourly average standard by more than 20% but the annual average standard was not violated, whereas, at Raipura in Kota and Municipal Corporation in Howrah the annual average standard was violated but the violations over the 24 hourly standard were 16.7% and 6% respectively.

5.7 YARDSTICK FOR WATER QUALITY MONITORING AND MANAGEMENT

The primary water quality criteria for water bodies to be used as yardstick for water quality management have been identified. A pilot study was taken up by Central Pollution Control Board (CPCB) on river Yamuna under Indo-Dutch collaboration to introduce bio-monitoring techniques in Indian rivers and feasibility of their inclusion in the yardstick.

5.8 NATIONAL AMBIENT AIR QUALITY MONITORING (NAAQM) PROGRAMME

5.8.1 A total number of 260 monitoring stations have been set up so far for monitoring of ambient air quality in the country under National Ambient Air Quality Monitoring Programme.

During the year 30 new stations have been identified for establishment in phases.

5.8.2 Air Quality Data Analysis

Air Quality Data for the period 1987-90 was analysed and the reports have been published by CPCB. The significant observation are as follows:

— The pollutant exceeding the standards at almost all the locations under the NAAQM network was Suspended Particulate Matter (SPM)

— In Howrah, West Bengal, three out of the four locations (except at Bandhaghat) have featured within the top 10 locations having high concentrations for all the three pollutants. These pollutants also violated the proposed Standards for annual averages.

— Except for the NAAQM location at Municipal Corporation, Howrah, the sulphur dioxide concentrations at all other locations were within the stipulated air quality standard.

— The Annual Mean Values of nitrogen dioxide, exceeded the proposed air quality standard at Raipura (Kota) and Municipal Corporation (Howrah). It has also been observed that the annual mean values of nitrogen dioxide for 1989 were on a higher side compared to the corresponding 1988 values for almost all the locations at Kota and Madras.

— At 11 NAAQM locations in Kota, Howrah, Baroda (GIDC) Pondicherry, (PIDC) the violations over the 24-hourly average standard for sulphur dioxide were in the range of 0.5 percent. Municipal Corporation and Naskarpara, both in Howrah are the two locations where sulphur dioxide violated the 24-hourly average standard by 24% and 11% respectively.

— The highest percent violation in the range of 15-20 percent over the 24-hourly average standard for nitrogen dioxide was observed at Raipura and Anand pura in Kota.

— At 51 NAAQM locations, annual mean value for SPM exceeded 200 ug/m^3.

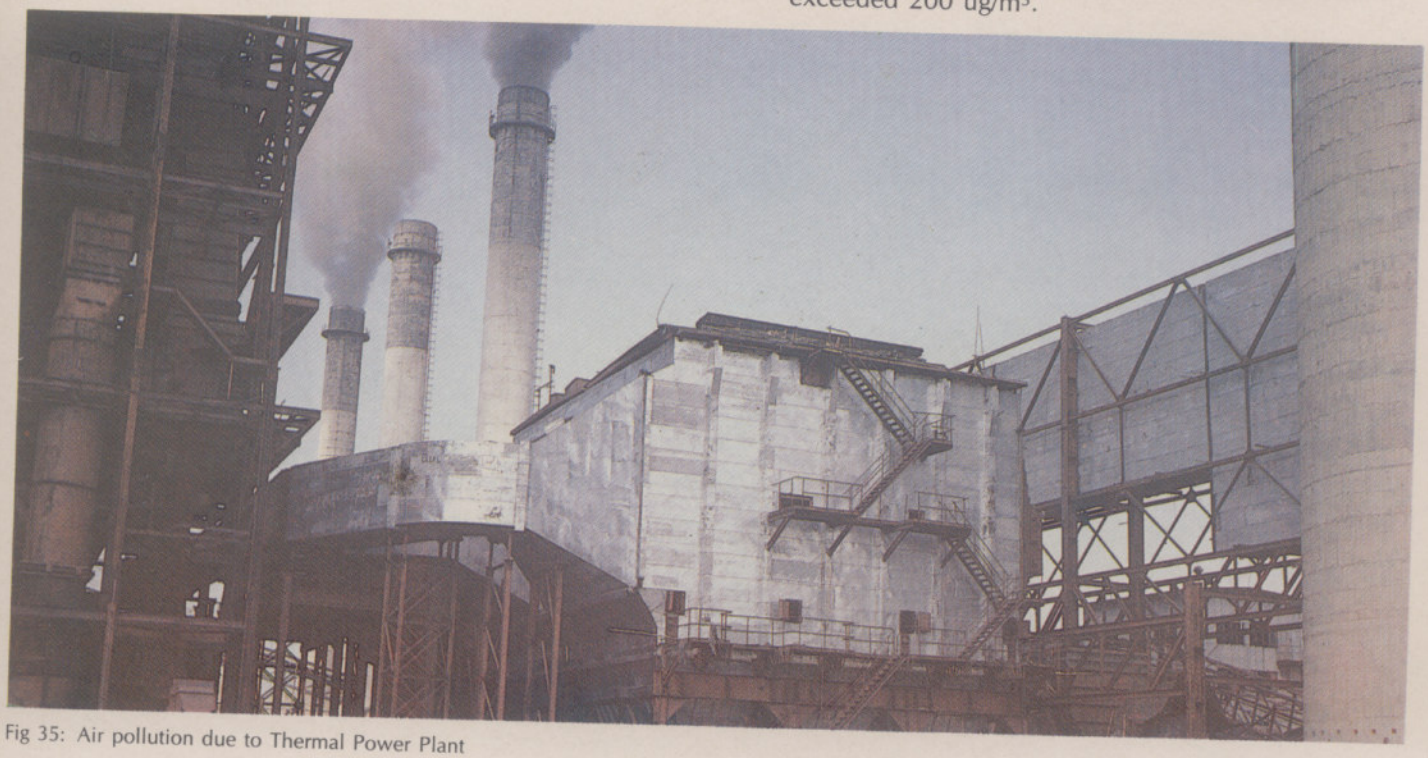


Fig 35: Air pollution due to Thermal Power Plant

5.9 POLLUTION CONTROL IN MAJOR CATEGORIES OF INDUSTRIES

5.9.1 Task Forces

Task Forces for major categories of industries have been constituted by the Central Pollution Control Board with catalytic functions in securing nation wide compliance to the prescribed standards by the respective industrial units. The main functions of the task forces are;

— to create a forum for industries and State Pollution Control Boards to interact with a view to hastening the process of compliance of standards

— to disseminate to the industries the latest technologies available for control of pollution in specific industries

— to prepare status of compliance at national level for respective industrial category.

5.9.2 Action Plan

5.9.2.1 Under the 15-Point Action Plan, the Ministry initiated action to control pollution in the 17 categories of major polluting industries by December, 31, 1991, and directed State Pollution Control Boards to ensure the compliance of Standards in these industries. Pollution Control Status of 17 categories of industries in 23 States/Union Territories including all major industrial estates have been collected, collated and compiled. Defaulting units have been identified and actions are being taken against them.

5.9.2.2 Action plan has been focussed on large and medium units, particularly in the identified 17 heavily polluting sectors and classified in the following two categories.

— The industries which have commenced production on or before 16th May, 1981 and have shown adequate proof of at-least commencement of physical work for establishment of facilities to meet the specified standards within a time-bound programme, to the satisfaction of the concerned State Pollution Control Board, shall comply with such standards latest by the 31st December, 1993.

— The industries which have commenced production after the 16th day of May, 1981 and on or before the 31st December, 1991 and have shown adequate proof of at least commencement of physical work for establishment of facilities to meet the specified standards within a time-bound programme, to the satisfaction of the concerned State Pollution Control Board, shall comply with such standards latest by the 31st day of December, 1992.

5.10 VEHICULAR POLLUTION

Central Pollution Control Board carried out Vehicular Pollution surveys in all metropolitan cities of the country and estimated total auto-exhaust pollution generated in these cities. The Board has now proposed to evolve mass based exhaust emission standards. In view of this, the survey will be extended to class I cities and a few selected class II towns.

5.11 NOISE POLLUTION

5.11.1 The problem of noise pollution not only exists in metropolitan cities but also in other urban situations and industrial establishments. The main sources of noise pollution are automobiles, domestic appliances, construction equipment, loudspeakers, aircraft operations, railway operations and bursting of crackers. The single largest contributor to the urban noise is the automotive traffic and unjudicious use of horns and sirens.

5.11.2 The adverse effects of noise on health include physiological, psychological, sociological and psychoacoustical. Continued exposure of high levels of noise results in interference, fatigue and temporary shift of hearing which may lead to permanent loss of hearing.

5.11.3 During 1989 the CPCB has carried out noise pollution surveys in eight major metropolitan cities viz. Delhi, Madras, Calcutta, Bangalore, Bombay, Hyderabad, Kanpur and Jaipur. The survey revealed that the noise levels in all these cities in residential, commercial and silence zones, are above the prescribed standards both during the day and night time, as per the norms recommended by the WHO.

5.11.4 Ambient air quality standards in respect of noise for different categories of areas have been notified under the Air Act and the Environment (Protection) Act, 1986. Noise limits have also been prescribed for automobiles and domestic appliances, construction equipment to be adopted at the manufacturing stage. These limits are to be complied by 1992 and 1993 respectively.

5.11.5 The CPCB has evolved codes of practice for controlling noise from sources other than industries and automobiles. These include public address system, aircraft operation, railway operation, construction activities and bursting of crackers. All the State Governments have been requested to advise the concerned Department to implement these codes of practice under the relevant local acts. Besides the State Governments have also been requested to enforce the ban on the use of horns/sirens and loudspeakers in the vicinity of silence zones such as hospitals, educational institutions, courts etc.

5.12 DEVELOPMENT OF STANDARDS

5.12.1 Standards for effluents and air emissions for major categories of water and air polluting industries have been evolved. These refer to the maximum concentration of pollutants in effluents and emissions that may be discharged into any water body or to the atmosphere. The State Pollution Control Boards while issuing their consent to the industries, can stipulate the same or more stringent standards if local situation so demands.

5.12.2 The industries for which standards have been finalised are:

— Natural Rubber and Processing;

— Dairy;

— Ceramic;

— Bagasse-fired Boiler and;

— Tannery

5.12.3 A Committee to evolve mass emission standards for motor vehicles for year 1995 and 2000 AD has been constituted by Central Pollution Control Board with following terms of reference;

— To suggest the mass emission standards for two, three and four wheelers to be implemented from 1995 and 2000 AD with respect to carbon mono-oxide, hydro-carbons and oxides of nitrogen.

— To identify the nature of changes required in ongive design and type of devices to be installed to meet the suggested standards.

5.13. POLLUTION CONTROL IN DELHI

5.13.1 Based on the studies on air quality monitoring the ambient environment of Delhi could be divided in three seasonal categories as given in the following Table:

Table 4

Category	Period	Feature
I	April to June	Critical period due to high particulate matter because of low humidity and high turbulance in the environment due to winds
II	July to mid October	Cleaner period due to high humidity and monsoon months
III	Mid-October to March	Critical period due to pollutants trapping because of low inversion and unfavourable meteorological conditions.

5.13.2 Study on Effects of Air Quality on Human Health

A study on effect of air quality on human health has been initiated in collaboration with All India Institute of Medical Sciences (AIIMS). The study involves survey of health and medical examination of residents in relatiion to ambient air quality which is being continuously monitored at Siri Fort, Delhi.

5.14 COMPUTERISATION

5.14.1 The computer facilities were strengthened to establish the on-line network within the Central Pollution Control Board (CPCB) and between the Central and the State Pollution Control Boards.

5.14.2 On-line computer connection is being established for networking of Central and State Pollution Control Boards through NICNET.

5.14.3 Required Data bases for analysis of water and air quality data from various monitoring stations, have been updated. Water Quality Statistics of India (1988 & 1989) and National Ambient Air Quality Statistics of India (1987-88) have been prepared and published.

5.15 RE-ORGANISATION OF MONITORING SYSTEM AND DELEGATION OF POWERS

5.15.1 Steps have been initiated on the re-organisation of the existing monitoring systems, preparation of a common consent form for the industries, and institutions lising of statutory environmental audit by the Ministry.

Suggestions from different states have been received in this regard and the formats are being finalised.

5.15.2 Under the Environment (Protection) Act, 1986, the Government has empowered the Central Pollution Control Board to enter any place and inspect any equipment, industrial plant, record, register, document or any other material object under sub-section (i) of Section 10 and to take samples of air, water, soil or any other substance, for the purpose of analysis, from any factory premises or other places under sub-section (i) of Section 11 of the Act. The Central Board has delegated its power and functions to UT administration in respect of Chandigarh and Delhi w.e.f. April 1, 1991 and June 1, 1991 respectively. It has been decided that powers and functions in respect of UT Pondicherry will be handed over to Pondicherry Government.

5.16 ENVIRONMENTAL AUDIT

The concept of Environmental Audit has been proposed by the Ministry for the assessment of development projects not only at the begining of the project but also on a regular basis. It has also been proposed that every person carrying on an industry, operation or process requiring consent under the Water (Prevention and Control of Pollution) Act, 1974

or the Air (Prevention and Control of Pollution) Act, 1981 or both or authorisation under the Hazardous (Management and Handling) Rules, 1989 shall submit an Environmental Audit Report for the Financial Year ending the 31st March in the form prescribed by the Government to the concerned State Pollution Control Board on or before the 15th day of May every year, starting from 1993.

The report would include steps taken or proposed to be taken in the following:

— Adoption of clean technologies for prevention of pollution

— Waste minimisation

— Waste recycling and utilisation

— Pollution control measure

— Investment on environmental protection

— Impact of the measures taken on waste reduction and other resource conservation.

5.17 ENVIRONMENT FRIENDLY PRODUCTS

5.17.1 The Scheme of labelling of Environment Friendly Products was notified on February 21, 1991. The scheme which will be operated on National basis envisages accredition and labelling of household and other consumer products which meet certain environment criteria, alongwith the quality requirements of Indian Standards. The label shall be known as "ECOMARK".

5.17.2 A National Steering Committee for implementation of the ECOMARK Scheme has been constituted. A Technical Committee constituted to assist the National Steering Committee would identify the individual products and determine the criteria for awarding the ECOMARK.

5.17.3 Criteria for two product categories, viz., toilet soaps and detergents, have been notified out of the sixteen consumer product categories identified in the first phase. A major awareness campaign is proposed to be launched in this regards.

5.18 PUBLIC AWARENESS

5.18.1 A scheme for the public participation in increasing public awareness for prevention, abatement and control of pollution has been initiated by the Ministry.

The scheme is to be implemented in different phases. In the initial phase of the scheme the thrust will be on creation of awareness of water and air pollution and its effect on day to day life of the people and the possible preventive measures as well as to secure compensation for those who may be suffering because of such pollution.

5.18.2 The proposed scheme has been forwarded to various State Governments for identifying atleast one NGO/local person in order to initiate the action.

5.19 MANAGEMENT OF HAZARDOUS SUBSTANCES

5.19.1 The Environment (Protection) Act, 1986, places on the Central Government the responsibility of laying down procedures 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-organisms/genetically engineered organisms and wastes. These rules are:

— Manufacture, Storage and Import of Hazardous Chemicals, Rules, 1989.

— Hazardous Waste (Management and Handling) Rules, 1989.

— Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms/Genetically Engineered Organisms of Cells, Rules, 1989.

5.19.2 In order to ensure effective implementation of these rules, regional meetings are being held at different places with implementing agencies, associations and industries to find out problems in implementation and take remedial measures. Four such meetings have been held at Bombay, Madras, Bhopal and Calcutta. The feedback obtained in these meetings are being considerd for appropriate actions including amendment to the rules proposed now.

5.19.3 A Centrally Sponsored Scheme is being implemented with the aim of creating infrastructure in the State Pollution Control Boards to regulate the management of hazardous substances handled by hazardous industries. 18 States/Union Teritories have been assisted so far. Financial assistance for creation of such structures was continued during the year.

5.19.4 Off-site/On-site Emergency Preparedness Plan has been prepared by the Ministry for Vadodara with the objective of analysing hazards present and to plan mitigative measures in terms of response time, resource mobilisation and effectiveness in case of accidents. A mock-drill was conducted to assess the effectiveness of the plan. The drawbacks of the plan have been identified for remedial measures. Similar plans are being prepared for 9 other selected districts, viz, Durgapur, Midnapore, Tuticorin Mangalore, Moradabad, Visakhapatnam, Thane-Belapur and Kota.

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

5.19.6 Vulnerability analysis of 8 extremely hazardous substances viz., hydrogen cyanide, carbon disulphide, thionyl chloride, phosgene, ammonia, and chlorine, oleum and hydrogen fluoride was completed by IIT Delhi. Based on this study, guidelines for use by industries have been drafted.

5.19.7 Guidelines on siting of hazardous wastes treatment, disposal facilities and identification and assessment of abandoned hazardous wastes sites were issued and widely circulated to the concerned agencies.

5.19.8 A Scientific Advisory Committee on Chemical Hazards under the National Programme for the Protection of Flora and Fauna has been set up.

5.19.9 An Inter-departmental Coordination Group was constituted to discuss and analyse the environmental issues related to Gulf War.

5.19.10 A Brain Storming Session on National Hazardous Wastes Management Programme was held at NEERI, Nagpur, to discuss current status of hazardous wastes management practices and need for further steps to be taken for adoption of cleaner technologies, wastes minimisation and proper disposal of hazardous wastes.

5.19.11 Guidelines on manufacture, storage and import of Hazardous Chemical Rules, 1989, and a set of rules for classification, labelling and packaging of hazardous chemicals have been prepared and circulated to all concerned.

5.19.12 Efforts have been made to maximise utilisation of fly ash and urban wastes in order to minimise their environmental hazards.

5.19.13 Certain specified major accident hazardous installations were visited to make the industries aware of the rules notified by the Ministry and study the implementation status.

5.19.14 A number of meetings of the Genetic Engineering Approval Committee were held to appraise the case for import of genetically engineered organism by the industry.

6. REGENERATION AND DEVELOPMENT

6.1 GANGA ACTION PLAN

6.1.1 The Central Ganga Authority (CGA) was constituted in February, 1985, to guide and oversee the implementation of a programme for restoring the quality of river Ganga. During the year, the works relating to pollution abatement schemes of River Ganga in the States of Uttar Pradesh, Bihar and West Bengal under Ganga Action Plan were continued.

6.1.2 State Steering Committees reviewed the implementation of schemes from time to time and the Committees comprising of implementing agencies and non-officials set up for each of the major towns continued to oversee the programme.

6.1.3 Objectives of Ganga Action Plan

The main objective of the Ganga Action Plan is to improve the river quality by reducing the pollution load and by establishing self-sustaining sewage treatment plant systems. In the first phase, out of nearly 1400 million litres per day (mld) of sewage generated in 25 class I towns along the river, 870 mld is proposed to be intercepted, diverted and treated. 405 mld of wastewater has been diverted till December, 1991.

6.1.4 Schemes Sanctioned

6.1.4.1 A total of 261 schemes necessary for completion of the works under Ganga Action Plan have been sanctioned and the State-wise position of the schemes is as follows:

Table 5

(Rs. in crores)

State	Schemes No.	Originally sanctioned amount	Likely revised amount
Uttar Pradesh	106	114.20	153.68
Bihar	45	33.59	48.04
West Bengal	110	108.47	160.00
	261	256.26	361.72

The revision has taken place because of cost escalation and change in scope/design of work. Statewise distribution of schemes is as follows:

6.1.5 Progress of Schemes

6.1.5.1 Out of the 261 schemes, 173 schemes have been completed so far. The remaining schemes are at various stages of completion. The Statewise physical progress of these schemes is shown in Table 7:

Table 7

Physical progress	Uttar Pradesh	Bihar	West Bengal	Total
Schemes sanctioned	106	45	110	261
Schemes completed	77	31	65	173
Schemes under progress	29	14	45	88

6.1.5.2 Seven sewage treatment plants (STP) out of the total 35 sewage treatment plants (STPs) to be established, have become operational. Another 5 are likely to be completed soon. The BHU Plant is generating methane to supply about five hours of its energy requirements during the peak hours.

6.1.5.3 The schemes for sewage interception and diversion have been accorded priority under the Ganga Action Plan. In all, 88 schemes have been sanctioned in the three States which involve laying of 349 kms of sewers (including forcemains) and installation/ renovation of 130 sewage pumping stations. 53 schemes have been completed so far. As a result 405 mld of waste water flowing into the river has been diverted out of which 116 mld is being taken to the sewage treatment plants for treatment. The plan when completed, will intercept, divert and treat 870 mld of waste water.

6.1.5.4 Under the low cost sanitation programme, 43 schemes have been taken up in the 3 States. 39 schemes involving construction of 2743 public toilet complexes and 43,927 individual pour flush latrines have been completed. The others are in various stages of progress. These have helped tourists and the people living near the river bank to use these toilets, which has helped in reducing pollution of the river.

6.1.5.5 Out of the 28 schemes of electric crematoria, 19 schemes involving construction of 22 electric crematoria have been completed and 5 more are to be completed soon.

Table 6

*(Rs. in lakhs)

	Uttar Pradesh		Bihar		West Bengal		Total Cost	
	Nos.	Cost*	Nos.	Cost*	Nos.	Cost*	Nos.	Cost*
1. Interception and diversion	40	3686	17	1960	31	7057	88	12703
2. Sewage treatment plants	13	7563	7	1292	15	5846	35	14721
3. Low cost sanitation	14	1001	7	550	22	670	43	2221
4. Electric crematorium	3	149	8	363	17	748	28	1253
5. River front facilities	8	613	3	88	24	678	35	1377
6. Other schemes	28	1012.65	3	162.71	1	30.47	32	1205.83

Fig 36: Construction of a Sewage Treatment Plant at Baranagar—Kamarhati under Ganga Action Plan

As a result of construction of these electric crematoria, the pollution of the river on account of throwing of unburnt and half burnt bodies has been reduced.

6.1.5.6 Programmes for construction of re-development of ghats, renovation of kunds/talabs, improvement of lanes/bye-lanes leading to the ghats, traffic regulation of road segments and re-allocation of dhobi ghats have been taken up under Ganga Action Plan. Out of 35 river front development schemes involving 122 ghats, 30 schemes involving 92 ghats have been completed. 5 more schemes will be completed by March, 1992. This will help to keep the river front clean.

6.1.5.7 Based on an Expert Committee report, 68 industrial units were identified as grossly polluting along the river Ganga. The present status of installation of Effluent Treatment Plants (ETPs) of these 68 gross polluting industries in river Ganga in comparison with that of implementation year (1988) is as follows:

			1988	1991
Category I	:	Units with ETPs	25	43
Category II	:	Units with ETPs under construction	11	8
Category III	:	Units without ETPs	27	7
Category IV	:	Units closed	5	10

The number of units with ETPs has gone up as a result of legal and administrative measures taken under the provisions of the Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974.

6.1.6 Innovations under the Ganga Action Plan

6.1.6.1 The Ganga Action Plan has introduced new technologies for sewage treatment. The 'Upflow Anaerobic Sludge Blanket' technology has been developed in collaboration with the Dutch Government. A five mld plant has been set up at Kanpur. This technology is also being adopted at Mirzapur and Chapra. Another technology called 'Rotating Biological Rope Contactor Process' developed by the National Environmental Engineering Research Institute, Nagpur has been experimented at Swarg Asram in Rishikesh.

6.1.6.2 A new method for afforestation with raw sewage, developed by the Central Soil Salinity Research Institute (CSSRI) Karnal is inexpensive but requires more land. This method is being experimented in Varanasi and Buxar.

6.1.6.3 A project on rearing of turtles for scavenging is in progress at Varanasi. About 10,000 turtles have been released in a 7 km stretch near Varanasi and about 24,000 turtles are in the captive rearing stage under the project.

Fig 37: Electric Crematorium at Hazipur

6.1.6.4 Automatic water quality monitoring stations are proposed to be installed at nine locations out of which three have been installed. Most of the components of the instruments have been manufactured indigenously. Training programmes for technicians and operators are being organised.

6.1.6.5 A chrome recovery plant has been set up in a pilot tannery in Jajmau area of Kanpur with the assistance of the Dutch Government. This would not only stop the harmful chromium from going to the river, but will help in recovery of the chromium salt to the tanner for tanning. Cost of this plant can be recovered in one and half years. It is proposed to induce the tanners to set up more such plants.

6.1.6.6 Action has been initiated to set up improved wood crematoria under the Ganga Action Plan. These crematoria can reduce fuelwood consumption by about 40% and are cheap and easily acceptable by the people.

6.1.7 Studies on minimum flow of rivers

In order to achieve the desired water quality objectives, apart from pollution abatement, maintaining the minimum flow in the river is essential for ensuring self purification of the residual pollution load. To fulfill this objective, at places where the clean season flow is critically low (from Narora to Allahabad and down stream of Wazirabad at Delhi on Yamuna), coordination and follow-up actions have been taken up to initiate necessary studies by the concerned agencies/Ministries for alternative techno-economic solutions like gated barrage, pilot channels etc.

6.1.8 Public participation

6.1.8.1 During the year special attention was given to peoples' participation through voluntary agencies/NGOs by organising exhibitions, melas, etc. under the Ganga Action Plan.

6.1.8.2 Two films viz., Ecology of the River Ganga and Resource Recovery from Sewage Treatment have been produced for creation of awareness among the people.

6.1.9 Future Programme

In continuation of the phase I of the GAP, planning for cleaning of tributaries of River Ganga and the other required works have been initiated under Phase II of the Plan. These comprise of the following:

— Pollution abatement schemes in 25 class I towns on the main stream of Ganga which were not taken up earlier;

— Schemes in Class II and III towns along main stream of the Ganga;

— Schemes of pollution abatement in tributaries of the Ganga.

6.1.10 National River Action Plan

A National River Action Plan (NRAP) has been proposed to take up works in other grossly polluted stretches of major rivers of the country. The rivers proposed to be included in NRAP will be based on the pollution criteria studied by Central Pollution Control Board.

Fig 38: Renovated Oliyar Ghat at Mirzapur

Fig 39: Afforestation activities under Ganga Action Plan

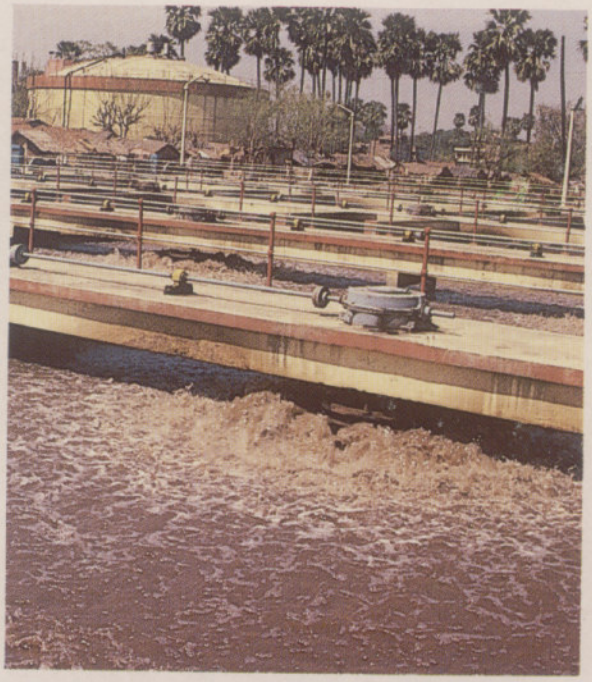


Fig 40: Sewage Treatment Plant at Saidpur, Patna

6.2 WASTELANDS DEVELOPMENT

6.2.1 The Wastelands Development Programme is being guided and overseen by the National Wastelands Development Board (NWDB) which has adopted a mission approach for enlisting peoples' participation, harnessing inputs of science and technology and achieving inter-disciplinary coordination in the programme planning and implementation. The overall goals of the programme are as follows:

— to check land degradation;

— to put wastelands to sustainable use;

— to increase biomass availability, specially fuelwood and fodder; and

— to restore the ecological balance.

6.2.2 The National Forest Policy, 1988 envisages people's involvement in the development and protection of forests. The requirement of fuelwood, fodder and small timber, of the tribals and other villagers living in and near the forests are to be treated as first charge on forest produce. Accordingly, people's participation has been built into all the schemes being implemented by the NWDB.

Fig 41: Main Pumping Station at Chandan Nagar (West Bengal)

Fig 42: Ganga Sewa Sivir—peoples' participation

6.2.3 Afforestation under 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. However, during the year, targets have been set in terms of two mutually exclusive items, viz., seedlings for farm forestry/agro-forestry and area in respect of public lands including non-forest public and community lands. Targets and achievements for the year 1990-91 and 1991-92 are given in the following table:

Table 8
(Area coverage in lakh ha.)
(Seedlings distribution in crores)

	1990-91		1991-92	
	Target	Achievement	Target	Achievement
(i) Area coverage (of public lands) (lakhs ha.)	5.50	7.44	10.5	8.81*
(ii) Seedlings distribution (for planting on private lands) (in crores)	250	125.88	150	127.95*

* Upto November, 1991

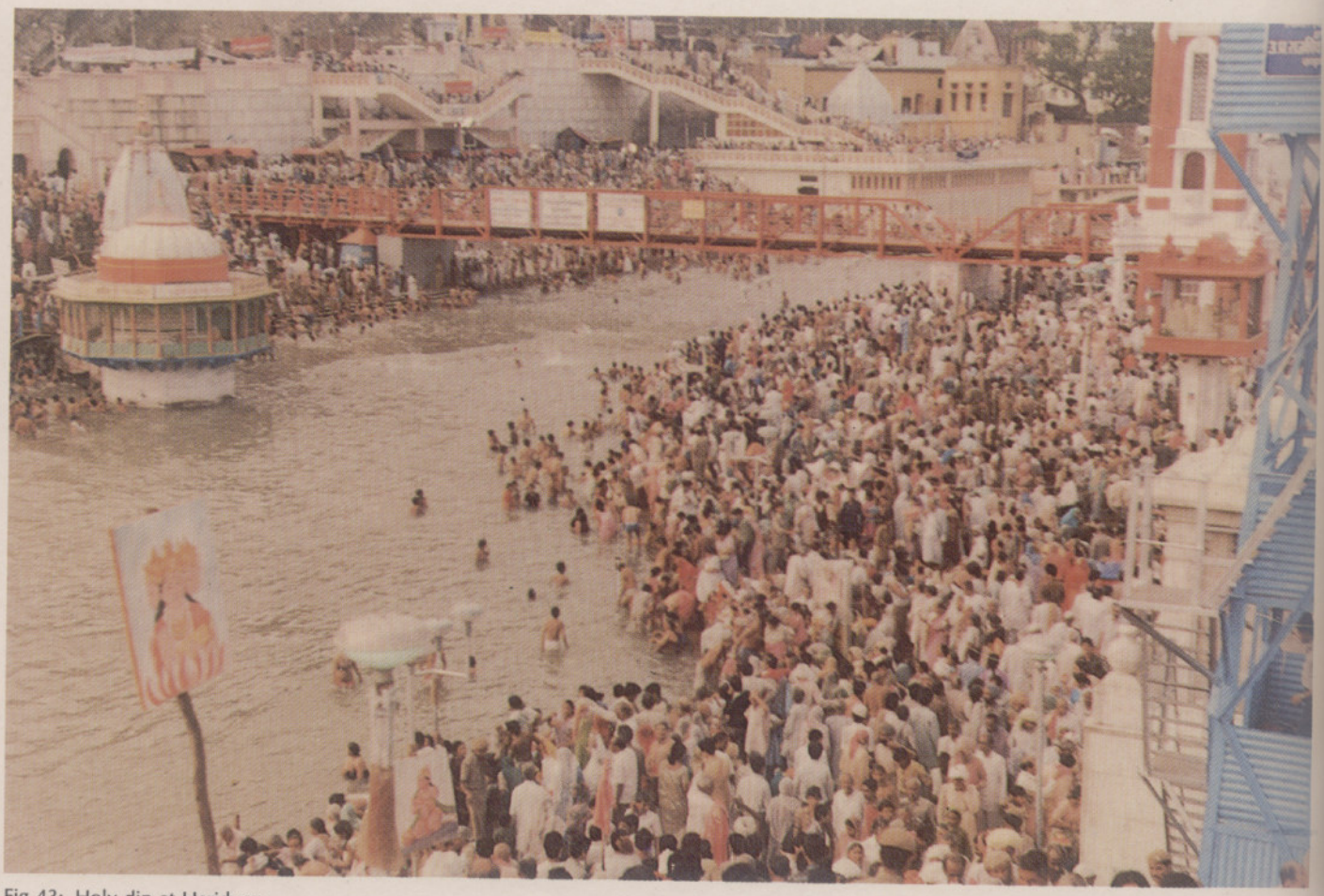


Fig 43: Holy dip at Haridwar

Fig 44: Soil and moisture conservation measures in wastelands development

Fig 45: A patch of *Jatropha curcas* reclothing degraded land

6.2.4 Plan Schemes

6.2.4.1 Integrated Wastelands Development Project Scheme (IWDPS) (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 natural resources on watershed basis. The stress under the scheme is to take up micro-level planning in selected micro-water-sheds in various districts in the States with the active participation of the local people from the planning stage. During the year a total of 55 projects has been sanctioned under this scheme.

6.2.4.2 Fuelwood and Fodder Projects (50% Centrally Sponsored)

The scheme is meant to promote integrated development of identified water-sheds by combining activities like tree planting, agro-forestry, silvi pasture development, horticulture and soil and moisture conservation. Projects under this scheme are intended to check land degradation and regenerate degraded lands/wastelands and augment the production of fuelwood, fodder and forest produce specially from community and degraded forest lands by involving the village community/local people in the programme.

6.2.4.3 Scheme for raising of 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 focussed to benefit the tribal populations who depend upon the minor forest produce.

6.2.4.4 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. Aerial seeding is a new technology which can speed up the process of development of such areas at a fast pace and at reasonable cost. During the year an area coverage of 15000 ha. has been achieved.

6.2.4.5 Seed Development Scheme (100% Centrally Sponsored)

An important factor in the success of afforestation and wastelands development activities is the ready availability of quality seeds. Under this scheme, the State Governments are being assisted to develop facilities for collection, testing, certification, storage and distribution and quality seeds of known origins.

Fig 46: Greening along water courses in the Thar Desert.

6.2.4.6 Margin Money Scheme

The scheme aims at encouraging flow of institutional funds for afforestation and wastelands development projects by providing central assistance, so that such projects can be brought within the economic viability criteria of NABARD During the year a provision of Rs. 250 lakhs has been made for providing assistance under the scheme.

6.2.4.7 People's 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.

6.2.4.8 Grants-in-Aid Scheme

The scheme of Grants-in-Aid to Voluntary Agencies is being implemented with a view to involve Non-Government Organisations (NGOs) and Voluntary Agencies (VAs) in the process of afforestation and wastelands development. Under the scheme, financial assistance is provided to the NGOs and voluntary agencies to take up projects for afforestation and wastelands development. 380 voluntary agencies have been assisted so far undertaking 561 projects for afforestation and wastelands development from the inception of the scheme. During the year, 92 new projects have been sanctioned under this scheme.

Fig 47: Nursery raising

6.2.5 Technology Extension

In order to harness and bring in more scientific and technological inputs for reducing land-degradation, enhancing biomass production, achieving sustainability of technology through greater cost effectiveness and acceptability by the beneficiaries, a Technology Extension Programme has been initiated with the assistance of a number of scientific and technical institutions/departments, universities and voluntary agencies. Various demonstration projects covering usar lands, arid and dry areas, gullied and ravinous lands, marshy and water logged areas etc. have been launched. During the year a coverage of 362 ha. has been achieved under this scheme.

Fig 48: Surnal land PRIOR to plantation and AFTER plantation

6.2.6 Inter-Departmental Coordination

Policy Advisory Groups (PAGs) were set up to resolve crucial policy issues pertaining to the following subjects:

— Fuelwood conservation

— Wood substitution.

— Grazing and livestock management

— Benefit distribution from common lands

— Institutional finance and fiscal incentives for farm forestry

The reports of the PAGs are under finalisation.

6.2.7 Greening Programmes

6.2.7.1 Green Haryana Programme

The Green Haryana Programme, initiated during 1990-91 was also continued during the year. As a result of coordination in the afforestation and wasteland development efforts, 28,857 ha. were covered during the year.

6.2.7.2 Green Delhi Campaign

The campaign aims at improving the environment of Delhi by making it greener through massive tree plantations which continued during the year. During the year a total 35.30 lakh saplings have been planted.

Fig 49: Tree plantations under Green Rajasthan Programme

6.2.7.3 Green Rajasthan Programme

The Green Rajasthan Programme launched in June 1990 continued during the year. During the year, district level Action Plans, prepared for all the districts of the States were implemented.

6.2.7.4 Smriti Vans

The concept of Smriti Vans has been introduced with the twin purpose of planting trees as life memorial in

Fig 50: Womens' Participation in nursery raising

perpetuating the memory of departed ones and greening of lands for maintenance of ecological balance. The Rajiv Smriti Van was inaugurated in Delhi on 50 acres of land in August, 1991. The State Governments have also been advised to promote the setting up of Smriti Vans with technical advice and assistance from the State Forest Departments.

6.2.8 Cooperatives

6.2.8.1 Tree Growers' Cooperatives

The Pilot Project of the Tree Growers' Cooperatives has been taken up in five States in collaboration with the National Dairy Development Board. One hundred and two cooperatives have so far been registered with a total membership of 11046. These cooperatives have been leased 1223 ha. of land by the State Governments for raising nurseries and planting the lands with fodder and fuelwood species.

6.2.8.2 Indian Federation of Farmers' Cooperatives (IFFCO)

IFFCO has promoted 29 Farm Forestry Cooperatives in three States viz., U.P., M.P. and Rajasthan with financial assistance of Rs. 130.50 lakhs from NWDB and planted 4040 ha. of private wastelands for production of fuelwood, fodder and timbers etc.

6.2.8.3 Women's Cooperatives

The involvement of women in tree planting activities has been recognised in a pilot project on "Tree Growers Cooperatives" in Andhra Pradesh, Gujarat, Karnataka, Orissa and Rajasthan. The women are being trained through 62 women oriented programmes and 1795 women are presently participating in this cooperative venture.

6.2.9 Communications

6.2.9.1 Films

Keeping in view the potential of films as strong means in communicating the desired messages and information, the production of the following films has been taken up during the year:

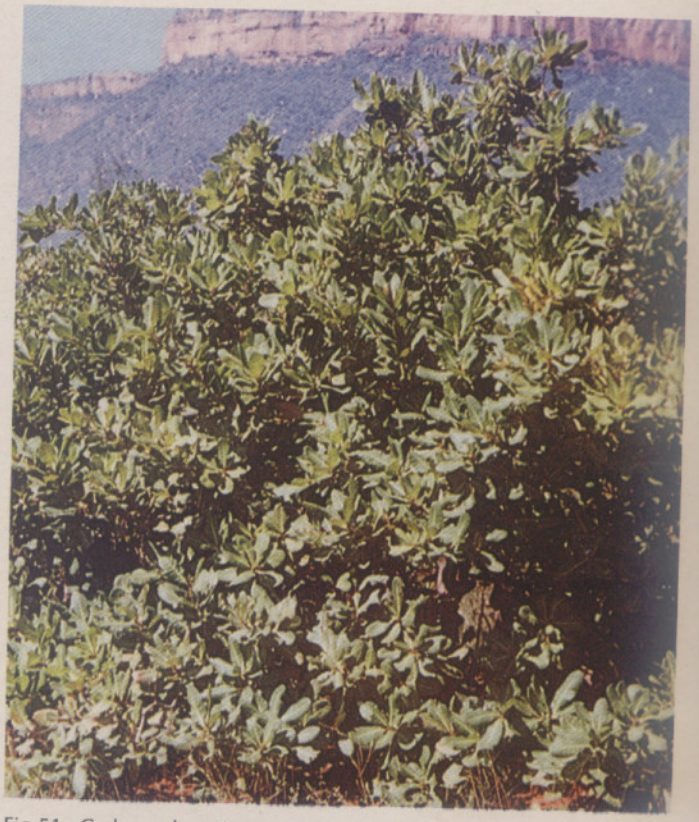


Fig 51: Cashew plantations in Tirupati foot hills.

— Pole Planting

— Agro-Forestry

— Sand-dune Stabilisation

— Sewage water disposal through tree planting

— Sukhomajri regeneration of the Shivaliks

— Bio-gas Utilisation

— Green Haryana Programme

— Joint Forest Management covering the experience in three States

— West Bengal Experience in Joint Forest Management.

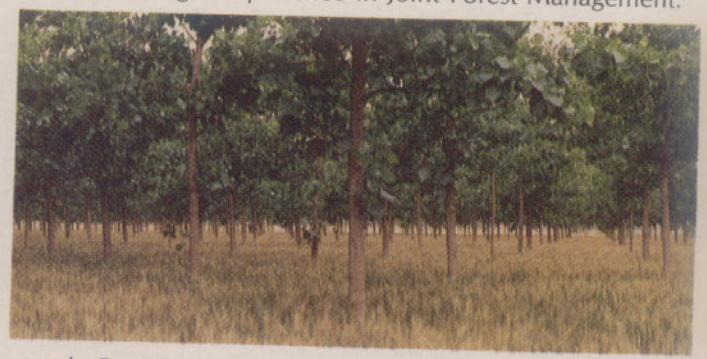


Fig 52: Poplars interspersed with wheat under Farm Forestry Programme

Fig 53: Khejri plantations

6.2.9.2 Folk Media

Street plays, while making use of traditional art forms are effective means for raising awareness among the people specially in the rural areas for promoting afforestation. Sixty such plays were performed in four districts of Haryana during the year.

6.2.9.3 Print Media

With a view to raise the level of awareness in the field of afforestation and to disseminate messages, 34 publications have so far been brought out by the NWDB in the form of brochures, booklets, reports, etc. During the year the following publications have also been brought out:

— What you can do for Cleaner and Greener Haryana

— Vriksharopan Technique

— Rajiv Gandhi Smriti Van

— Nursery

— Micro-Planning Guidelines

6.2.9.4 Journalist Fellowship Scheme

Nine Fellowships have been awarded during the year with a view to disseminate success stories of Indira Priyadarshini Vrikshamitra Awardees.

6.2.9.5 Communications Strategy

It is recognised that communications play an important role in sensitising people to social development issues. During the year, NWDB prepared a paper on Communications Strategy after consultation with the experts. The paper has been circulated and follow-up action on this will be taken during the year 1992-93.

Fig 54: Stabilisation of the shifting sand dunes

6.2.10 National Fund For Afforestation

A National Fund for Afforestation and Wastelands Development has been set up. Donations from individuals as well as corporate/non-corporate bodies towards the National Fund to regenerate degraded areas/wastelands are eligible for 100% tax exemption under the relevant provisions of the Income Tax Act.

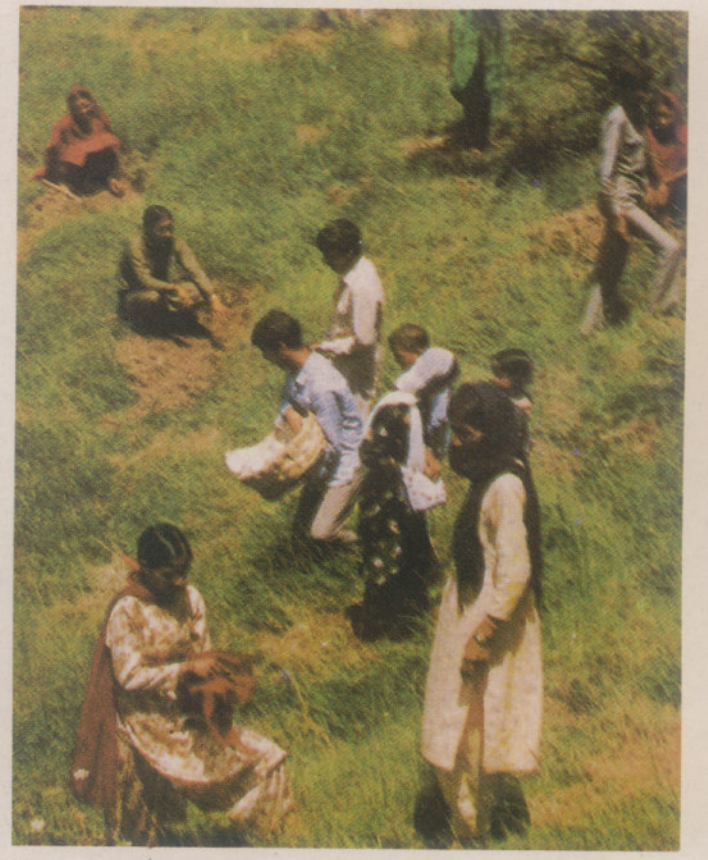


Fig 55: People's participation in afforestation of Wastelands

6.2.11 Regional Centres

Seven Regional Centres have been set up under the World Bank Aided National Social Forestry Project in different universities and national level institutions. They provide technical and extension support to the State Forest Departments in preparing projects for wastelands development and afforestation with people's participation. They also act as a forum for exchange of ideas and experiences amongst the States concerned as well as non-governmental organisations and carry out problem specific studies and training relevant to afforestation/social forestry.

6.2.12 Geographical Information System (GIS)

With a view to promoting the use of GIS technology for land use management and the wastelands development, nine pilot projects are being implemented in collaboration with leading scientific and technical institutions of the country in different agro-climatic zones.

6.2.13 Monitoring and Evaluation

The progress and achievements of tree planting/afforestation activities under various programmes including the 20-Point Programme are monitored by NWDB through several 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-governmental

Fig 56: Regeneration programmes—people's participation

Fig 57: Successful regeneration efforts

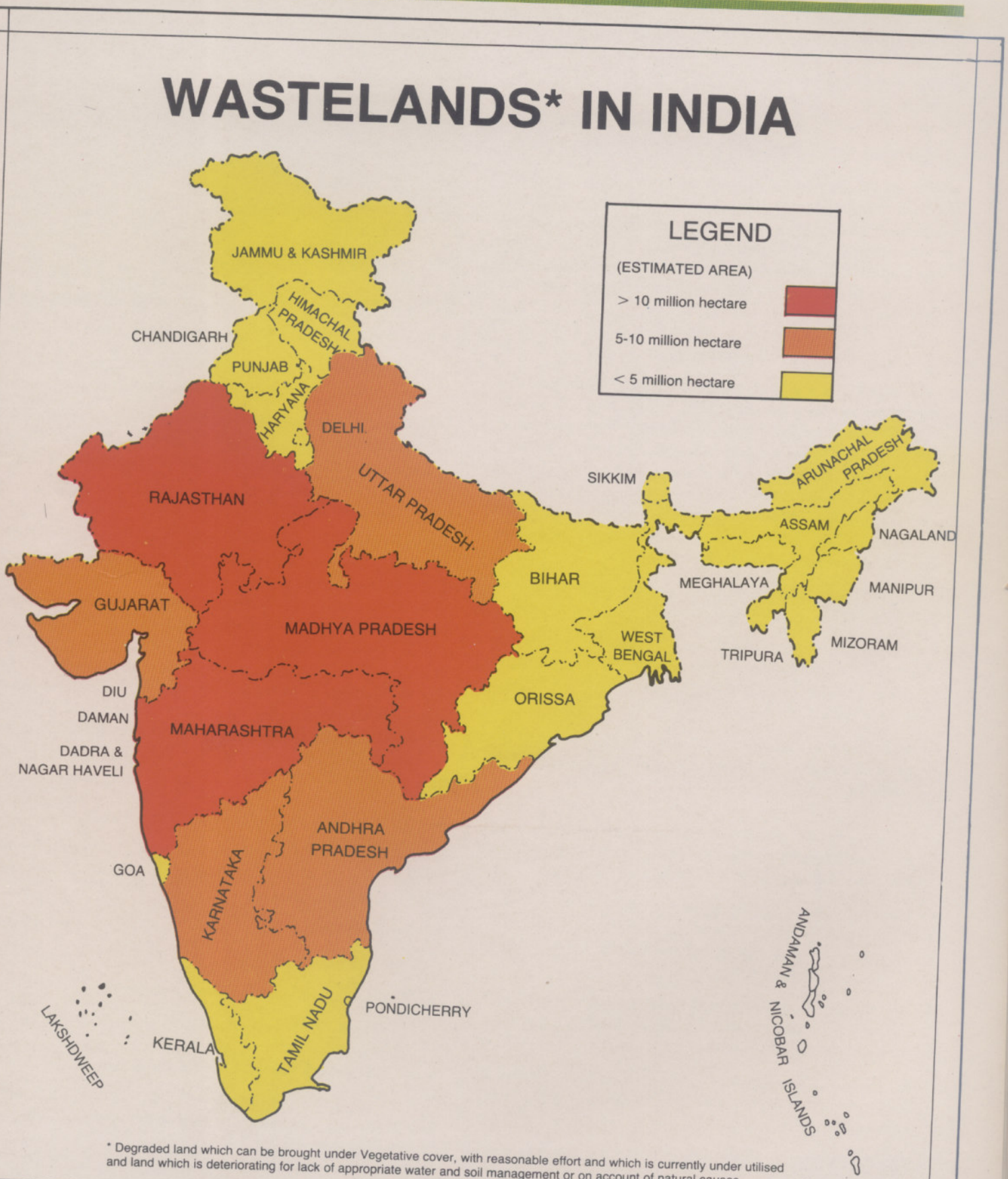


Fig 58: Wastelands in India

organisations like PRADAN and individual forestry experts besides those undertaken by the State Governments. The Regional Centres have been entrusted with studies on survival rate.

6.3 OTHER ACTIVITIES ON ECO-REGENERATION

The main objectives of the eco-regeneration are to demonstrate technologies for regeneration of ecologically degraded and fragile areas to undertake integrated environmental improvement projects and to create environmental awareness. These activities are being carried out by organising Eco-Task Forces of Ex-servicemen and Field Demonstration Projects.

6.3.1 Field Demonstration Projects

The scheme is intended to demonstrate technologies for restoration of selected degraded areas and integrated ecological development. Under this scheme, various projects have been sponsored to undertake activities such as nursery raising, afforestation, soil conservation, development of water resources, installation of smokeless chullhas, solar cookers and bio-gas plants, cultivation and maintenance of medicinal plants and creation of environmental awareness. During the year the following projects were continued:

— Integrated environment development around Binsar Sanctuary, Almora (U.P.) by Paryavaran Jan Jagran Samiti;

— Eco-development, afforestation and eco-regeneration of degraded hill slopes in Pathanjalipuri, Distt. Coimbatore by the Arya Vaidyar Rama Varier Educational Foundation of Ayurveda, Coimbatore;

— Integrated ecological improvement of Umri area in the jurisdiction of Marathwada Agricultural University, Parbhani;

— Ecological improvement of some villages in Baghmundi and Jhalda blocks of Purulia District in West Bengal by School of Fundamental Research, Calcutta;

— Compact hill area development, training and extension module, Chitreswar, Almora (U.P.) by Ecology, Environment and Energy Conservation Organisation, Chitreswar, Almora (UP);

— Ecologically sound integrated non-insecticidal techniques for pest management by Punjabrao Krishi Vidyapeeth, Akola (Maharashtra);

— Ecological improvement of village Biswas in Tamluk-II Block of Midnapur, West Bengal by Tarun Sangha, Distt. Midnapur, West Bengal;

— Eco-development, afforestation and eco-regeneration in the vicinity of Baba Balak Nath Temple, Hamirpur (H.P.) by Trust Baba Balak Nath Temple, Hamirpur (H.P.); and

— Ecological improvement of some villages in Imphal, Manipur by Society for Advancement and Rural Development Activities, Lamkhai P.O. Lamsang, Manipur.

Fig 59: Subabul plantation—successful rehabilitation programme

6.3.2 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 for 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 of the three Eco-Task Foreces, presently deployed in the States of Uttar Pradesh, Rajasthan and Jammu & Kashmir are given below:

6.3.2.1 Eco-Task-Force (TA-127), Uttar Pradesh

This Task Force is deployed in the Kairkuli micro-catchment near Mussoorie. The achievements of the Task Force during the year are:

— Plantation (nos.)	4,15,000
— New area covered (ha)	546
— Mined area reclamation (no. of mines)	4
— Protection of old plantation (lakhs)	18,46,000

6.3.2.2 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:

— New plantations (nos.)	6,55,000
— New area covered (ha)	564
— Maintenance of old plantation	25,00,000

6.3.2.3 Eco-Task Force (TA-129) Jammu & Kashmir

This Task Force was created in 1988 and 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)	93,000
— New area covered (ha)	40
— Fencing (meters)	14,288

The requirements of dry fodder of the local villagers during winter are met from the grass grown in the protected area of the region under the Task Force.

7 RESEARCH

7.1 ENVIRONMENTAL RESEARCH

7.1.1 Introduction

The main objective of environmental research programme is to generate information for understanding various linkages that operate in different eco-systems and to provide a scientific basis for development of methods for optimal utilisation of natural resources besides planning and development of strategies for environmental protection, conservation and management.

7.1.1.1 At present, 69 projects are in operation in various universities and institutions all over the country. There are two major environmental research programmes namely Environmental Research Scheme and the Man and Biosphere Programme.

7.1.1.2 The Man & Biosphere Programme is an inter-disciplinary programme of research and training which emphasizes an ecological approach to the study of inter-relationships between man and his environment whereas the Environmental Research Programme covers the areas of Chemical Engineering and Technological aspects of Environmental Management.

7.1.1.3 During the year, two projects were sanctioned and 26 were completed under these research programmes. The lists 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

An All India Co-ordinated Programme for studies on Sea Level Rise at 10 different institutions continued during the year. The objectives of the programme are as follows:

— Sea level trend analysis

— Inundations of land areas

— Frequency of storm ranges

— Coastal erosion/aggredation and their effects on coastal waterways/beaches

— Coastal fisheries, wetland ecosystems and coral reef etc.

— Changes in estuarine hydrography and impacts on the ground water reservoirs and freshwater aquifers due to salt water instrusion

— Impact on existing industrial, power, defence, municiapl and other installations

— Impacts of developmental programmes with particular reference to development of minor ports and off-shore oil pipelines.

— Impacts on Warfs and Jetteys

— Impacts on fishing harbours

— Likely impacts on Gulf of Kutch and Gulf of Mannar

— Socio-economic impacts and abatement of pollution.

A new co-ordinated project on "National Methane Campaign" for actual methane measurements at nine different centres has also been initiated.

7.1.2.2 All India Co-ordinated Research Project on Conservation of Endangered Plant Species-Tissue Culture Programme

The Programme on Seed Biology and Tissue Culture involves identification and enumeration of endangered plant species, undertaking studies on gene pool conservation, artificial propagation in natural habitats and development of techniques of mass-multiplication of selected plant species. Salient findings of the programme are as follows:

— Basic biology of some of the important medicinal plants *(Coptis teeta, Podophyllum hexandrum., Valeriana sp., Aconitum sp., Picrorhiza kurroa* and *Nardostachys jatamansi)* was investigated.

— Phytochemical investigations on the medicinal plants covered under the programme revealed that the Indian species *(Coptis teeta, Podophyllum hexandrum* etc.) have higher quantities of active principles than the related Japanese and American species. *C. teeta,* for example, has been shown to contain Ca 11.0% berberine (alkaloid) as compared to 6-7% in *C. Japoniea* (Japan) and *C. trifolia* (U.S.A), *Podophyllum hexandrum* similarly, has been shown to contain 5 times more 'Podophyllotoxin' an anticancer drug, as compared to its counterpart *P. peltatum* of U.S.A. These species are endemic to India and their demand in international medicine industry is growing considerable posing serious threat to their survival.

— Protocols have been successfully developed for the micro-propagation of various endangered species, viz. *Podophyllum hexandrum, Saussurea lappa, Picrorhiza kurroa, Valeriana wallichii, Nardostachys jatamansi, Aconitum heterophyllum* (all medicinal plants) and *Delphinium malabaricum, Nepenthes Khasianam, Vanilla walkeriae, Paphiopedilum insigne* and *Dendrobium wardianum.* These plant taxa are not only of high economic value, but also are vanishing from their natural habitats either because of the habitat destruction or over-exploitation.

— The plants *Podophyllum hexandrum, Valeiana wallichii, Nepenthes khasiana, Delphinium malabaricum* and *Picrorhiza kurroa,* has been successfully transplanted in their native habitats or experimental sites by *in vitro* method.

— Preliminary studies on the possibilities on enhancing the quantities of active principle of some medicinal plants through culture have shown positive response.

— Studies on the short-term and long-term cold storage (cryo-preservation) of some plant taxa have been successfully accomplished.

7.1.3 Integrated Action Oriented Reserach Demonstrations and Extension Programme on Eco-development

7.1.3.1 The programme envisages integrated research and development aimed at finding solutions to the local environmental problems through resource survey, conservation, regeneration and planning appropriate land use and to evolve action plan for undertaking eco-development activities in the ecologically sensitive areas of Himalayas, Western Ghats and Eastern Ghats regions of the country.

7.1.3.2 During the year, the G.B. Pant Himalayan Institute of Environment and Development, Almora-an autonomous Institute of the Ministry was entrusted with the Himalayan region component of the programme.

7.1.3.3 Twenty one projects under Himalayan region, 19 under Western Ghats and 12 under Eastern Ghats remained operational, whereas six projects under Himalayan region and nine under Western Ghats regions have been completed during the year. The list of the completed projects is given at Annexure III.

7.1.3.4 The Ministry also continued the Integrated Action Oriented Programme on river Kaveri with the following objectives:

— Physico-chemical and biological monitoring of water quality of the river and its tributaries

— Environmental epidemiology covering studies on prevalence of water-borne and other environmental diseases alongwith the river stretch and

— Inventorisation of the sources of pollution alongwith river stretch. The project is coordinated by Madras Science Foundation in collaboration with Tamil Nadu and Karnataka Pollution Control Boards.

Salient findings of this programme during the third year reveal the following:

— On the basis of Bio-monitoring and Physicochemical profiles of the river water, it is confirmed that, 23 stations out of 144 are highly polluted.

— The tributaries of the river are more polluted and carrying more nutrients and solids than the main river.

— 683 algal species, 155 periphytic algae, 177 fungi, 533 angiosperms, 287zooplankton 153 benthic animals and 188 species of fishes have been recorded from the entire Kaveri Basin. The fish fauna includes several commercially exploitable as well as endangered species.

Fig 60: A view of the Himalayas at Lahul

Fig 61: Snow covered Himalayan Mountains—necessity for sustainable management strategies

7.1.4 Monitoring of Research Projects

During the year, meetings were conducted to review and monitor the progress of 57 on-going research projects under ERC and MAB programme. An workshop was also organised to monitor the programmes of the on-going projects under Western and Eastern Ghats programme.

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

The Institute established in August, 1988 as an autonomous Organisation of the Ministry was strengthened during the year and considerable progress was made towards its infrastructure, manpower and research and development programmes.

7.2.1 Infrastructure

The Institute was provided 35.844 ha. of land, free of cost at Kosi-Katarmal, Almora by Government of U.P. for the construction of its buildings, genebank and arboretum. Arrangement has also been made by the Govt. of U.P. for acquisition of 7.64 ha. private land at Katarmal. Architectural model of the first phase construction of Institute's buildings at Kosi Katarmal was finalised and site preparations required for execution of the construction work were completed.

Government of Sikkim has also offered 2.8340 ha of land at Pangthang, Gangtok (Nampong Block) to the Institute for conducting the research projects in the Eastern Himalayas.

7.2.2 Manpower

During the year, 13 scientists, 7 technical/project staff and 20 supporting administrative staff were appointed through regular recruitment process.

7.2.3 Research and Development

7.2.3.1 R & D activities of the Institute were expanded under the following four major themes:

— Land and water resource management

— Sustainable development and rural ecosystems:

— Conservation of biological diversity; and

— Ecological economics and environmental impact analysis.

7.2.3.2 Following research projects continued during the year:

— Restoration ot degraded land and sustainable rural development of Katarmal, Almora in Kumaon Himalaya

— Integrated watershed mangement-a case study in Sikkim Himalayas

— Designing ecologically sound natural resource management strategies for sustainable rural development in Kapkote Block (Almora District) in Central Himalayas

— Development of agroforestry model in Garhwal Himalaya

— Jhum and sustainable development of a village cluster in Nagaland

— Mechanisms of the maintenance of biological diversity and their role in ecosystem organisation and function in conservation areas

— Introduction of rainwater harvesting technology for sustainable rural development in the Himalayas

— Environmental management information system for the Himalayas.

7.2.3.3 With expansion of manpower and creation of laboratory facilities, the Institute initiated the following projects during the year:

— Exploration and investigations on lesser known food crops and wild edible elements in central Himalayas

— Defining development and identification of appropriate rural development approaches in the Hills

— Analysis of nomadic repository of knowledge in the central Himalayas

— Cooperative planting programme of nitrogen fixing trees for revegetation of degraded landscapes

— Biological maintenance of soil fertility

— Establishment of a functional arboretum at Katarmal, Almora

— Studies on diversity, fragmentation and conservation of ecologically sensitive habitats of the Himalayas

— Impact of domestic sewage disposal on water springs of Almora town

— Environmental impact analysis of multipurpose river valley projects-a case study in Garhwal

— Agricultural Economy of Himalayas-analysis of regions excluding Kumaon.

7.2.4 Publication and Audiovisuals

7.2.4.1 The Institute published a book entitled "Agricultural Economy of the Himalayan Region with special reference to Kumaon". Besides 30 research papers have been published in various journals, books etc.

7.2.4.2 A video film of 25 minutes duration on "Himalaya mein Jan Jeevan Ke Vikalp" highlighting the scope of medicinal plant cultivation was produced by the Institute during the year.

7.3 RESEARCH ON WETLANDS, MANGROVES AND BIOSPHERE RESERVES

7.3.1 Wetlands

Research on various aspects of Wetlands has been promoted through Universities and other research Institutions in the country. 20 research projects have so far, been sanctioned and one more project on conservation and management of wetland-Kabar Lake (Begusarai) has been approved by the Ministry. Details of sanctioned projects during the year are given at Annexures II.

7.3.2 Mangroves

In order to provide scientific inputs for conservation and management of mangroves in the country, nodal Research Institutions have been identified. Fourteen research projects have so far been sanctioned. During the, year a research project on "Nutrient dynamics of Pichavaram mangroves" in Tamil Nadu to M.S. Swaminthan Research Foundation has been sanctioned. Details of sanctioned projects are given at Annexure II

7.3.3 Biosphere Reserves

Research on various aspects of Biosphere Reserves areas has been promoted through academic and research Institutions in the country for management of the Biosphere Reserves. A list of completed research projects is given at Annexures III.

7.4 FORESTRY RESEARCH

7.4.1 Indian Council of Forestry Research and Education (ICFRE)

ICFRE, an autonomous body with the Ministry of Environment and Forests, holds the mandate to organise, direct and manage research and education in the fields of forestry. It is over all responsible for framing the forestry

Fig 62: Pair of Sarus Cranes—now a declining species in the wetlands of Northern India

research policy of the country and ensure the best method of application of all sources of scientific knowledge to the solution of problems facing the forestry sector in the country. The major objectives of the Council are as follows:

— To undertake, aid, promote and co-ordinate forestry education, research and its application.

— To develop and maintain a National Information Centre for forestry and allied sciences.

— To act as a clearing-house for research and general information relating forests and wildlife.

— To develop forest extension programmes and propagate the same through mass media, audio-visual aids and extension machinery.

— To provide consultancy services in the field of forestry research, education and training and in allied sciences.

— To do other things considered necessary to attain the above objectives.

The ICFRE was registered as a Society under the Societies Act, 1860, on 12th March, 1991 and has been notified as an autonomous body under the Ministry on 1st June, 1991.

7.4.1.1 The Research Institutes and Centres under the Council are:

— Forest Research Institute, Dehra Dun (FRI)

— Institute of Forest Genetics and Tree Breeding, Coimbatore (IFG & TB)

— Institute of Wood Science and Technology, Bangalore (IWS & T)

— Institute of Deciduous Forests, Jabalpur (IDF)

— Institute of Rain and Moist Deciduous Forest Research, Jorhat (IR & MDFR)

— Institute of Arid Zone Forestry Research, Jodhpur (IAZFR).

— Conifers Research Centre, Shimla (CRC).

— Advanced Centre for Forest Productivity, Ranchi (ACFP).

7.4.1.2 The following research priorities on forestry have been identified by the Council.

— Develop mitigation strategies in forestry sector to reduce and store green house gases.

— Research in upland watershed management (integrated soil and water conservation to check siltation and water scarcity and boost afforestation).

— Research in reforestation of degraded lands and problem soils (barren/mined/waste/water-logged/ salt affected lands, etc.).

— Research in conservation, protection and sustainable development of existing forests to conserve bio-diversity.

— Increasing productivity of existing forests and future plantations through:

  — High quality seed production

  — Production and multiplication of site matched planting stock.

  — species/varieties improvement using traditional breeding methods and bio-technology.

  — biological rejuvenation of lands using Mycorrhizae and other useful micro-organisms.

— Research on multi-purpose trees in farming systems.

— Research on improved utilisation, including improved recovery and processing of traditional wood and paper products.

— Research on non-wood forest products which provide sustenance to the people and supply raw-materials to a large number of forest industries.

— Research in modern tools, equipments, techniques and operations for afforestation, logging and extraction of forest produce.

— Protection of forest from entomological and pathological diseases.

Fig 63: Bagworm infestation in Chir Forest in Jammu and Kashmir

— Socio-economic research for motivating farmers/land owners to adopt tree farming in a manner similar to crop based farming.

— Research on policy strategies and combination of measures desired towards enlarging area under forest including studies on property rights and land tenure, culture and gender issues related to conservation, non-timber products, effects of tariff and non-tariff trade barriers, legal and regulatory setting for forestry and other laws regulating tree felling, transportation and sale.

7.4.1.3 The Council has been actively engaged since 1989 in providing financial support to forestry research projects, being undertaken by a number of universities/institutions in the country. During the year, 22 forestry research projects were supported by ICFRE at 13 various Universities.

7.4.2 Forest Research Institute, Dehra Dun

The Institute caters to the research needs of Uttar Pradesh, Punjab and Haryana States. Its research mandate includes research in ecology, management of forests, utilisation of forest products, development of non-wood products and at the national level research on forest inventory, watershed management, socio-legal aspects of forestry etc.

The salient achievements of the Forest Research Institute during the year are as under:

Fig 64: Refoliation after treatment undertaken by Forest Research Institute, Dehra Dun

— Evaluation of *Acacia tortilis* and *Poplar deltoids* for successful use as timber in furniture making and kiln drying.

— Development of a process for production of synthetics lignosulphonates from spent liquor of paper mills.

— Investigations on *Sterculia vilosa, Artocarpus chaplasha* and *Alnus nepalensis* for their oil content for commercial exploitation. Species of *Quercus leucotrichophora, Prosopis juliflora* and *Prosopis cineraria* have also been investigated for their polysacharides content and isolotion of starches from such seeds.

— Control of epidemic attack of defoliator of chir pine, bagworm, *Clania cremerii,* in Rajouri Forest Division of J & K.

— Development of techniques for accelerated-ecological reclamation of limestones and rock phosphate mines.

— Detection of a foliage rust Melampsora causing pathogenic diseases of Poplars on exotic clones.

— Systematic training in inoculation of nursery seedlings with VAM and production of quality seeds, certification and storage.

— Development of techniques for macropropogation of *'Bambusa tulda'* through vegetative means to eliminate the dependence on bamboo seed for production of seedlings.

— Commencement of Postgraduate Diploma course in Pulp and Paper Technology in the Deemed Univeristy.

7.4.3 Institute of Forest Genetics and Tree Breeding, Coimbatore

The institute primarily caters to the general forestry research problems pertaining to the States of Tamil Nadu and Kerala and research on eco-restoration of Western Ghats, mangrove forests of the West and the East Coasts and bio-diversity of the tropical evergreen forests of Western Ghats. The research highlights of the Institute include:

— Collection and assemblage of phenotypically superior clones of *Bambusa arundinacea, Azadiracta indica* and *Tamerindus indica.*

— Vegetative propagation methods for *Acacia nilotica, Albizia lebbeck, Eucalyptus* sp., *Casaurina* Sp. and *Bambusa arundinacea.*

— Productivity estimates of Teak, *Acacia* and *Casaurina* plantations.

— Assessment of cultivation practices and marketing of *Casaurina* produce.

7.4.4 Institute of Wood Science and Technology, Bangalore

The primary objective of the Institute is to conduct research in wood sciences and technology, substitutes for wood, enhancing durability of lesser known timbers found in the country, improve and develop new technologies for wood based industries.

The institute has developed a substitute for 'jigat' the binding material for joss sticks (agarbatti) manufacture, which is presently imported annually to the tune of 1500 tonnes. The technique, developed in the institute for *Albizia chinensis* timber preservation has helped more than 10,000 fishermen to prolong the life of their catamarans from 5 to 22 years. The research highlights include:

— Development of non-wood products;

— Cost effective seasoning techniques including solar seasoning.

7.4.5 Institute of Deciduous Forests, Jabalpur

The Institute caters to the forestry research needs of the states of Maharashtra, Madhya Pradesh, Orissa and Goa. The Institute has surveyed the medicinal plants of Central India and carried out *ex-situ* conservation of 300 medicinal plants at the Institute's Gardens. The research achievements include:

— Control of fungal epidemic on *Bambusa nutans* in coastal area of Orissa,

— Research on non-wood forest products and *ex-situ* conservation of 300 medicinal plants

— Rehabilitation of Bauxite mined area near Amarkantak

— Development of agro-forestry models for economic upliftment of tribals; and

— Research in diseases and insect pests of social forestry species raised by the farmers.

7.4.6 Institute of Arid Zone Forestry Research, Jodhpur

The Institute caters to the general research requirements of forests and forestry problems relating to the States of Rajasthan, Gujarat and parts of Haryana and Punjab. The primary objective of the institute is to conduct research at national level on greening the arid and semi-arid areas of the country and within the region eco-restoration of the Aravalli hills, development of agri-silvi pastoral packages for the arid tracts and research on irrigated plantations along Indira Gandhi Nahar Project (IGNP).

The research activities of the institute include:

— Agro-forestry studies in arid zone of Rajasthan

— Sand dune fixation studies in Thar Desert

— Irrigation management study in forestry plantations in command area of IGNP

— Agro-forestry studies in irrigated plantations of Jaisalmer district.

— Control of Rohida, skeletonizer; and

— Control of Neem shoot borer.

7.4.7 Institute of Rain and Moist Deciduous Forest Research, Jorhat

The Institute has the mandate to carry out research on ecology, regeneration and management of forests occuring in the north-eastern states, West Bengal, Sikkim and Andaman and Nicobar Islands, conservation methods to preserve the unique heritage of flora/fauna, containment of shifting cultivation and management of mangrove forests in the region.

The Institute has also initiated research on forest tree-mycorrhizae, associations in the rain forests of Assam, Nagaland and Arunachal Pradesh, collection of bamboo and cane germplasm and their micro/macro propagation.

7.4.8 Conifers Research Centre, Shimla

The Centre has the mandate to carry out research on regeneration of high level conifers, forestry related problems of the cold deserts and conservation of natural cover in the Western Himalayas. The Centre has contributed significantly to artificial regeneration of Silver fir and Spruce by research on their seed, nursery and planting technology and generated valuable knowledge on nutrient cycling in coniferous forests of western Himalayas.

Other achievements of the Centre include;

— Development of Junipers and *Hippophae;*

— Management of alpine pastures; and

— Rehabilitation/reforestation of cold deserts.

7.4.9 Advance Centre for Forest Productivity, Ranchi

The primary aim of the Centre is to produce brood lac and carry out extension work for lac cultivation in central tribal belt of the country. The centre has developed the following forestry programmes for aleviation of poverty of the tribals:

— Increasing productivity under agro-forestry programmes in the regions;

— Regeneration, collection, processing, marketing and development of non-wood products for the benefit of forest-dwellers;

— Development of cash crops of forest origin and

— Studies on socio-economic development of tribals.

7.5 WILDLIFE RESEARCH

Research on various aspects of biology, ecology, and management of problems is basically conducted by the Wildlife Institute of India, DehraDun, Bombay Natural History Society, Bombay and Salim Ali Centre for Ornithology and Natural History, Bombay.

7.5.1 Wildlife Institute of India (WII)

7.5.1.1 Wildlife Research, a major activity of WII covers various aspects of applied research on wildlife for different ecological and geographical region of the country. The following five studies have been completed by the institute;

— Snow leopard (Ladakh)

— Nilgiri langur (Tamil Nadu)

— Grizzled giant squirrel (Tamil Nadu)

— Monitoring of reintroduced Mugger crocodiles (Andhra Pradesh); and

— Monitoring of reintroduced Rhinoceros (Dudhwa, U.P.)

Fig 65: Red Wattled lap wing on eggs

7.5.1.2 During the year, 14 studies covering high altitude outer Himalayas, Tarai, moist peninsular forest and arid, desert and river eco-systems were continued. These studies pertain to endangered species, aquatic animals, crucial habitats including animal and gene corridors, problems of pastoral communities and impacts of development projects.

7.5.1.3 Four new research projects covering study on Mantane grass lands in the high altitude Himalayas, and Western ghats and endangered smaller animals like the Malabar Civet and the Indian Wolf, have been taken up. Two more research projects covering investigations on disease and monitoring techniques for determining status of wildlife health have also been initiated by the Institute during the year.

7.5.1.4 The Institute continued its consultancy on the following:

— Appraisal of the management plan of a new National Park in Nepal

— Advise on the problem of Terai cattle at Agra-air base;

— Management of Mundanthurai-Kalakad Tiger Reserve and

— Management of Zoological Parks.

7.5.1.5 Apart from its regular newsletter, the institute also brought out following two manuals;

— Technique manual of Wildlife census

— Technique manual on Chemical restraint of wildlife animals.

A computerised data base containing information on the bio-geographically co-related netwrok of protected areas, status of threatened species and bibliography of wildlife literature etc. is being developed by the Institute.

7.5.2 Projects entrusted to the Bombay Natural History Society.

Under the Indo-US Rupees Fund Programme, the Ministry has been sponsoring a number of research projects implemented by this Society. Seven research projects taken up earlier under the Indo-US Rupee Fund Programme continued during the year. These are:

— Ecology and Management of Keoladeo National Park: The main finding of the study is that the wetland area of the Park is being converted into grassland-woodland bio-type. Steps to control the meance of aquatic weeds have been recommended.

— Ecology of Point Calimere Sanctuary, Tamil Nadu: Various disturbances being caused to the endangered eco-system which this sanctuary represents have been identified.

— Migration of birds and setting up of a migration data bank

Fig 66: Sambar—the most widely distributed and the largest of all Indian Deer.

Under this project field stations for birdringing and observation of bird movement patterns were set up in Andhra Pradesh, Gujarat, Bihar, Punjab, Madhya Pradesh, Orissa and Tamil Nadu. Several important recommendations for management of the Chilka lake (Orissa), Harike Lake (Punjab) and Kabar Lake (Bihar) have been made.

— Ecology of the Indian Elephant: The study covered the elephant populations of Tamil Nadu, Karnataka and Bihar and has yielded information regarding migration pattern of the elephants and the extent of degradation of their habitats. These findings have provided valuable inputs for formulating project elephant.

— Ecology and Behaviour of Raptors: The study is meant for obtaining information on the current status and distribution of the birds of prey and their role as indicators of pollution of the forests and wetlands. Techniques for captive breeding and releasing in the wild of the highly endangered birds are being developed.

— Ecology of Grasslands: The study involves survey of the remaining wild subtropical grasslands of the Indian plains, which are the habitat of highly endangered species like the hispid hare, pigmy hog, pelicans and bustards. Once the important grasslands are identified from the point of view of endangered biotic communities, both floral and faunal, prescriptions for their conservation will be developed.

Revision of the Handbook of Birds of India and Pakistan: The internationally recognised "Handbook of the Birds of India and Pakistan" by Dr. S. Dillon Ripley and Late Dr. Salim Ali has been taken up for revision and updation.

7.5.3 Salim Ali Centre for Ornithology and Natural History (SACON), Bombay.

The Ministry has approved the setting up of SACON with the major objectives of developing and conducting research as well as courses in all aspects of Ornithology and Natural History of other life forms. Details of the research areas, courses etc., being covered by SACON have been identified. Details are given in chapter 8.

7.6 NATIONAL NATURAL RESOURCE 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:

— Examine and identify the key issues in the management of (including information systems) bio-resources and environment

— Study the national requirements and identify the potential user/users for remote sensing technology

— Identify improved methods for management of resources by integrating conventional surveys and remote sensing techniques and generate specific national programmes/projects for achieving the above

— Identify the data sources required for NNRMS especially bringing out the requirement of remote sensing data

— Identify supporitng research, training programmes joint experiments and technology development/transfer for the above.

7.6.2 Out of 11 sanctioned projects under NNRMS six projects have so far been completed and remaining are in different stage of completion. Two more new projects have been considered for funding by the Standing Committee of Bioresources and Environment during the year. The lists 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 Under the Ganga Action Plan, Research Programme of 48 projects by the 14 Universities and Colleges along the Ganga has been completed. A document covering baseline information on biological and physio-chemical features of the River Ganga and the impact on human activities has been published.

7.7.2 Under the guidance of the GAP Research Committee, 13 Research Projects including literature search have been taken up on the thrust applied areas relevant to Ganga Action Plan. These studies include:

— Water quality monitoring

— determination of heavy metals and pesticides

— EIA studies of GAP schemes on health,

— bio-monitoring of the river, etc.

Besides, projects for rehabilitation of scavenging turtles through captive breeding in the Ganga at Varanasi where 10,000 turtles have been released have also been taken up.

7.7.3 Studies on resource recovery through sewage fed pisciculture, sewage fed forestry etc., continued during the year. Besides, the same on non-point pollution monitoring of pesticides as well as conservation of endangered Gangetic Dolphins and turtles have been initiated. A Fisheries Coordination Committee of the GAP has prepared a Report for the restoration of the fisheries productivity of the Ganga.

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

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. The Council renders assistance to other Universities in improving their courses both at graduate and post-graduate levels. Forest Research Institute, Dehra Dun, research institution under the Council, has been notified as a deemed University by Department of Education.

8.1.1.2 Indian Institute of Forest Management (IIFM), Bhopal

The Indian Institute of Forest Management, Bhopal, was set up in the year, 1982, as an autonomous organisation of the Ministry with the objective of providing training in management and allied subjects to persons from the Indian Forest Service, State Forest Service, Forest Development Corporation and Forest related industries to develop Forestry Management skills.

During the year the Institute organised two one-week courses for IFS officers and conducted management development programmes/seminars on issues related to social forestry, rehabilitation of degraded eco-systems, forestry administration etc.

8.1.1.3 Indian Plywood Industries Research Institute (IPIRI), Bangalore

The Indian Plywood Industries Research Institute, an autonomous organisation of the Ministry, organised 17 short-term courses in the areas of saw-doctoring, saw-milling, plywood manufacturing, maintenance of plywood machines, log grading etc. during the year. Besides, the Institute also conducted a one-week course for IFS Officers on Wood Panel Technology and issued four Technical Information Service Bulletins.

8.1.2 Forestry Training

8.1.2.1 The Indira Gandhi National Forest Academy (IGNFA), Dehradun, continued its primary task of initial in-service training for Indian Forest Service (IFS) Probationers. Forty seven IFS Probationers and 2 Foreign trainees from Bhutan passed out during the year. At present 65 probationers and 2 foreign trainees from Bhutan are undergoing training in the 1990-92 batch alongwith 63 probationers in the 1991-93 batch.

During the year 2 two-week Computer Appreciation courses for IFS Officers and Research Scientists from the FRI, one advanced course in GIS for IFS Officers and one-week Vertical Integration Course for IFS Officers were organised.

8.1.2.2 State Forest Service Colleges

Three State Forest Service Colleges located at Dehradun (U.P.), Burnihat (Assam) and Coimbatore (Tamil Nadu) continued to impart initial 2 year in-service training to the officers of the State Forest Service (SFS). One hundred and thirty seven State Forest Service (SFS) trainees from various States are being trained at these Colleges.

8.1.2.3 Eastern Forest Ranger's College (EFRC), Kurseong

During the year, 93 Ranger Trainees are undergoing a 2-year training course at EFRC, Kurseong.

8.1.2.4 Training under Colombo Plan

Twenty seven IFS Officers, four SFS Officers, fourteen Range Forest Officers and two Scientists have been sponsored for training in the UK and Australia under Colombo Plan during the year.

8.1.2.5 Inservice Training of Forest Officers

The Ministry organised 52 one-week compulsory training/orientation programmes for IFS Officers during the year. About 1200 IFS Officers covering almost 50% of the total cadre strength of IFS, attended the course.

8.2 WILDLIFE EDUCATION AND TRAINING

8.2.1 Wildlife Institute of India, Dehradun organised nine month Post Graduate Diploma and three month certificate courses on Wildlife for protected area managers at the professional and Field Technician level. In addition, 19 Officer Trainees including one from Lao PDR, graduated in the XII Diploma Course, conducted by the Institute while the second batch of M.Sc. Wildlife Course, concluded during the year. Besides, the Institute also organised a Zoo Management Course for Middle Level Managers and Technicians and a Four week course for 16 trainees from Zoos and Wildlife Organisations from different States.

8.2.2 IUCN has recognised WII as a Regional Centre for Wildlife Training, and has provided fellowships for Diploma and Post graduate students.

8.2.3 WII has been conducting short courses for Indian Forest Service Officers in order to provide a basic understanding of wildlife and biodiversity conservation through a well managed network of protected areas supported by appropriately oriented management of forest areas outside. During the year, 27 IFS officers attended the course. As a part of this programme the Institute conducted a short course for 20 IFS officers during the year.

8.2.4 Under INDO-US Project WII conducted a 10 day Training Workshop on Wildlife Interpretation and Conservation Education and one week Field Training Workshop on Chemical Restraint Techniques for Capture of Wild Animals, during the year.

8.3 ENVIRONMENTAL EDUCATION AND AWARENESS

The Ministry accords priority to promote Environmental Education and create Environmental Awareness among various age groups of country's population through diverse activities and mass media campaign.

8.3.1 National Environment Awareness Campaign (NEAC), 1991

8.3.1.1 The Ministry has been organising a National Environment Awareness Campaign (NEAC) since 1986 to create environmental awareness at the national level. As a part of this campaign, 19th November to 18th December of every year is observed as National Environment Month (NEM). During this year also the activities under the NEAC and NEM continued.

Fig 67: Raising of environmental consciousness through Padayatra

8.3.1.2 The major theme for NEAC-1991 was "Peoples' participation in Global Environmental Concerns". The campaign also addressed the whole gamut of environmental issues such as afforestation, eco-regeneration, pollution control, conservation of flora and fauna etc.

More than 550 organisations comprising of NGOs, schools, colleges, universities, research organisations, professional bodies, women and youth organisations, Government Departments etc., from various States and Union Territories have been involved in organising various programmes such as seminars, workshops, training camps, public meetings, rallies, padayatras, jathas, audio-visual/film shows, display of posters, drama, folk dances, street theatres, tree plantation drives, essay/debate/painting competitions for school children and preparation and distribution of environment educational resource material to create environmental consciouness. The Target groups like students/youth, teachers, women, tribals, administrators, professionals, legislators, industrial workers, voluntary workers, armed forces and the general public have been covered under the campaign.

8.3.1.3 Under the campaign, the Centre for Environment Education, Ahmedabad, continued its activities to strengthen the NGO's and the School clusters to ensure consolidation and continuation of the achievements made during the preceeding campaigns. The Southern Region Cell of the Centre also organised trainings and environment related programmes, through electronic media, for the people in the region.

8.3.1.4 The C.P.R. Environmental Education Centre, Madras continued a variety of programmes under the campaign to spread awareness and interest among the public specially among the youth and children on all aspects of Environment and Ecology with the purpose of promoting conservation of nature and natural resources. The Centre also acted as a Regional Resource Agency (RRA) for NEAC, 1991, for the Southern Region.

8.3.1.5 The National Museum of Natural History (NMNH), an associated organisation of the Ministry, conducted a large number of in-house and field activities to promote environmental awareness under the campaign. The programmes include, nature study visits to Wildlife Sanctuaries for teenagers and teachers, film shows on Wildlife and Environment, distribution of environment education resource material etc.

8.3.1.6 During the campaign, Doordarshan telecast fortnightly programmes on Environment and related areas

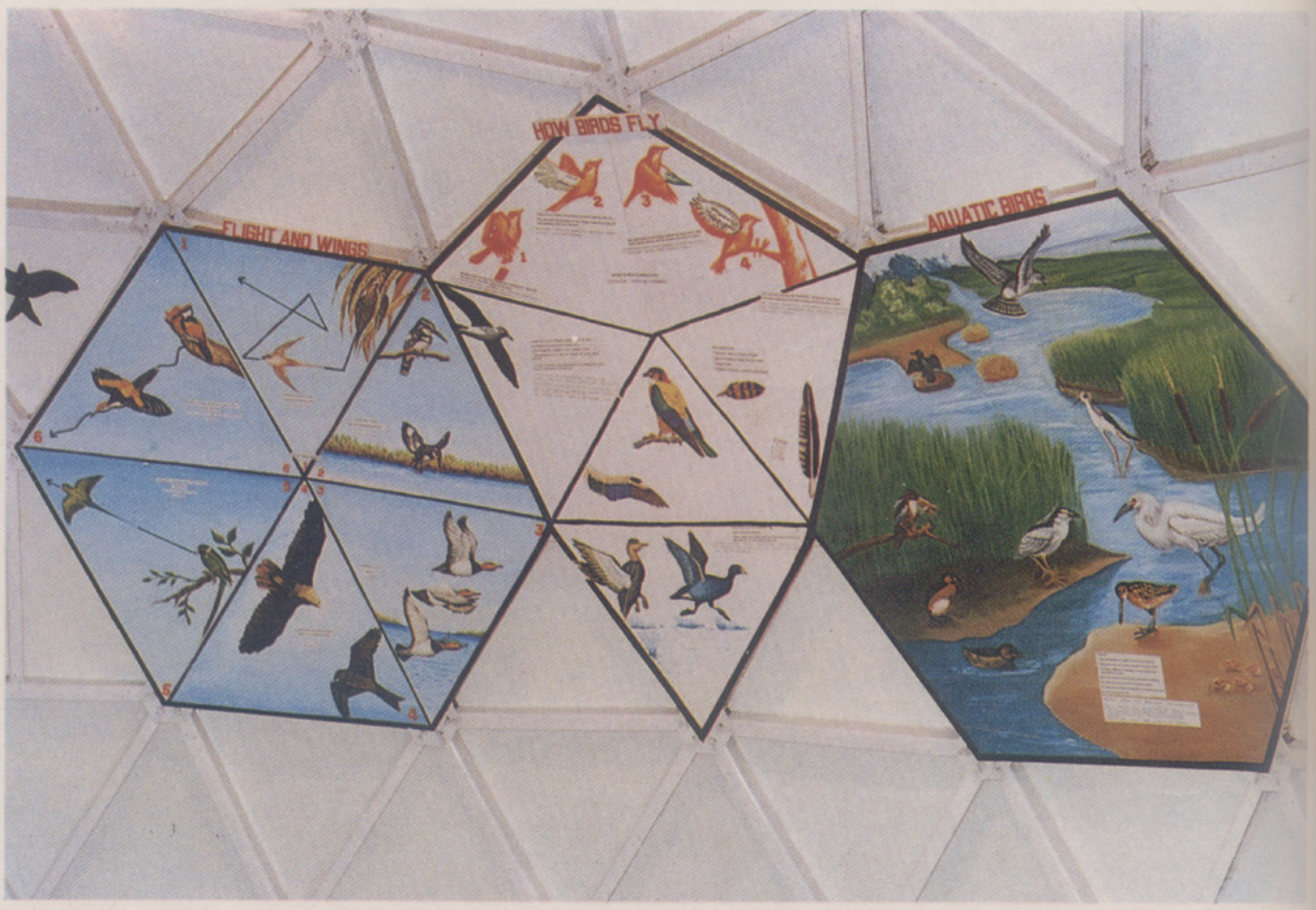


Fig 68: Birds of Madras—an exhibit developed by C.P.R. Environmental Education Centre, Madras

in the National Network and a variety of programmes were broadcast by All India Radio. The Regional Centres of Doordarshan also telecast several programmes in various regional languages during the campaign.

8.3.1.7 During the year the Ministry considered several proposals on non formal education and awareness, setting up of Eco-Clubs in Schools, production of audio-visuals and documentary films, organisation of training programmes, and seminars, symposia, conference etc. and provided financial assistance to several organisations. Various NGO's professional bodies, academic Institutions etc. were also motivated to celebrate the Earth Day, World Environment Day, Wildlife Week etc. to spread the message of Environmental conservation and sustainable development among the people.

Besides a National contest namely "Care for the Environment" through designing of symbols, writing slogans composing songs/poems, printing of posters, scripting films etc has also been launched by the Ministry with the purpose of making environmental conservation to become a people's movement.

8.3.2 Centres of Excellence

The Ministry has set up the following five Centres of Excellence in the areas of Environmental Education, Ecology, Mining and Ornithology & Natural History with a view to strengthening awareness, research and training in priority areas of Environmental Science and Management.

— Centre for Environment Education, Ahmedabad;

— C.P.R. Environmental Education Centre, Madras;

— Ecological Research and Training Centre, Bangalore;

— Centre for Mining Environment, Dhanbad; and

— Salim Ali Centre for Ornithology and Natural History, Bombay.

8.3.2.1 Centre for Environment Education (CEE), Ahmedabad

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

— The eight month training programme in environmental education was completed and one more training programme has been initiated.

— The initial concept to develop an 'eco-mark' for environment friendly products manufactured and marketed in the country has been prepared.

— The Centre has undertaken the development of an interpretation programme at the Sultanpur National Park in Haryana.

— The eco-development programmes of the Centre around the Sanctuaries at Sariska, Ranthombore and Hingolghat, continued.

— Publications on the work done at Kanha National Park, a series of books and monographs on Environment and Development and fortnightly issue of "CEE-NFS" Newsletter have been undertaken.

— Two publications, one on Environment & Development: Traditions,Concerns & Efforts in India, and other on "An overview of India's Approach to Environment and Development", in regard to the forthcoming UN Conference on Environment & Development, are being prepared.

— Hindi version of the UNESCO-UNEP Journal "Connect" entitled "Sampark" has been published and an agreement has been made to publish an Indian edition of "Nature Scope" (USA).

— A project "Towards Locale Specific Environmental Education" under IDRC assistance has been initiated.

— Work on the pending parts of Phase-I in the Indo-US collaborative Children's Environmental Education T.V. project continued.

8.3.2.2 C.P.R. Environmental Education Centre (CPREEC), Madras

The Centre was set up by the Ministry in 1988 with the objective of creating and increasing consciousness and knowledge about the environment and to generate resource material and educational packages on environmental conservation. The Centre continued its activities to spread awareness and interest among the public, including voluntary workers, educators, women, farmers, youth and children on all aspects of environment and ecology with the purpose of promoting conservation of nature and natural resources. Various activities undertaken by the Centre, during the year are as follows:

— Training programmes for NGOs and rural workers, students and teachers from Andhra Pradesh and Tamil Nadu were organised.

— Summer camps, paintings, essay and oratorial competitions on various environmental themes were conducted for children of different age groups.

— Exhibitions on 'Birds and Trees' of Madras were organised.

— Several booklets and pamphlets as resource material were brought out by the Centre for distribution.

— Development of an advanced water testing kit to test 20 parameters within 24 hours has been undertaken by the Centre.

— A survey was carried out by the Centre for detecting the noise level in three major places in Madras city.

— A project on 'Women in Wastelands Development' has been undertaken by the Centre and six selected districts as well as the local NGO groups have been identified to implement the various phases of the project. Two training workshops on 'Communication Techniques on Wastelands Development' and 'Orientation programme for identified NGOs" have been organised by the Centre in this regard.

8.3.2.3 Ecological Research and Training Centre (ERTC), Indian Institute of Science, Bangalore

The Centre was established in 1983 with a mandate to focus on the ecology and environment of Western Ghats. The Centre has implemented 13 major projects on biological diversity, population biology, ecological history of India, little known economic species of Western Ghats, Multipurpose life support species, micro-watershed development, awareness and networking. The Centre continued its activities during the year with special attention to the following research aspects:

— Nursery experiments for propagation of selected trees, shrubs and lianas;

— Vegetational changes in Nilgiris during the period 1943-1985;

— Dynamics of tree population in Mudumalai Sanctuary;

— Distribution of frog species in Western Ghats;

— Sacred groves in the Siddapur Taluka of Uttar Kanada District; and

— Nesting cycles in paper wasp, *Ropalidia marginata.*

8.3.2.4 Centre for Mining Environment, Dhanbad

The Centre was established in 1987 with a view to generate scientific data for sustainable mining in the country.

During the year, the Centre organised two training programmes on Environmental Monitoring and Impact Assessment of Mining areas for middle and senior level inservice professionals and co-sponsored an International Conference on 'Mineral Development and Environment'. The Centre has also introduced a 3-semester M. Tech. Programme in Environmental Sciences and Engineering. Three Doctoral degrees in the area of Mining Environment have been so far awarded under the aegis of the Centre. A number of research projects in the following areas have been undertaken by the Centre:

— Land use management;

— Air quality;

— Haul road dust consolidation;

— Air pollution in fire areas and its effect on health;

— Shelf and economic implications of mining;

— Coke oven effluent treatment; and

— Noise and vibration problems in mining areas.

8.3.2.5 Salim Ali Centre for Ornithology and Natural History (SACON), Bombay

The Ministry has approved the setting up of Salim Ali Centre for Ornithology and Natural History with the following major objectives:

— To develop and conduct research in all aspects of Ornithology and Natural History of other lifeforms;

— To develop and conduct courses in Ornithology and Natural History for students at M.Sc., M. Phil., and Ph.D levels;

— To develop and conduct short-term oriented courses in specialised aspects of Ornithology and Natural History;

— To initiate applied research in the field of Ornithology and Natural History;

— To create a Data Bank on Indian Ornithology and Natural History; and

— To bring out publications on Ornithology and Natural History, based on the studies.

The following six areas have been identified to be covered by SACON:

— Avian Ecology and Economic Ornithology;

Fig 69: Birds roosting on a tree top

— Terrestrial Ecology

— Wetland Ecology;

— Eco-toxicology;

— Conservation Biology and

— Environmental Impact Assessment.

8.3.3 National Museum of Natural History (NMNH)

The National Museum of Natural History, an associated organisation of the Ministry was set up in 1978 to promote environmental education and to create conservation awareness among the public through its exhibit galleries and inhouse as well as outreach educational activities. The Museum has several exhibit galleries dealing with biological diversity, ecology and conservation, a 'Discovery Room' for children, an 'Activity Room' for pre-school children and a 'Bioscience Computer Room' for high school students and conducts a wide variety of educational activities all the year round catering to different target groups for promoting environmental awareness.

A brief report of the activities of the NMNH during the year is as follows:

8.3.3.1 Exhibit galleries

The exhibits on 'Origin of the Earth and Evolution of Life' in the Introductory gallery, 'Food Web' in the Ecology gallery and 'Tropical Forests of the World' in the Conservation gallery were remodelled and updated. A new exhibit 'Landmarks in Biological Studies' was also added in the Cell gallery.

A new interactive software was installed as educational resource of the Bio-science Computer Room and 'Discovery Boxes' were prepared on new topics and added to the Discovery Room. An open air exhibit depicting an elephant group has also been set up.

8.3.3.2 Temporary Exhibitions

The NMNH organised two temporary exhibitions—one on 'Endangered Animals of India' dealing with the habits, habitats and status of India's endangered fauna and the importance of wildlife conservation and the other on 'The Scourge: the state of India's deadly water' dealing with water pollution. Besides a new exhibition, 'You and the Environment' dealing with environmental issues and focussing attention on what an individual can do to promote environmental conservation was also mounted in the Mobile Museum of the NMNH during the year.

8.3.3.3 Educational Activities

Apart from the regular educational activities of the NMNH such as daily film shows and audio-visual presentations, monthly public lectures, school loan service of portable exhibits to enrich class-room teaching of Biology, inhouse orientation and guidance to visiting school groups and teachers, the Museum conducted the following special activities.

— A month long summer programme entitled 'Know Your Environment' for teenagers of age group 14-17 years specially designed to provide a first hand experience of observing and understanding nature and to learn how they can contribute to improve the quality of our environment.

— Month long programmes on Nature Painting and Animal Modelling were also conducted for younger children of age group 8 to 13 years.

— On the occasion of the World Environment Day and the 13th Anniversary of the NMNH on 5th June, 1991 a special exhibition on 'Endangered Animals of India' was inaugurated.

— During the Wildlife Week (October 1-7) the Museum conducted a Nature Painting and Poster contest for children and teenagers, special lectures and film shows on wildlife.

— The World Heritage Week (November 19-26) was observed with a number of special programmes as follows:
  — Environment Quiz Contest;
  — Declamation Contest for teenagers and
  — A teachers orientation workshop for development of environmental education resource material.

— The 25th of November was observed as Conservation Day at the NMNH as part of the Quami Ekta Week. A special

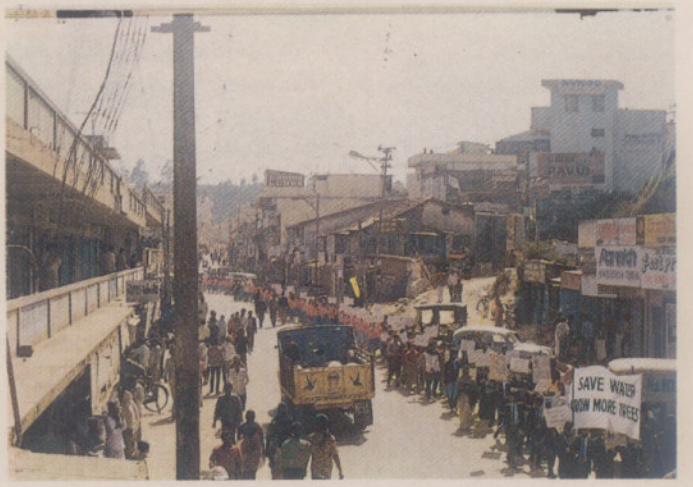


Fig 70: Children participating in Nature Mela at Ooty

Fig 71: Prize winning entries in a painting competition organised at NMNH

declamation contest was organised for school children on 'Conservation for Development'.

— A play entitled 'Pani ki Kahani' was also staged by some staff members of the NMNH on this occasion.

— Under the audio-visual/film extension programme, A.V. presentations and film shows were organised by the Museum on several occasions at the Delhi University, J.N.U., I.I.T., W.W.F. (India), the Chandigarh Museum and Art Gallery, Thapar Corporate Research and Development Centre, Patiala, Kotdwar (Haridwar) and several Army Units in Northern India.

— The Museum conducted a three week internship training in Environmental Education for the B.Sc. (Environmental Science) final year students, providing lectures, discussion sessions and a nature study tour to Melghat Tiger Reserve, Maharashtra.

— Several special programmes for handicapped children were also organised. This included 'Touch, Feel and Learn' programme for visually handicapped children, 'Fun with objects' for mentally retarded children and creative activities such as animal and plant modelling for hearing impaired children.

A set of Braille literature based on the popular publications of the NMNH for promoting environmetal education was also brought out for the benefit of visually handicapped children.

— NMNH organised a special programme for children entitled 'The Dinosaur comes alive' when several groups of children worked around the Allosaurus model at the Museum creating 'Fantastic Animals' with the help of dry tree branches, old newspapers and other scrap material. this provided an unique opportunity of recreation, fun and creativity through which children learnt about recycling of materials and developed interest in animals.

8.3.3.4 Publications

During the year the NMNH brought out environmental

education resource material in the form of workbooks for children and popular literature for the general public and disseminated through its educational programmes.

8.3.3.5 Indo-US Natural History Workshop

The NMNH participated in the IX Indo-US Natural History Workshop on "Processes of Exhibit and Programme under Indo-US Subcommission on Education and Culture. The Report of the Workshop has been finalised and published.

8.3.3.6 Regional Museum of Natural History, Mysore

Construction of the building for the first regional Museum of the NMNH at Mysore in the state of Karnataka was completed during the year and various exhibit galleries dealing with Natural History, Flora, Fauna and Ecosystems of South India, Ecology, Conservation and Man and the Environment are being housed in the building. The regional Museum also conducted a large number of educational activities for school children during the year.

8.4 FELLOWSHIPS AND AWARDS

8.4.1 Indira Gandhi Paryavaran Puraskar (IGPP)

The Ministry has decided that from 1991 Indira Gandhi Paryavaran Puraskar, instituted in 1987, would be awarded both to an individual as well as to an organisation for their significant contribution in the field of environment. Each award carries a cash component of Rupees one lakh and a silver trophy and a citation.

During the year, the following awardees have been selected.

— Samaj Parivartana Samudaya, Dharwad (1989).

— Shri Sant Kumar Bishnoi, Abohar (1990).

— Dasholi Gram Swarajya Mandal, Chamoli (1991).

— Shri S.P. Godrej, Bombay (1991).

8.4.2 Indira Priyadarshini Vrikshamitra Awards (IPVM)

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

Every year 10 awards are given in the following five categories:

— Individuals;

— Educational Institutions;

— Panchayats;

— Voluntary Agencies; and

Fig 72: Awareness raising through cultural activities

— Government Agencies.

Each award carries a medallion, citation and a Cash Component of Rs. 50,000/-.

During the year the following Awardees for 1990 under different categories have been selected.

— Sh. Vinayak Patil, Nasik, Maharashtra

— Sh. O.P. Aggarwal, Sarguja, Maharashtra

— Sh. A.K. Upadhyay, Jaisalmer, Rajasthan

— Janashiksha Eevam Vikas Sansthan, Dungarpur, Rajasthan

— Ubeshwar Vikas Mandal, Udaipur, Rajashan.

— Gram Vikas Mandal, Pingot, Bharuch, Gujarat.

— Rakhyawal Primary Farm—Forestry Cooperative Society Limited, Udaipur, Rajasthan.

— Shivagiri Shree Narayana Senior Secondary School, Srinivasapuram, Varkala, Kerala.

— Thirumala Tirupati Devasthanam, Tirupati, Andhra Pradesh.

— Social Forestry Projects Division, Sambalpur, Orissa.

8.4.3 National Awards for Prevention and Control of Pollution

National awards have been instituted from 1991 by the Ministry to recognize the achievements of Industries for their significant contributions in the prevention and control of environmental pollution and would be presented every year to the eligible industries.

During the year, the following industries have been selected for these awards:

— M/s Gujarat Ambuja Cements, Amreli;

— M/s Sree Rayalseema Alkalies & Allied Chemicals Ltd. Kurnool;

— M/s Shriram Fertilizers & Chemicals, Kota and

— M/s Bhopal Pesticides Pvt. Ltd., Bhopal.

8.4.4 The IGPP Awards for the year 1989, 1990 & 1991, IPVM Awards for the year 1990 & National Awards for Prevention & Control of Pollution for the year 1991 were given away by the Prime Minister on 18.2.1992 in a special function organised by the Ministry.

8.4.5 Pitambar Pant National Environment Fellowship

This annual Fellowship was instituted by the Ministry in 1978 to ecourage and recognize excellence in any branch of research related to environmental sciences. The amount of fellowship has been revised and nominations for the years 1990 and 1991 are being invited.

8.4.6 Desert Ecology Fellowship

The Ministry, since, 1991, has instituted the Desert Ecology Fellowship at the University of Jodhpur to study the Desert Ecology and as a tribute to the Bishnoi Community in nature conservation. The terms and conditions of the fellowship are being finalised with the University

8.5 ENVIRONMENTAL INFORMATION

8.5.1 Environmental Information System (ENVIS)

ENVIS, set up by the Ministry in Dec. 1982 as a decentralised information system network continued its activities in collection, collation, storage, retrieval and dissemination of environmental information to decision makers, policy planners, scientists, engineers, environmentalists, research workers and the general public all over the country. The ENVIS Network besides the Focal Point in the Ministry presently consists of 13 subject oriented centres, known as ENVIS Centres, set up in the various institutions/organisations of the country in the priority areas of environment like pollution control, toxic chemicals, energy and environment, Eastern Ghats, environmentally sound and appropriate technology, bio-degradation of wastes, desertification, estuary, mangroves, corals and lagoons, media and environment etc. A list of the existing ENVIS Centres alongwith the corresponding subject area is given at Annexure IV

The activities of 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 ENVIS Focal Point strengthened its potential information base in the form of publications, reports, bibliographies, abstracts, databases etc., as well as numerical data i.e. statistics relating to environment. The information base was also enriched by the publications and data provided by all ENVIS Centres.

The Focal Point also looked after the various activities of the scientific library in the Ministry and strengthened it as a document repository of the ENVIS Network. During the year, the library enhanced its collection of books, national/international scientific periodicals, journals, conference proceedings etc., in environment and related areas. The library, at present has a collection of over 17,000 books, scientific and technical reports for providing a back-up support to ENVIS in disseminating substantive information to the user community. Besides, over 150 National/international journals in the scientific and environmental fields are also subscribed by the library. In addition, the library also provides the reprographic facilities as and when required in disseminating information by ENVIS to the user groups. Apart from technical books and journals, a wide range of general books, magazines, newspapers etc., both in English and Hindi have also been procured by the Library for use of the officials of the Ministry.

8.5.2.2 Query-Answer Service

The ENVIS Network responded to various requests for information on environment and related fields to different user groups. Besides, ENVIS as National Focal Point (NFP) and Regional Service Centre (RSC) of INFOTERRA/UNEP also responded to several queries from INFOTERRA users from several countries including South Asia sub-region by providing substantive information as far as possible in the form of bibliographies, re-prints/reports, documents etc.

During the year, the ENVIS Focal Point alone responded 1554 queries out of which 1493 were national and 61 international. The ENVIS Centres separately responded 2597 queries out of which 2247 were national queries and 350 were of international nature. A detailed break-up of the number of queries processed by ENVIS Network during the last four years is given in fig. 73. 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 Abstracting Journal "Paryavaran Abstracts" containing information about the environmental research in the Indian context in the area of environment and related fields. About 600 environmental related journals are referred to in the compilation of the various abstracts for inclusion in the publication and these abstracts are arranged under 12 major categories like Air pollution, Water Pollution, Noise Pollution, Ecology, Environmental Management, Nature and

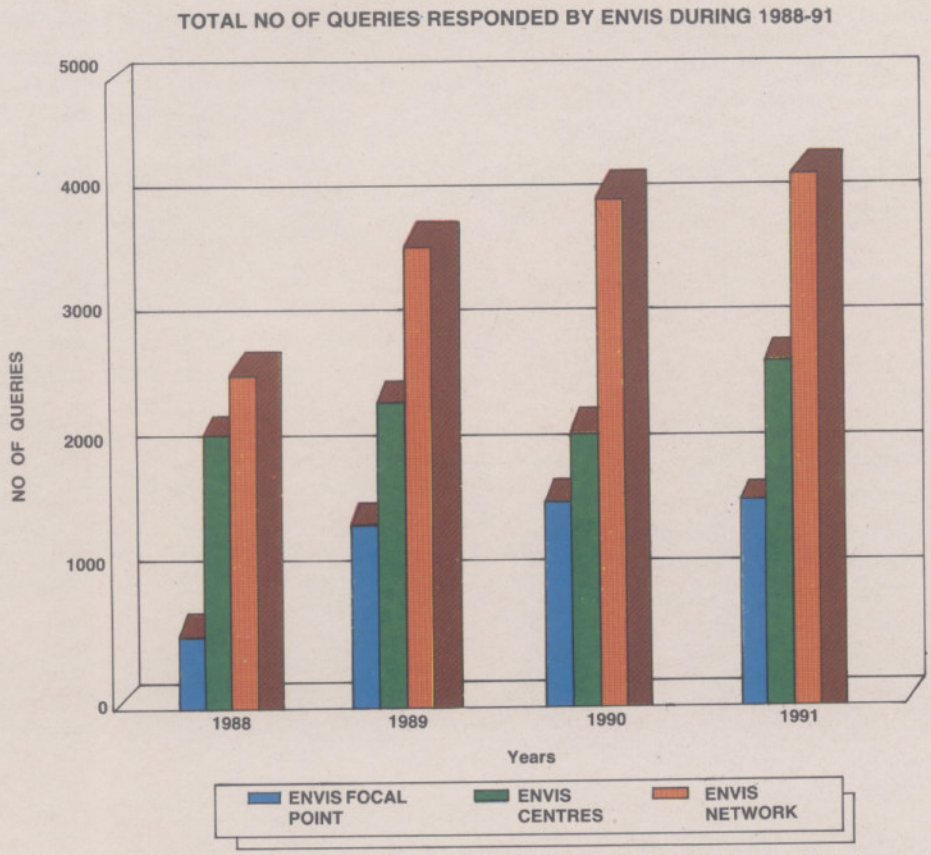


Fig 73: Total number of queries responded by ENVIS during 1988-91

Natural Resources Conservation, Health and Toxicology, Wastes, Forestry, Wildlife, Energy etc. A subject and keyword index has also been appended to the journal for precise retrieval of information. During the year, 4 issues of the journal containing about 1000 abstracts were published.

8.5.2.4 Networking of the ENVIS Centres

Steps are being initiated for networking the ENVIS Centres with the Focal Point for smooth and continuous to and fro information flow from the ENVIS Centres & the Focal Point. Various possibilities are being explored for establishing these linkages of the Centres.

8.5.2.5 Establishmenht of new ENVIS Centres

During the year, three new ENVIS Centres in the area of "desertification; estuary, mangroves, corals and lagoons; and environmental education" have been set up in Central Arid Zone Research Institute, Jodhpur; Annamalai University, Tamil Nadu; and Centre for Environment Education, Ahmedabad, respectively. Several new areas are being explored to set up more ENVIS Centres in phases to make ENVIS Network comprehensive.

8.5.2.6 Meeting of the Scientific Advisory Committee

In order to review the functioning of the ENVIS Network as well as to augment the existing network structure, the focal point arranged the meeting of the Scientific Advisory Committee of ENVIS during the year.

The Committee reviewed the activities of the Focal Point as well as other ENVIS Centres and suggested various changes to make the network more rational and effective. New priority areas for setting up the ENVIS Centres were also identified by the Committee.

8.5.2.7 Liaison with other Information Systems

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

8.5.2.8 Publications

— During the year ENVIS Focal Point compiled and

published the Annual Report (1990-91) of the Ministry.

— A booklet entitled "Environment—The Indian Perspective" was also prepared and published by ENVIS.

8.5.2.9 INFOTERRA/RSC Activities

ENVIS Focal Point continued its activities as a National Focal Point (NFP) of INFOTERRA Network (an International Information System of the United Nations Environment Programme). As NFP/INFOTERRA, ENVIS is the coordinating centre for INFOTERRA activities within India.

More than 500 Indian sources engaged in the environmental related activities were registered by ENVIS as NFP for inclusion in the international INFOTERRA Directory of environmental sources published by UNEP. During the year, these sources were updated by the ENVIS Focal Point. ENVIS also continued to function as the Regional Service Centre (RSC) of INFOTERRA to cater to the environmental information needs of the South Asia Sub-region countries.

During the year, ENVIS both as NFP and RSC, responded to more than 4100 national and international queries and provided substantive information as far as possible to the users.

8.5.2.10 RENRIC Activities

ENVIS also continued to provide information feed back to Regional Environmental and Natural Resources Information Centre (RENRIC) Programme of SACEP in order to augment and improve its collection of environmental information. During the year, ENVIS responded to various queries on environment and related areas from RENRIC partner countries and provided substantive information to its users.

8.5.2.11 Activities of the ENVIS Centres

During the year, all the ENVIS Centres continued their activities in information collection, collation, retrieval, storage and dissemination in their respective subject areas. Some of the major activities of the existing ENVIS Centres are as follows:

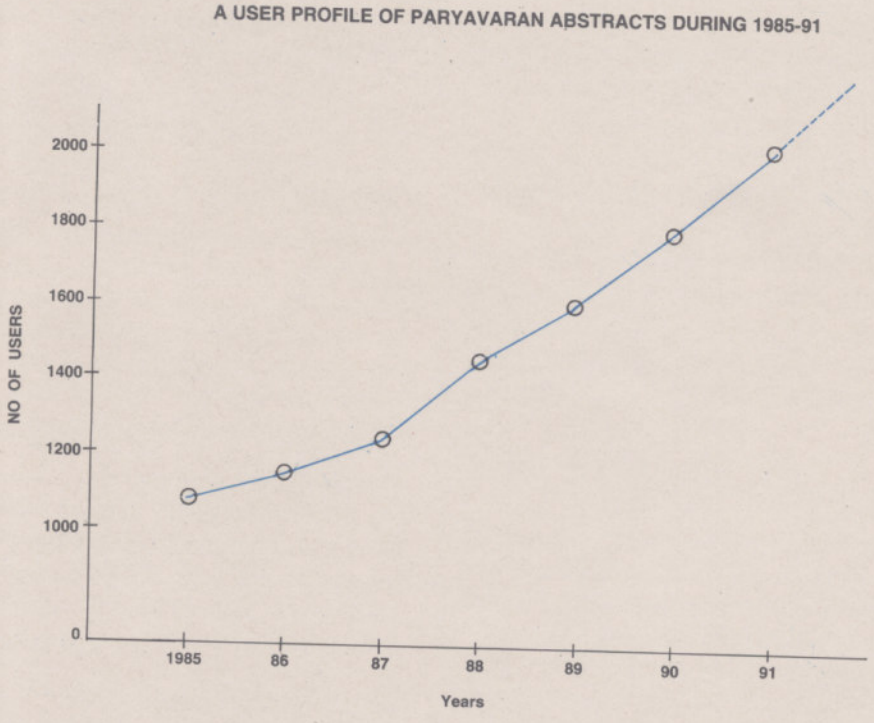


Fig. 74: User Profile of Paryavaran Abstracts during 1985-91

— A data base using CDS/ISIS software was developed by the Centre at the Central Pollution Control Board, New Delhi, to bring out a directory of 'who's who' in Pollution Control' and to update the selected bibliography on environmental impact assessment.

— ENVIS Centre at Industrial Toxicology Research Centre at Lucknow conducted specific reviews on important toxic chemicals like Arsenic, Aflatoxin and Endosulfan and compiled specific bibliographies on environmental health toxicology sources, heavy metal toxicity etc.

— Safety cards on pesticides and other toxic chemicals hazardous to industrial workers as well as its preventive measures have been prepared by the ENVIS Centre at the National Institute of Occupational Health, Ahmedabad.

— A documentary base in the subjects of ecology, biological diversity, eco-development, conservation of natural resources has been built up by the ENVIS Centre at the Centre for Ecological Sciences, Indian Institute of Science, Bangalore.

— A 'state of art report' on the utilisation of fly-ash has been compiled by the ENVIS Centre at Environmental Planning and Coordination Organisation, Bhopal.

— A revised edition of the Directory of Environmental NGOs in the country is being published by the ENVIS Centre at World Wide Fund for Nature WWF-India, New Delhi.

— ENVIS Centre at Tata Energy Research Institute, New Delhi continued the publication of its bi-annual journal namely 'Energy Environment Monitor'.

— A news letter covering various aspects of appropriate technology for social change, environmental awareness, etc. in Indian and global context has been published by the ENVIS Centre at Development Alternatives, New Delhi.

— A data base on the books, reports, monographs, etc. in the field of bio-degradation of wastes and environmental impact assessment has been developed by the ENVIS Centre at Anna University, Madras.

— A new approach paper on strategies and plans for tribal welfare based on specific data from Eastern Ghats has been prepared by the ENVIS Centre at Deptt. of Geo-Engineering & Resource Development Technology, Andhra University, Visakhapatnam.

9 LEGISLATION AND INSTITUTIONAL SUPPORT

9.1 LEGISLATION

9.1.1 Consequent upon the implementation of Environment (Protecton) Act, 1986, the Ministry of Environment and Forests has taken several steps to provide legal and institutional basis. These include framing of rules, notification of standards, notification of environmental laboratories, delegation of powers, identification of agencies for hazardous chemicals management and setting up of Environmental Protection Councils in the States. Additional responsibilities have been placed on the Central and State Pollution Control Boards under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. Legal actions under these two acts are taken by the respective State Pollution Control Boards.

9.1.2 The activities during the year are as follows:

9.1.2.1 In order to provide immediate relief to the victims of the accidents arising due to handling of hazardous substances, the Public Liability Insurance (PLI) Act has come into force with effect from 1st April, 1991. The main Rules under the Act were notified on 1st May, 1991. Notifications under various provisions of the Act have been issued. Besides, an ordinance restricting the liability of the insurer has also been issued on 31st January, 1992.

9.1.2.2 A set of rules on the transportation of hazardous chemicals by road has been notified by Ministry of Transport under Motor Vehicles Rules, 1989. A few amendments indicating the responsibilities of the occupier/transporter/ driver etc., have been drafted for inclusion in the proposed amendments to the Motor Vehicles Rules, 1989.

9.1.2.3 A notification restricting the use of Benzidine and Benzidine based dyes in the country has been issued, suggesting a three year time span for phasing out these dyes.

9.1.2.4 The Department of Agriculture, on initiation of the Ministry, has issued a notification banning use of PCP (Penta Chlorophenol) which has adverse environmental effects. Efforts were also made to restrict the use of harmful pesticides in consultation with the concerned Departments.

9.1.2.5 In order to protect and conserve environment of Aravallies, a Notification inviting objections has been issued regulating the development in the area.

9.1.2.6 A Notification regulating development in the Dahanu Taluk of Thane District, Maharashtra has been issued.

9.1.2.7 The Ministry has also issued a Notification under EPA, 1986 declaring the Coastal stretches as Coastal Regulation Zone (CRZ) and imposing graded restrictions on industrial operations and processes in these zones.

9.1.2.8 A legislation for setting up a National Environmental Tribunal and codification of strict liability for damages arising out of any accident or incident involving hazardous substances has been prepared and is under finalisation.

9.1.2.9 Amendments to existing Acts:

— The Water (Prevention and Control of Pollution) Cess (Amendment) Bill, 1991 has been passed by both the Houses of Parliament and received President's assent on 16th December, 1991. The Rules under the amended Act are being framed for implementation.

— A proposal to amend the Environment (Protection) Act, 1986 to make it more comprehensive and effective is under consideration.

— Wildlife (Protection) Amendment Bill, 1991 was passed by the Parliament and promulgated as Act No. 44 of 1991 after receiving the assent of the President of India.

9.1.2.10 Legal Action against Polluting Industries

— 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 State-wise information regarding the number of cases filed by the Central and State Pollution Control Boards is compiled and analysed on a quarterly basis.

— As on 31.12.1991, 5242 cases have been filed by the State Pollution Control Boards under the Water Act and Air Act. Out of these, 1696 cases have been decided, 3350 are pending in various courts and 196 were dismissed. In 351 cases convictions were obtained and in 238 cases, court passed restraint orders.

9.2 INSTITUTIONAL SUPPORT

9.2.1 Assistance to State Pollution Control Boards

The State Pollution Control Boards and setting up of Mobile Laboratories continued to be supported for strengthening their activities. An amount of Rs. 30.93 lakhs was released to various State Pollution Control Boards during the year to carry out their programmes.

9.2.2 Assistance to State/UT Deptt. of Environment

The scheme of providing assistance to the State/UT's Department of Environment for setting up of Technical Cells with technical/non-technical staff to deal with the environmental problems as well as to function as a co-

ordinating agency in the concerned State/UT was continued. During the year, financial assistance of Rs. 20.03 lakhs was provided to various State/UT's Departments for strengthening their technical set up.

9.2.3 Environmental Laboratories

The work of recognitionof environmental laboratories and analysts under Environment (Protection) Act, 1986 has been transferred to the Central Pollution Control Board. However, the Ministry would be considering the cases of private laboratories.

10 INTERNATIONAL COOPERATION

10.1 INTRODUCTION

10.1.1 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), International Centre for Integrated Mountain Development (ICIMOD) and the International Union for Conservation of Nature and Natural Resources (IUCN). The Annual financial contributions are made to the above organisations and efforts are made through active participation to obtain adequate benefits from the above organisations. The Ministry also functions as the nodal agency for participation in international agreements such as the convention on International Trade in Endangered species, the Conventional of Migratory species, Ramsar Convention on Wetlands and the Basel Convention on Transboundary Movement of Hazardous substances. These International Conventions/Agreements are being looked after by respective Divisions. In addition, the Ministry is also dealing with Vienna Convention, the Montreal Protocol on the Substances that deplete the Ozone Layer and are participating in the Inter Governmental Negotiating Committees for Convention on Climate Change and Bio-diveristy.

10.1.2 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 Co-operation (SAARC), United Nations Environment Programme (UNEP), Canada, USA, Sweden, Norway, Denmark, U.K. Netherlands and Germany etc. All bilateral and multilateral agreements of cooperation and liasion with the donor agencies for securing information on areas of donor's interest and presenting project ideas for consideration by the donors are dealt with by the International Cooperation Division of the Ministry.

10.2 The details of various cooperation programmes are as follows:

10.2.1 Indo-Australia

During the Annual Consultations with the Australian Mission, it was agreed that a project on cleaning of Hussain Sagar Lake in Hyderabad would be supported.

10.2.2 Indo-ADB

Asian Development Bank (ADB) provided assistance for a project on 'Review of Environmental Laws' in India. An agreement has been signed with the ADB for developing Environmentally Sound Coal Technology.

10.2.3 Indo-Canada

CIDA has agreed in principle to support the "Eco-development of Chilka Lake" project in Orissa. The detailed project is being formulated. In addition, discussions have been held for securing cooperation with Canada in the areas of forestry, wildlife and conservation.

10.2.4 Indo-DANIDA

A Project proposal for Environmental Master Plan Study of South Kanara District of Karnataka has been prepared for DANIDA assistance which is being processed for necessary clearances. DANIDA has also agreed to support a project on Environmentally Sound Development of three lake areas in Tamil Nadu.

The Denmark Government has also been approached to strenghten the Tamil Nadu Pollution Control Board and take up the study of pollution in the Ooty Lake. The agreement on this with the Danish Government is under finalisation.

10.2.5 Indo-EEC

EEC and India have collaborated primarily in the area of pollution control. One Ambient Air Quality Monitoring Station in Delhi has been installed under EEC Co-operation. Efforts are now being made to seek cooperation with EEC in the areas of clean technology, waste minimisation and industrial pollution control with special reference to dye and chemical industries. The new proposals are being considered under the Indo-EEC Working Group on Trade and Commerce. Depending on the progress in identifying and pursuing new areas of cooperation, a separate agreement between India and EEC is being contemplated.

10.2.6 Indo-France

India and France signed an agreement to initiate cooperation in the environment sector in the year 1982. Clean technologies, technology transfer in sustainable development, waste-minimisation and environmental audit and water quality monitoring have been indicated as possible areas for cooperation. A formal proposal is being worked out for soliciting French Cooperation in these areas.

10.2.7 Indo-FRG

FRG have agreed to provide assistance for strengthening of laboratories of Central and State Pollution Control Boards (Phase II). Major Components of this project are as follows:

— Strengthening of the nine laboratories in the States of Assam (Guwahati) West Bengal (Calcutta), Delhi (CPCB), Gujarat (Baroda and Gandhinagar), Karnataka (Bangalore), Madhya Pradesh (Bhopal), Punjab (Patiala) and Rajasthan (Jaipur).

— Operation of automatic ambient air quality monitoring station and mobile units and stack monitoring in Delhi.

— Provision of advisory services and organisation of activities in the field of environmental planning.

10.2.8 ICIMOD

India participated in the Governing Body of the ICIMOD held during the year and sucessfully underlined the regional chadracteristics of ICIMOD in the matter of mountain development. It was also decided that India will play an active role in guiding the programmes and policies of ICIMOD taking into account the priority research areas for the Hindukush Region.

10.2.9 Indo-Japan

During the Annual Consultations, the Japan Government agreed to consider supportng establishment of a National Environmental Management and Training Centre in India. Further progress was made in respect of Japanese loan assistance for Yamuna Action Plan and Greening of Aravalli Hills.

10.2.10 Indo-Dutch

During the Indo-Dutch Joint Working Committee, held in October, 1991, it was decided to pursue all the on-going projects vigorously besides expediting the pipeline projects in the areas of pollution control, Ganga Action Plan for execution of schemes in Kanpur and Mirzapur, Conservation, Industrial Councelling and Institutional strengthening. The Dutch side also agreed to consider a number of new project ideas notably in the areas of Global Environmental Problems and Conservation, under their Spearhead Programme.

Under Indo-Dutch bilateral cooperation programme basic training on sampling and analysis was provided under the project "Monitoring of river Yamuna". The following projects have also been agreed to.

— Strengthening of the Kerala Pollution Control Board;

— Control of Pollution in small scale textile industry; and

— Pollution Control in Gujarat State Fertilizer Company

10.2.11 Indo-Norway

Projects under Norwegian assistance in Orissa have been identified and are being formulated. The proposal for NORAD assistance to Disaster Management Institute in Bhopal is under active consideration. NORAD has also agreed to support the strengthening of G.B. Pant Himalayan Institute plans to takeup environmental projects in Karnataka, Rajasthan and Himachal Pradesh in addition to Orissa.

Besides, projects on pollution monitoring from aluminium industry and dispersion modelling of air pollutants in five places viz. Delhi, Dhanbad, Chembur, Visakhapatnam and Talcher have been agreed under cooperation programme.

10.2.12 Indo-Sweden

SIDA agreed to support seven Seminars on Administrative Development in forestry sector. Two of these seminars have been held so far. SIDA has also approved the proposal for setting up an environmental Centre in Hyderabad. Another project on assistance to paper and pulp mills is under active consideration of the Swedish side.

10.2.13 SACEP

An inter-ministerial meeting was held to review the activities of SACEP in India. Proposal to nominate the Director of SACEP has been finalised and the Govt. of India nominee has taken charge of the post on 18.2.92.

10.2.14 SAARC

The Regional study of natural disasters and protection and preservation of environment was finalised in the SAARC Meeting of the Coordinators during the year. It was also decided to set up a committee on environment and examine the recommendations of the regional study and purpose specific measures for the implementation of recommendations. The first Meeting of the Committee was held during February, 1992 in which it was decided to take a common stand by the SAARC Countries in UNCED conference, 1992. A Meeting of the SAARC Ministers of Environment is being held shortly for finalising a joint communique for the UNCED conference.

10.2.15 Indo-UK

The British Government has offered a grant of £ 40 million out of which a project on Environmental Forestry in Western Ghats (Karnataka) has been prepared. The ODA has also agreed to support environmental forestry projects in Himachal Pradesh and Uttar Pradesh as well as technical assistance in selected areas under Ganga Action Plan. The proposals for strengthening of ICFRE are being pursued for early approval and implementation from ODA based on their Mission Reports.

10.2.16 Indo-US

A meeting of the Working Group on Environment and Ecology under the Indo-US Joint Commission was held in the month of October, 1991, in New Delhi. As per the recommendations of the Working Group, the two sides agreed to collaborate projects in the areas of Biodiversity Conservation, Conservation of Wetlands, Mangroves, other Endangered Systems, Clean Technologies, Forestry Research and Education. Further collaborations between the USEPA and the CPCB were also envisaged.

A project related to public awareness in critically polluted

areas was also agreed for funding and for which Dhanbad in Bihar has been selected as a study area.

10.2.17 UNDP/FAO

Four projects with an estimated outlay of $7.5 million have been submitted to the UNDP for their assistance.

10.2.18. World Bank

10.2.18.1 An agreement was signed with the World Bank for a major project on Industrial Pollution Control under which credit of about US $ 155 million would be available over the course of next five yeras. The project which also involves funding from Government of India, State Governments, Development Finance Institutions (DFIs) and Individual Units consists of Institutional Development, Investment and Tecnical Assistance Components. Under the Institutional Development Component, the Pollution Control Boards of the four most heavily industrialised States i.e. Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh are to be assisted through strengthening of monitoring and laboratory facilities. Under the Investment Component, loans are to be made available to units in the small scale sectors for Common Effluent Treatment Plants (CETPs) and for units in the medium and large scale sectors for the installation of waste minimisation and pollution control equipment. Under the Technical Assistance Component, training, preparation of pilot plant studies, hand books, manuals, etc., will be undertaken. Funds will also be available for the establishment of demonstration projects.

10.2.18.2 Under Ganga Action Plan, three sewage treatment plants in U.P. and 12 Pumping Stations Schemes in West Bengal are being executed with World Bank Assistance.

10.2.18.3 During the year, Forestry sector projects for Andhra Pradesh, Maharashtra, Madhya Pradesh and West Bengal have been proposed for World Bank Assistance.

10.2.19 Multilateral Co-operation Programmes

During the year, externaly aided afforestation and Wastelands Development Projects were implemented in 11 States with assistance from donor Agencies like World Bank, SIDA, EEC, and OECF, (Japan) Japan etc. Similarly two Tree Growers' Co-operative projects have been proposed for assistance by SIDA and CIDA.

10.3 GLOBAL ENVIRONMENTAL ISSUES

10.3.1 U.N. Conference on Environment & Development (UNCED)

In connection with the UN Conference on Environment and Development to be held in Brazil in June, 1992, the United Nations General Assembly has established an Inter-Governmental Proparatory Committee in which India is playing an important role among the developing countries in putting forth their views and concerns in the preparatory process. The Ministry has established an Inter-Ministerial Group (IMG) to consider various issues related to UNCED. The IMG held a number of meetings during the year and held consultations with selected NGOs and experts to coordinate the preparations for the UNCED.

Two publications for the UNCED Conference, one on "Environment & Development: Tradition, Concerns and Efforts in India" and the other on 'An overview of India's approach to environment and development' are being prepared by the Centre for Environment Education, Ahmedabad a grants-in-aid institution of the Ministry. India also participated in the Ministerial Conference of selected developing countries on Environment and Development, organised by China at Beijing in June, 1991.

10.3.2 Climate Change

The Ministry is the nodal agency for the Inter-Governmental Panel on Climate Change (IPCC), jointly established by UNEP & WHO to study the causes and impacts of climate change and response strategies required to deal with these problems. Inter-Governmental negotiations on a Global Convention of Climate Change under the aegis of the UN General Assembly were held during the year in which India actively participated in the negotiations.

10.3.3 Bio-diversity Convention

As Nodal Agency for a Global Convention on the Conservation of Bio-diversity, India held wide scale consultations with Government agencies and experts to formulate Government's views on various aspects of the Convention and also participated actively in the on-going negotiations, under the aegis of UNEP.

10.3.4 Protection of the Ozone Layer

India participated actively in the 2nd Meeting of the parties to the Vienna Convention, the 3rd Meeting of the parties to the Montreal Protocol held in June 1991 and in other meetings related to various aspects of the Montreal Protocol. The necessary approval of the concerned authorities was also obtained by the Ministry to accede to the Vienna Convention on the protection of the Ozone layer. This convention has come into force June, 1990. During the year, an exercise to draft a strategy for a reduction and eventual phase-out of Ozone depleting substances has been initiated.

10.3.5 Global Environment Facility

A Global Environment Facility (GEF) has been jointly established by the World Bank, UNDP and UNEP. The Ministry on behalf of the Govt. of India has been playing a co-ordinating role with regard to the same.

10.3.6 International Conventions

The Ministry continued to be actively involved with important International Conventions like the Convention on International Trade in Endangeed Species of Wild Flora and Fauna (CITES), the International Whaling Convention and the Convention on Conservation of Migratory Species.

10.3.7 Environment Action Programme (EAP)

With a view to channelising external assistance in the sectors of Environment, Forest and Development, it has been decided to formulate an EAP for India which would inter-alia highlight the thrust areas and also a shelf of bankable projects. The modalities of drawing up the EAP are under consideration.

11 ADMINISTRATION, PLAN CO-ORDINATION AND BUDGET

11.1 ADMINISTRATION

11.1.1 The strength of the Ministry including National Wastelands Development Board and Ganga Project Directorate at the Headquarters is 1168 (Group 'A' 231: 'B': 339: 'C':360 and Group 'D': 238).

11.1.2 Personnel Policies

11.1.2.1 In accordance with the revised recruitment rules for Group 'A' Scientific posts direct recruitment to 13 Group 'A' Scientific posts in the Ministry and its subordinate offices was made. Under the flexible complementing scheme, 16 Group 'A' Scientific Officers were reviewed and 10 were promoted to the next higher grade with effect from 1.7.1991 and 1.1.1992.

11.1.2.2 In accordance with the Government guidelines, representatives of Minorities/Scheduled Caste/ Scheduled Tribes are represented on the Departmental Recruitment/ Review Committee 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 subordinate offices are under review.

11.1.2.4 The Ministry is the cadre controlling authority for the Indian Forest Service (IFS). During the year, 74 appointments by direct recruitment were made on the recommendations of the Union Public Service Commission, as the results of the IFS Examination conducted by them. Moreover, 50 officers from the State Forest Services were also promoted to the Indian Forest Service during the year. The strength and composition of 5 cadres participating inthe Indian Forest Service were revised and this revision has resulted an upward increase in the strength of these cadres.

11.1.3 Reservation in Service

11.1.3.1 A statement showing the reservation of Scheduled Castes/Scheduled Tribes in the Department as on 31.12.1991 is given in the Table 9.

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 66 vacancies have been identified for the drive and the necessary action initiated to fill up the same. The entire selection process is likely to be completed by the 31st March, 1992.

11.1.4 Grievances Cell

11.1.4.1 Keeping in view the enhanced awareness about the environmental issues among the public, the Ministry has set up a Central Grievances Cell, on 26th September, 1991, under the direct charge of Joint Secretary (Administration), to receive various complaints on the following:

— Environmental degradation;

— Pollution;

— Cruelty to animals; and

— Release of grants to various Organisations.

During the year, the Cell has received 100 such grievances and have taken action for speedy redressal.

11.1.5 Joint Consultative Machinery

The Departmental Council of the Ministry set up under the Joint Consultative Machinery and Compulsory Arbitration for 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 continued to function regularly. The Office Council of the Ministry held four meetings during the year. The Regional Councils set up in Botanical Survey of India and Zoological Survey of India continued to function regularly.

11.1.6 CGO Complex Coordination Committee

The Ministry took an active interest in improving the environment in and around the CGO Complex and to provide general facilities to a number of Central Government Offices, located in the Complex. The measures taken include construction of fence all around the complex to stop entry of unauthorised persons, improvement of lawns, regulationof traffic within the complex and earmarking of parking areas etc. Some of the measures proposed for future include construction of a DTC Terminal, construction of Kiosks for the vendors and setting up of a Centralised Canteen facility.

11.1.7 Use of Hindi

11.1.7.1 Hindi as Official language is being progressively used in the Ministry and its attached and subordinate offices. The Official Language Implementation Committee of the Ministry met regularly during the year.

11.1.7.2 Inspection of Offices: In order to ensure effective implementation of the Annual Programme and instructions on use of Hindi, 12 offices under the Ministry of Envirovment and Forests were inspected during the year.

11.1.7.3 Training in Hindi: During the year, 15 employees were nominated for Hindi training, 12 for Hindi typing, and 6 for Hindi stenography training.

11.1.7.4 Hindi Week: Hindi week was organised from 9-13th September, 1991 during which various competitions

Table 9

Statement showing the total Number of Government Servants and the Number of Scheduled Castes and Scheduled Tribes amongst them in the Ministry of Environment and Forests as on 31.12.1991

Group	Sanctioned strength	Number position	Scheduled Castes	Percentage to total number of employees	Scheduled Tribes	Percentage to total Number of employees
1	2	3	4	5	6	7
Group 'A'	231	211	14	6.76%	8	3.86%
Group 'B'	339	270	26	8.69%	4	1.33%
Group 'C'	360	315	29	9.06%	9	2.81%
Group 'D' (excluding Safaiwala)	210	199	67	33.66%	19	9.54%
Group 'D'	28	28	28	100%	—	—
Total	1168	1023	164	16.03%	40	3.92%

in proficiency and use of Hindi were held and prizes distributed to the winners.

11.1.7.5 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, continued during the year. Out of 10 entries received under this scheme, the following were awarded prizes:

Jansankhya Vishphot Aur Paryavaran by	
Shri Harish Chandra Vyas and Shri Kailash Chandra Vyas	Rs. 10,000/- (First)
Jeevon Ka Sansar Anokha by Shri Shakti Kumar Trivedi	Rs. 7,000/- (Second)
Aaj Dharati Roti Hai by Dr. Rajeshwari Prasad Chandola	Rs.2,000/- (Consolation)

11.1.7.6 Publication of Journal

The quarterly Hindi Journal 'Paryavaran' continued to be published by the Ministry in order to encourage creative writing in Hindi among its officers and employees. A special issue of the Journal was brought out on the occasion of World Environment Day, on 5th June, 1991.

11.1.8 Orientation Course on Office Procedure

During the year two in-house part time Training Programmes were organised. The Refresher Training Programme organised for Assistants and Section Officers from 22.4.1991 to 29.4.1991 was attended by 25 participants., The Training Programme in Office Procedure, Financial Rules and Handling of Parliamentary matters etc. organised for scientific/technical officers in the Ministry from 9.9.1991 to 16.9.1991 was attended by 18 officers.

11.1.9 O&M Inspection

The O&M Inspection of the sections of the Ministry was carried out in accordance with the Central Secretariat Manual of Office Procedure.

11.1.10 Study Team

A Study Team has been set up to carry out the review of all scientific and non-scientific posts in the Ministry including NWDB and GPD. Similar exercise is also being carried out for the associated offices of the Ministry.

11.2 CIVIL CONSTRUCTION UNIT

11.2.1 Civil Construction Unit, headed by a Chief Engineer (Civil), was set up in the Ministry in August, 1987 for taking up the important building wroks of the Ministry and its associated offices viz. Botanical Survey of India, Zoological Survey of India, National Museum of Natural History, Indian Council of Forestry Research Education, 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 encadred with CPWD in 1989.

11.2.3 The Civil Construction Unit has taken up 45 new schemes so far with total estimated cost of Rs. 40 crores. The

works mostly consist of Office-cum-laboratory buildings, herbaria, National Museum of Natural History, Forest Research Institute, National Forest Academy, National Zoological Park and residential quarters for the staff of the respective organisations, located all over India. Out of the above, 27 works costing Rs. 21.5 crores are being directly executed by CCU for which divisions and sub-divisions have been set up at Almora, Delhi, Dehradun, Bangalore, Mysore, Coimbatore, Jodhpur and Jabalpur, while other works in eastern, 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 P.W.D.

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. The field work load of the unit during 91-92 is about Rs. 10 crores.

11.2.5 During the year Herbarium-cum-Office building of BSI at Jodhpur and Reptile House at National Zoological Park, New Delh, have been completed, and Museum of National History at Mysore, Staff Quarters of ICFRE at Dehradun and Bangalore are nearing completion.

11.2.6 Some of the major construction works proposed to be taken up by CCU at various Institutes are as follows:

— G.B. Pant Institute of Himalayan Environment and Development, Almora,

— Institute of Arid Zone Forestry Research Complex, Jodhpur

— Institute of Wood Science and Technology, Bangalore

— National Museum of Natural History, New Delhi

— Herbarium-cum-Office buildings and residential quarters of Botanical Survey of India and Zoological Survey of India at Itanagar, Shillong, Gangtok, Pune and Port Blair,

— Residential quarters of Forest Survey of India, Dehra Dun.

11.3 WELFARE

11.3.1 The Ministry has give considerable importance to the welfare of the staff during the year. A medical check up covering the blood group, diabetic and cardiac status for 827 officer and staff was conducted and identity cards to that effect were issued. A Cancer Detection Drive, in association with the Indian Cancer Society was also conducted for 110 employees.

11.3.2 The Recreation Club set up with the objectives of promoting sports, cultural and recreational activities continued to play a key role during the year. The staff of the Ministry participated in various Inter Ministerial Athletics, Volley-ball and Cricket Tournaments.

11.3.3 An employee of the Ministry who participated in the inter-Ministerial championship for best physique was selected for the Junior National Power-lifting championship. Another employee of the Ministry participated in the inter-Ministry Veterans Atheletics Competition held in February, 1991 and won the second position inthe 100 M, second position inthe 800 M and third position in the 400 M races in the National Veterans Championship held in Cuddapah in March, 1991. He also participated inthe IXth World Veteran Atheletic Meet held in Finland in July, 1991.

11.3.4 The Annual Day of the Ministry of Environment and Forests was celebrated on the 4th of January, 1992. All members and families of officers and staff participated in various competitions and cultural programmes. On this occasion prizes were distributed to the winners.

11.4 PLAN COORDINATION AND BUDGET

11.4.1 The Plan Coordination function of the Ministry involves coordination with the different functional areas including close co-ordination with the Planning Commission for the implementation of the Five Year Plan in general and Annual Plan, in particular.

11.4.2 The Central Annual Plan for the year 1991-92 was Rs. 33,724.87 crores out of which the Annual Plan for the Central Ministry was Rs. 19,014.84 crores and that for the State Plan was Rs. 14,710.03 crores. The pictoral representation of the Annual Plan allocation may be seen in figure 75. The corresponding amount in the Annual Plan 1990-91 was Rs. 30,466.19 crores for the centre out of which Rs. 17,617.82 crores was for the Central Ministry and Rs. 12,848.37 crores was for the States. The over all step up in 1991-92 was thus 10.7% over than that in 1990-91.

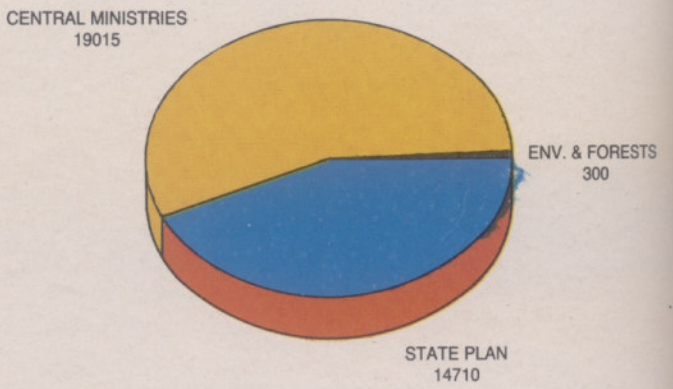


Fig. 75 Total Central Plan for 1991-92

11.4.3 The allocation for the Ministry of Environment and Forests in the Annual Plan 1991-92 was Rs. 300.44 crores as against Rs. 237.00 crores in the Annual Plan of 1990-91, thereby raising the allocation by 26.8%. The Revised Estimate (RE) for 1991-92 was Rs. 266.44 crores, compared to Rs. 209.26 crores in 1990-91. The Budget allocation of the Ministry for the year 1992-93 is Rs. 280.00 crores. The sector-wise break-up of the above allocations is given in Table 10.

Table 10 (Rs. in crores)

Sector	1990-91		1991-92		1992-93
	BE	RE	BE	RE	BE
Environment	41.00	30.83	47.13	37.97	48.00
Ganga Action Plan	71.00	62.00	70.00	54.60	55.00
Forests and Wildlife	40.00	36.43	53.20	52.37	62.00
National Wastelands Development Board	85.00	80.00	130.01	121.50	115.00
Total	237.00	209.26	300.44	266.44	280.00

11.4.4 It could be seen from the above that the allocation to the Environment and Forests sector in the over all central plan was 0.8% in 1990-91 which was stepped up to 0.9% in 1991-92.

11.4.5 Annual Action Plan

The Annual Action Plan and progress of expenditure of the Ministry for the year 1991-92 was reviewed at the level of the Divisional Heads of the Ministry as well as the Secretary (E&F).

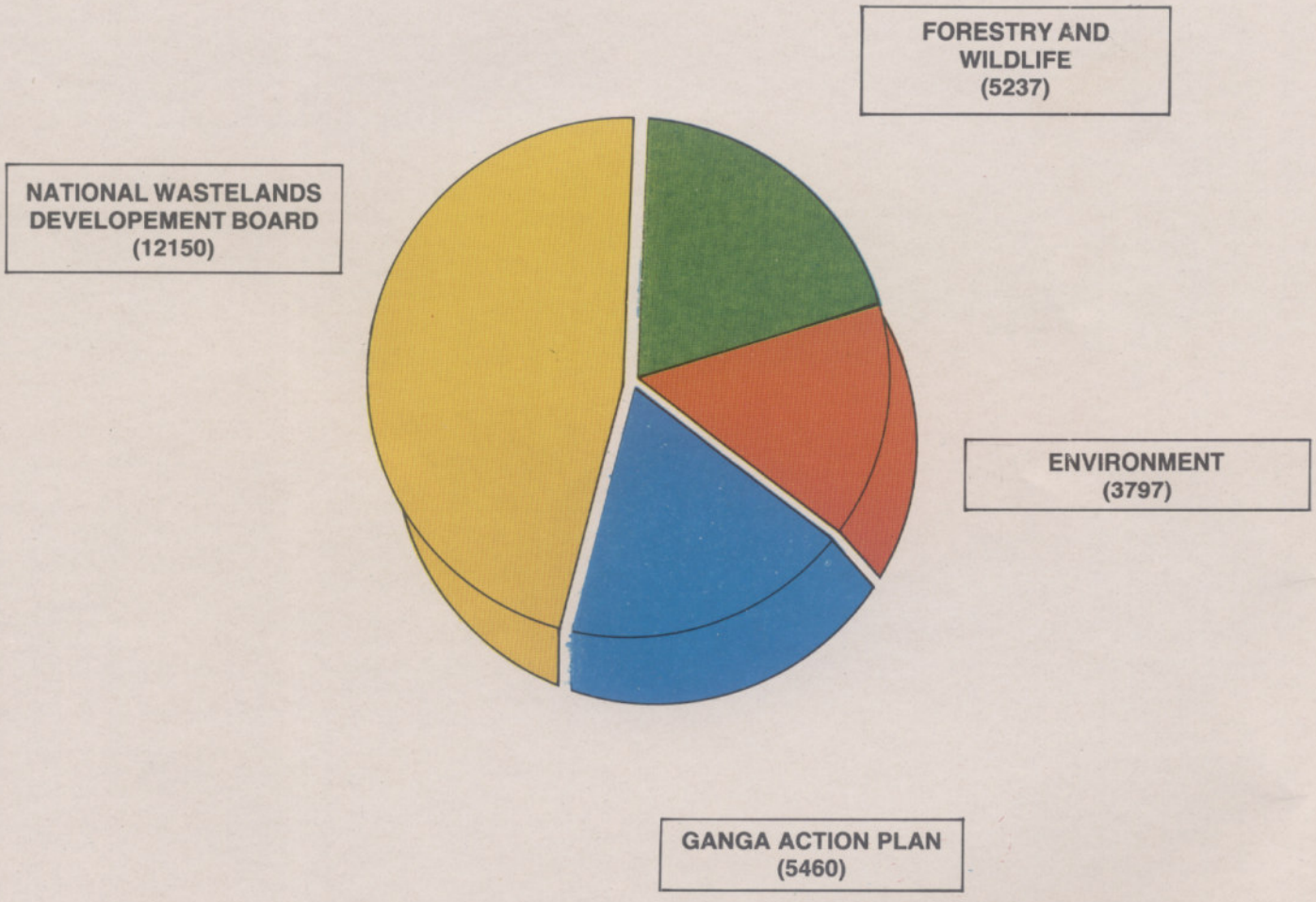
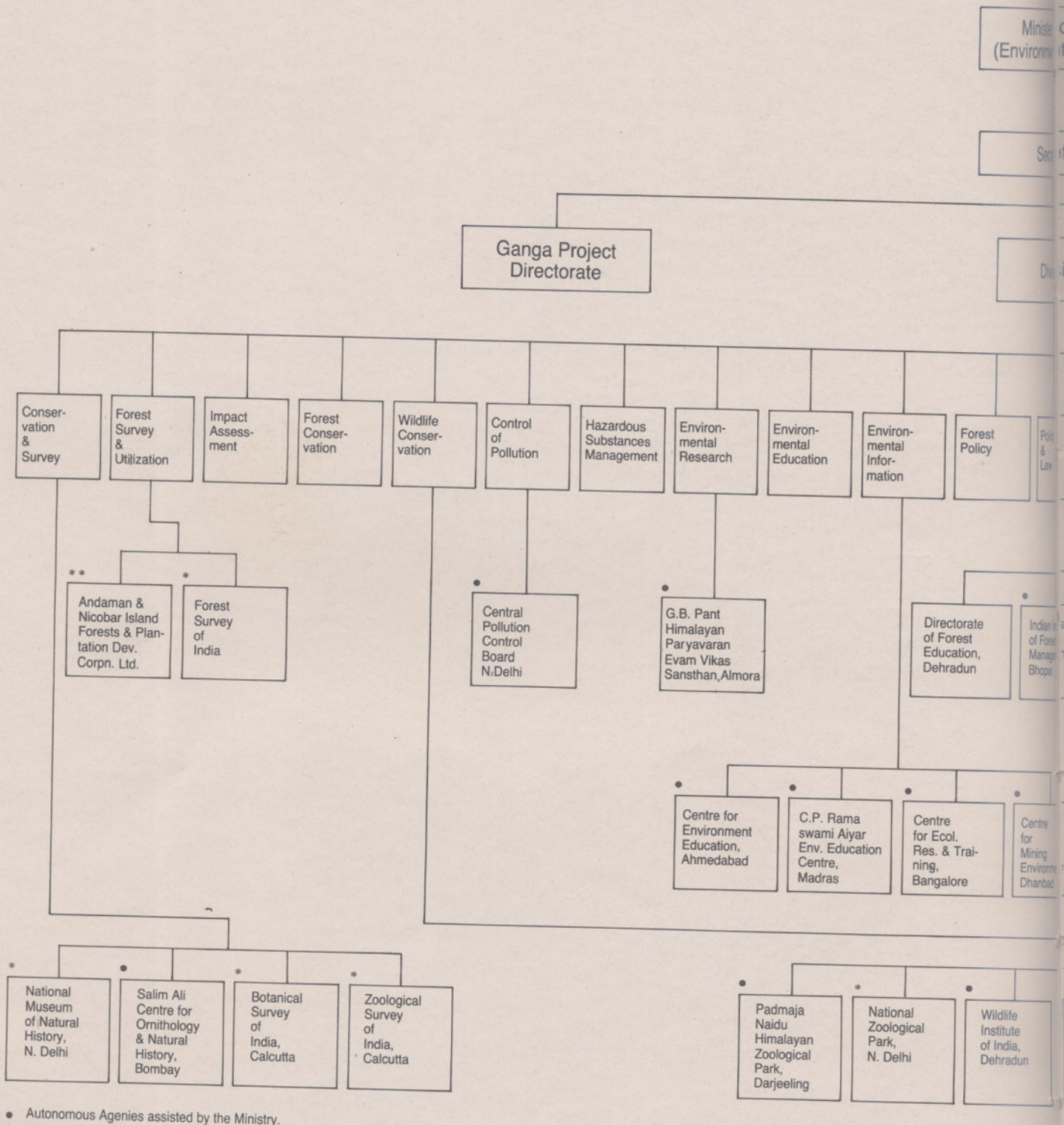


Fig. 76 Areawise Distribution of Funds for the Year 1991-92 (R.E.) (in Rs. Lakhs)

ORGANISATION CHART OF THE MIN S



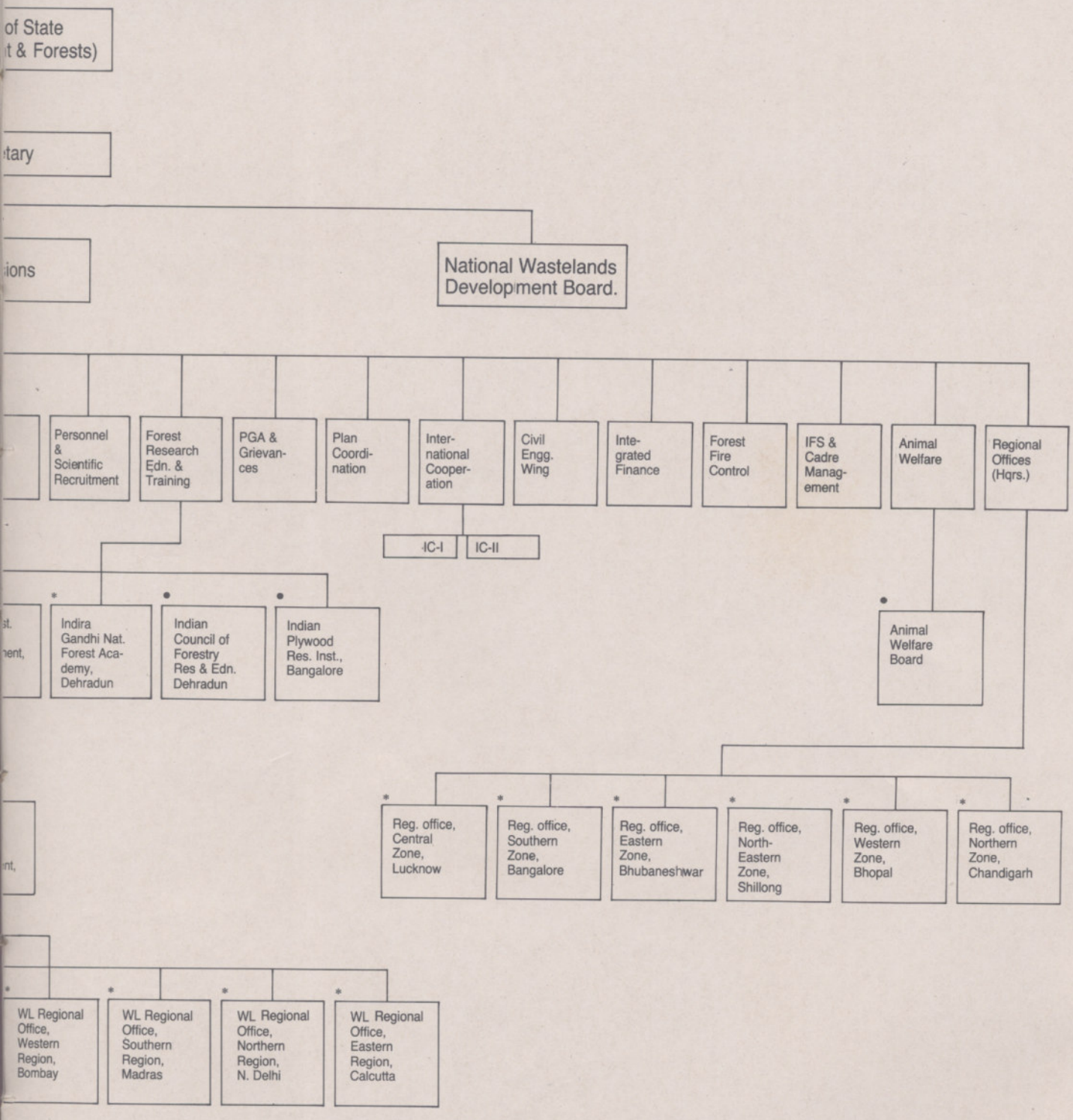
• Autonomous Agenies assisted by the Ministry.

* Associated Units under the administrative control of the Ministry

** Public Sector undertakings

Annexure I

STRY OF ENVIRONMENT & FORESTS



ANNEXURE II

LIST OF PROJECTS SANCTIONED DURING 1991-92

Sl. No.	Title of the Project	Institution
Environmental Research/Man and the Biosphere		
1.	Study of human nature interactions in and around National Parks and Sanctuaries.	Indian Institute of Public Administration, New Delhi-110 002.
2.	Microbial degradation of pesticide and application of immobilized enzymes/cells in pesticide effluent treatment.	Centre for Advanced Study in Botany, University of Madras Guindy Campus, Madras-600 025.
Himalayan Region		
1.	Eco-system based development for carrying capacity of Hill Resort Town.	School of Planning and Architecture, I.P. Estate, New Delhi-110 002.
Wetlands		
1.	Conservation and Management of Wetland—Kabar Lake (Begusarai) North Bihar.	P.G. Deptt. of Zoology, Bhagalpur University Bhagalpur.
Mangroves		
1.	Nutrient dynamics of Pichavaram Mangroves in Tamil Nadu.	M.S. Swaminathan Research Foundation Madras.
NNRMS		
1.	Mapping and Monitoring of Vegetation and land use in Nilgiri Biosphere Reserve.	Centre for Ecological Sciences, Indian Institute of Science, Bangalore.
2.	Monitoring of Environmental impact of Iron-ore, lime stone and china clay mining in Singhbhum District of Bihar using remotely sensed data.	Centre of Mining Environment, Indian School of Mines, Dhanbad.

ANNEXURE III

LIST OF PROJECTS COMPLETED DURING 1991-92

Sl. No.	Title of the Project	Institution
	Environmental Research/Man and the Biosphere	
1.	Allelopathic properties of Eucalyptus.	Department of Botany Punjab University Chandigarh-160 014.
2.	Evaluation of the genetic risk to man at the place of his work using multiple parameters.	Department of Zoology Punjab University Chandigarh-110014.
3.	Effect of SO_2 and particulates on plants in some industrial/ urban areas.	Department of Plant Anatomy National Botanical Research Institute Lucknow-226001.
4.	Studies on Ethnobiology of the Oroon tribe of Chotanagpur.	Dr. Zakir Hussain Institute for Non-formal and Continuing Education Sattelite Centre Patna-800001.
5.	Studies on the effect of particulate air pollution on Sal forest ecosystem	Deptt. of Forestry H.P.K.V.V., Naini Solan-173230.
6.	Ecological Survey of Paharia Community in Santhal Parganas.	Deptt. of Botany Godda College, Godda-814134.
7.	Improvement of *Prosopis cineraria* through selection and vegetative propagation for higher biomass production.	Dayanad College, Hissar-125001 Haryana.
8.	Publication of Book on Ecology and Sociobiology of South Indian Primates.	National Education Society Bangalore-560004.
9.	Bio-ecological Studies on horse shoe crab (Arthropoda; Arachnida) of Indian Coastal Region.	Zoological Survey of India, Calcutta, West Bengal.
10.	Conserving and augmenting predaceous bugs in the Western Ghats and evaluating their role in biological control production, release and evaluation.	Deptt. of Zoology, St. Xavier's College Palayankottai-627002 Tamil Nadu.
11.	An Action Plan for efficient utilisation of medicinal plants and ensuring better remuneration of tribals in North Sikkim.	Centre for Research Planning and Action, Hailey Road, New Delhi.
12.	Germplasm collection, propogation and improvement of forest plants of Thar Desert.	Deptt. of Botany, University of Jodhpur, Jodhpur-342001.
13.	Biochemical mechanism of function toxicity of Propane 1, 2, dior on unsuspected environmental hazard.	Deptt. of Biochemistry Punjab University, Chandigarh.
14.	Evolving a system of self financing by Pollution Control Boards taking in to account technical, legal, administrative, and financial aspects.	National Council of Applied Economic Research, New Delhi-110019.
15.	Biodegradation of aromatic hydro carbons by micro-organisms	Indian Instt. of Science, Bangalore-560012.
16.	Safety evaluation of phyto-toxicity of environmental pollutants.	ITRC, Lucknow-226001.
17.	Uptake and accumulation of heavy-metals in some economic crustacean mollusces and pinfishes of Madras Coast.	Zoological Survey of India, Marine Biology Station 100 Seanothome High Road, Madras-600028.
18.	Air pollution due to fugitive and stack emission from the thermal power plant.	Dr. M. Ishaque Road ROHC (Eastern) (NIOH) Kyd Street, Calcutta-700016.
19.	Studies on the effect of mercury compounds on soil bacteria.	Deptt. of Bio-chemistry, University College of Science, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019.
20.	Soil exchange due to deforestation and cultivation-A case study in Simlipal National Park.	College of Agriculture, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019.
21.	Modelling of Swirling buoyant Jots and plomes for waste water disposal in Marine Environment.	Department of Social Engineering, IIT, Bombay, Bombay-400076
22.	Toxic heavymetals in the Indian Environment.	Madras Science Foundation, Madras-600020
23.	Monitoring the genotoxic impact of environmental pollution caused by a Chloralkali factory at Ganjam, Orissa.	Deptt. of Botany Berhampur University, Berhampur, Orissa-760007.
24.	Level of Air pollution and its effect on the health of workers and general population in Lodha-Bagdigi Bararee, Five area in Jharia Coal Field.	Deptt. of Mines Indian School of Mines, Dhanbad-826 004.
25.	Marine Fungi: Role in Biodegradation: As feed for delrivores and their enzymes.	National Institute of Oceanography, Dauna Paula, Goa-403004.
26.	Commercial utilization of medicinal plants in North Sikkim.	Centre for Research Planning & Action, 16-Dakshneshwar, 10-Hailey Road, New Delhi-110001.
	Himalayan Region	
1.	Ecological management and conservation of fish breeding areas along rivers	Deptt. of Biosciences, Jammu University, Jammu.

Sl. No.	Title of the Project	Institution
	and streams of Jammu province with special reference to restoration of damaged sites.	
2.	Germplasm bank of pasture grass and legumes at Palampur and Kukumseri (Lahul & Spiti) H.P.	Himachal Pradesh Krishi Vishvavidhyalaya, Palampur.
3.	Collection, culture and conservation of edible fungi of Western Himalyas.	Himachal Pradesh Krishi Vishvavidhyalaya, Palampur.
4.	Structure and function of low and high altitude grazing land ecosystem and the impact of the livestock component in the Central Himalayas.	Deptt. of Botany, Kumaun University, Nainital.
5.	Geomorphic study of lime stone topography around Cheerapunjee, in relation to landuse and afforestation.	School of Environmental Sciences, North Eastern Hill University, Shillong.
6.	Study of energy use and environmental effects in garhwal region of the Central Himalaya and action plan for mitigation.	Tata Energy Research Institute, New Delhi.
Western Ghats		
1.	The Koyana catchment—an environmental perspective.	Deptt. of Geography, University of Bombay, Bombay
2.	Effect of human activity and industralization on Patalganga river ccosystem.	Institute of Science M.C. Road, Bombay.
3.	Studies on sacred groves of Kerala with particular reference to conservation of rare, endemic endangered and threatened plants of the Western Ghats.	Centre for Earth Science Studies, Trivandrum.
4.	Studies of the effect of plantation crops area expansion, extent of soil erosion under different land usages and effective harvest of rainfall in Western Ghats, Palni Hills.	Krishnamurty International Development Foundation, Madras.
5.	Studies on selected indigenous species for future plantation programme in Kerala.	Kerala Forest Research Institute, Peechi.
6.	Imparting environmental training and education at Anglad Institute of Natural History.	St. Joseph's College Tiruchirapalli.
7.	Scheme on evaluation of the extent of pollution in the Nilgiris (Western Ghats).	Tamil Nadu Agril. University, Coimbatore.
8.	Experimentation for regeneration of vegetation and improvement of Devrai in Panshet reservoir catchment area (Pune Distt.).	Sankar Brahma Sama Granthalaya, Pune.
9.	Survey of technical feasibility of tree and fodder crop cultivation in steep hill slopes of Western Ghats for ecopreservation and development.	Krishnamurthy International Agricultural Development Foundation, Madras.
Biosphere Reserves		
1.	Bio-ecological studies on the aquatic insects of Niligiri Biosphere Reserve.	Loyala College, Madras.
2.	Ecological studies and long term monitoring of biological processes in Silent Valley.	Kerala Forest Research Institute, Kerala.
3.	Studies on Hydrological Processes and their impact on Nilgiri Biosphere Reserve using Remote Sensing Techniques.	Centre for Water Resources Development & Management Kozhikode, Kerala.
4.	Studies on human ecology and eco-restoration of Attapady Valley.	Kerala Forest Research Institute, Kerala.
NNRMS		
1.	Changes in landuse because of urban spread and industrialisation in Ahmedabad-Vapi region.	GEER Foundation, Gandhinagar.
2.	Environment impact of coastal wetlands of Vedaranyam (Tamil Nadu)	Institute of Remote Sensing, College of Engineering, Anna University, Madras.
3.	Impact of industrialisation on landuse in Madras Metropolitan area.	Madras Metropolitan Development Authority in association with Institute of Remote Sensing, Anna University Madras.
4.	Coastal environment	Department of Space, Space Application Centre, Ahmedabad.
5.	Impact of mining activities and super thermal power stations on environment.	- do -
6.	Environmental impact of coal mines in Jharia—Raniganj Coal Belt	Indian School of Mines Dhanbad, in association with Geological Survey of India, Calcutta, Central Mine Planning and Design Institute Ltd., Ranchi and Indian Institute of Technology, Kharagpur.

ANNEXURE IV

LIST OF REGIONAL OFFICES/ASSOCIATED UNITS/AUTONOMOUS AGENCIES/ENVIS CENTRES/CENTRES OF EXCELLENCE ETC. OF THE MINISTRY OF ENVIRONMENT AND FORESTS.

I. Regional Offices

1. Regional Office,
   North East Zone,
   Ministry of Environment and Forests,
   Upland Road,
   Loitumkhra,
   Shillong-793 003
2. Regional Office
   Central Region
   Ministry of Environment and Forests
   4-Windsor Place,
   Lucknow-226 001
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-464 016.
5. Regional Office
   Southern Region
   Ministry of Environment and Forests
   No. 493, Ist Main,
   III Block, III Stage
   Basaveswar Nagar
   Bangalore 560 079.
6. Eastern Region
   Ministry of Environment and Forests,
   194, Kharavel Nagar,
   Bhubaneshwar-751 001

II. ENVIS Centres

Institution	Area
1. Central Pollution Control Board CBD-Cum-Office Complex East Arjun Nagar, Delhi-110 0392	Control of Pollution (Water and Air)
2. Industrial Toxicology Research Centre, Mahatma Gandhi Road, Lucknow-226 001 (U.P.)	Toxic Chemicals
3. Deptt. of Geo Engineering & Resource Development Technology Andhra University Visakhapatnam-530 003 Andhra Pradesh	Eastern Ghats
4. Society for Development Alternatives B-32, Institutional Area, New Mehrauli Road, Hauz Khas, New Delhi 110 016.	Environmentally Sound and Appropriate Technologies
5. Centre for Environmental Studies Anna University, Guindy, Madras-600 025 Tamil Nadu	Bio-degradation of Wastes and Environmental Impact Assessment
6. Tata Energy Research Institute 7, Jor Bagh, New Delhi-110 003	Renewable Energy and Environment
7. Centre for Ecological Sciences, Indian Institute of Science, Bangalore-560 012 (Karnataka)	Western Ghats and Biological Diversity
8. World Wide Fund for Nature (WWF)-India, 172-B, Lodi Estate New Delhi-110 003	Non-Governmental Organisation Media and Parliament related to Environment.
9. Environmental Planning and Coordination Organisation, Paryavaran Parishar, E-V Sector, Arera Colony, Bhopal-464 016 (Madhya Pradesh)	Environmental Management related to the State of Madhya Pradesh
10. National Institute of Occupational Health, Meghani Nagar, Ahmedabad-380 016 (Gujarat)	Occupational Health
11. Central Arid Zone Research Institute, Jodhpur-342 003 (Rajasthan)	Desertification
12. Centre for Advanced Study in Marine Biology, Annamalai University, Parangipettai-684 052, (Tamil Nadu)	Estuaries, Mangroves, Corals and Lagoons
13. Centre for Environment Education, Thaltej Tekra Ahmedabad-380 054	Environmental Education

III. Centres of Excellence

1. Centre for Environment Education
   Nehru Foundation for Development
   Thaltej Tekhra,
   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,
Bombay Natural History Society,
Sahid Bhagat Singh Marg,
Bombay 400 023

IV Regional Centres of National Wasteland Development Board (NWDB)

	Address	Area of Operation
1.	Coordinator (SFSO: Regional Unit) University of Agricultural Sciences, Department of Economics GKVK Campus (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 173230 (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 Forest 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 (SFSQ: 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

V 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 and 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)

VI 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-2488 006
(U.P.)
2. Indira Gandhi National Forest 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 Forest 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 Technlogy, 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

VII Regional Offices (Wildlife Preservation)

1. Wildlife Preservation, Western Region 11, Air Cargo Complex, Sahar, Bombay 400 099
2. Wildlife Preservation, Eastern Region, Nizam Palace, 6th Floor, MOS Building, 234/4, A.J. Bose Road, Calcutta 700 020
3. Wildlife Preservation Northern Region Bikaner House; Shahjahan Road, New Dehli-110 011
4. Wildlife Preservation, Southern Region, 2C/5, Brownstone Apartments, Mahalingapuram Madras 600 034.