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Fig 2. The Indian Coral tree (*Erythrina suberosa*)

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INTRODUCTION AND THE YEAR UNDER REVIEW

Role and Organisation

The Ministry of Environment and Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion and co-ordination of environmental and forestry programmes.

The main activities of the Ministry are conservation and survey of flora, fauna, forests and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas and protection of environment. These tasks are being fulfilled through environmental impact assessment, eco-regeneration, assistance to organisations implementing environmental and forestry programmes; promotion of environmental and forestry programmes; promotion of environmental and forestry research, extension, education and training to augment the requisite manpower, dissemination of environmental information, international cooperation and creation of environmental awareness among all sectors of the country's population.

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

Allocation of Business

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

- National Forest Policy and Forestry Development in the country, including Social Forestry.
- Forest Policy and all matters relating to forests and forest administration in so far as the Andaman and Nicobar Islands are concerned.
- Indian Forest Service.
- Wildlife preservation and protection of wild birds and animals.
- Prevention of Cruelty to Animals.
- Central Zoo Authority.
- Fundamental research, including coordination thereof and higher education in forestry.
- Padmaja Naidu Himalayan Zoological Park.
- National Assistance to Forestry Development Schemes.
- Central Ganga Authority.
- Indian Plywood Industries Research and Training Institute, Bangalore.
- Forest Survey of India, Dehradun.
- National Afforestation and Eco-Development Board.
- Desert and Desertification.

An overview of the activities of the Ministry and its associated offices/organisations during the year:

Survey of Natural Resources

Flora

- Forty exploration tours were undertaken by various circles and units of the Botanical Survey of India (BSI) in different priority areas of the country during the year and about 4000 specimens have been collected.
- Several books of the BSI viz. Plant Wealth of Nanda Devi Biosphere Reserve, The Ethnobotany of Eastern Ghats in A.P. Meliolales of India etc., were released by various dignitaries.

Fauna

- A total of 54 surveys covering 60 districts falling under different ecosystem was conducted by the scientists of the Zoological Survey of India (ZSI) during the year.
- Faunistic surveys were undertaken in 11 States, 9 Conservation areas and 7 specialised eco systems during which a large number of animal species were identified and studied.
- The National Zoological Collections have been further enriched by the addition of 29,386 identified specimens pertaining to 357 species, which includes 4 species new to science out of which 2 species have been described by the staff of the Survey.
- State level faunal documents relating to the States of Meghalaya and West Bengal were published.

Forests

- The State of Forest Report 1995, the fifth assessment of the forest cover of the country was published by the Forest Survey of India (FSI) during the year. As per this report, which is based on data pertaining to the period 1991-93, there has been a decrease of 507 sq. km. in the extent of actual forest cover of the country.
- A highly sophisticated Digital Cartography System has been procured by the FSI at a cost of Rs. 7.75 crores for the purpose preparing vegetation and thematic maps digitally.

Conservation of Natural Resources Including Forestry and Wildlife

Biosphere Reserves

- Eight Biosphere Reserves have been set up so far and efforts are on to set up five more in the States of Gujarat, Arunachal Pradesh, Sikkim, Himachal Pradesh and Madhya Pradesh.

Wetlands, Mangroves and Coral Reefs

- The schemes on conservation and Management of Wetlands, Mangroves and Coral Reefs were continued during the year.

Bio-diversity Conservation

- A National Action Plan on Biological Diversity is under finalisation, which aims at consolidating the on-going efforts of conservation and sustainable use of biological diversity and to establish a policy and programme regime for this purpose.
- In order to involve the States fully in issues of biodiversity and to encourage State-level consultations, a detailed paper bringing out issues

of relevance to the States on the subject of biodiversity has been prepared and communicated to the Chief Secretaries.

- India participated in several international meetings concerned with bio-diversity during the year and was able to put forth its views effectively on all crucial issues, particularly on IPRs and access to genetic resources.

Combating Desertification

- India has decided to ratify the UN Convention to Combat Desertification, signed by it in October 1994 and continued to be represented during the negotiations in the 9th and 10th Sessions of the Inter-governmental Negotiating Committee.
- A Regional Meeting on the "Implementation of the Convention in Asia" was organised by India in collaboration with the Interim Secretariat of the Convention during August 1996 at New Delhi. The meeting was attended by representatives from Asian countries,developed countries, international organisations and NGOs from India and the rest of Asia and a number of areas were agreed upon for identifying specific programmes for regional co-operation.

Forest Conservation

- A conference of State Forest Ministers was organised at Vigyan Bhawan, New Delhi during 26th - 27th August 1996 to deliberate on issues relating to Forest Policy, conservation and protection, afforestation, cadre management, research and training, conservation of wildlife and issues of North Eastern States.
- During 1996 more than 500 proposals from various State and UT Governments were processed under the Forest (Conservation) Act 1980, out of which 239 were given Stage-II approval and 87 were approved in principle.
- A Seventh Regional Office of the Ministry has been set up at Ranchi to cater to the States of the Eastern Plateau or Upper East.
- So far 17 States have issued their resolutions for Joint Forest Management and as per reports received from 9 States, 4.05 million ha. of degraded forests in the country are being managed and protected through nearly 40,300 village Forest Protection Committees.
- A draft notification to prohibit and regulate certain processes and operations relating to wood-based industries specifically in the states of Arunachal Pradesh, Assam, Nagaland and Andaman and Nicobar Islands has been issued by the Ministry.
- Based on the recommendation of this Ministry, the Ministry of Commerce has decided to allow the export of only value added items made out of legally procured Redsanders Wood, subject to specified conditions and against a valid license to be issued by the Directorate General of Foreign Trade.
- Export of sandal wood oil has been restricted.

Wildlife Conservation

- The network of protected areas now consists of 83 National Parks and 447 wildlife sanctuaries covering about 1.50 lakh sq. km. area.
- A Wildlife Advisory Committee has been constituted to advise on aspects of wildlife conservation and related matters.
- The Kailash Sankhla Fellowship for 1996-97 has been awarded to the Dy. Conservator of Forests, Government of Sikkim.
- India is a signatory to the MOU concerning the conservation of Siberian Cranes along with range countries such as Afghanistan, Azerbaijan, Iran, Khazakasthan, Pakistan etc. The 2nd meeting of the range States was held at Bharatpur, India during 4th - 7th November 1996.
- An amount of Rs. 850 lakhs was provided as central assistance for development and maintenance of the 23 Tiger Reserves set up under Project Tiger.
- As per the tiger census carried out during 95-96, the total number of tigers recorded in 22 Tiger Reserves is 1333. No census was carried out in Valmik Tiger Reserve, Bihar.
- An amount of Rs. 193.98 lakhs was provided to the elephant range States to strengthen their anti-poaching and anti-depredation activities under project elephant.
- The Central Zoo Authority (CZA) granted recognition to one medium, five small and 43 mini Zoos of the country during the year.
- A film on "Zoos of India - Centres of Conservation" was produced and telecast.

- A two - day workshop on Red Panda was organised in Darjeeling during April 1996 by the Padmaja Naidu Himalayan Zoological Park.

Animal Welfare

- The Animal Welfare Board has appointed more than 6000 honorary Animal Welfare Officers to check cruelty inflicted on animals and to protect them.
- One hundred and seventy five training camps were organised by the Board in different parts of the country to educate and train members of SPCAs and to create awareness among the public about cruelty to animals and the need to prevent it.
- A scheme of Animal Birth Control has been taken up in six cities and more than 9000 sterilisations were carried out on stray dogs upto December 1996.
- More than 300 Animal Welfare organisations of the country have been recognised by the Board so far, which provides financial assistance to such organisations for animal welfare activities.

Environmental Impact Assessment

- A total of 415 projects were appraised for environmental and site clearance during the year, out of which 170 were granted environmental and/ or site clearance.
- An Inter-Ministerial Group has been set up to examine the issues of delegation of powers for according environmental clearance for thermal power projects.
- In accordance with the directions of the Supreme Court, all the States and UTs have submitted Coastal Zone Management Plans (CZMPs) which have since been approved by the Central Government with certain conditions and modifications.
- The coastal States have also been delegated powers to take decisions on proposals exceeding Rs. 5 crores falling under CRZ II category as per the approved CZMPs.
- A Dahanu Taluka Environmental Protection Authority has been set up on 19.12.96 under the Chairmanship of Justice C.S. Dharmaadhikari for the protection of ecologically fragile areas of Dahanu Taluka, Maharashtra.
- Through a Notification issued on 5th July 1996 in the Gazette of India, the area within a radius of 15 Km. of the petroleum refinery of M/s IBP Co. Ltd., at Numaligarh (East Kaziranga) has been declared as a "No Development Zone".
- A study of the upper Yamuna Basin has been taken up to prepare Natural Resource Accounts so that resource accounting corresponding to economic returns can be correlated and a more consistent and better stream of benefits can be derived from the same resource base.

Prevention and Control of Pollution

- Several activities such as organisation of training programmes, preparation of manuals etc. were undertaken to make Environmental Statement and Environment Audit more effective and comprehensive. Form V of the Environmental Statement has been revised.
- Under a 5 years long project sanctioned to National Institute of Sciences, Technology and Development Studies (NISTADS), production of computerised maps and preparation of zoning Atlas for siting industries have been taken up. About 150 base and thematic maps have been prepared for different districts of the country.
- Under the scheme "Adoption of Clean Technologies in Small Scale Industries", several training and awareness programmes were organised for personnel in Small Industry Development Organisation.
- Several Authorities have been set up during the year by the Ministry such as the National Environment Appellate Authority, Environmental Impact Assessment Authority for the National Capital Region, Loss of Ecology Authority for the State of Tamil Nadu, Authority for Environmental Planning for Thane, Dahanu Taluka Environment Protection Authority and Aquaculture Authority with the ultimate objective of prevention and control of pollution.
- Fifteen Waste Minimisation Circles (WMCs) have been established so far in different industrial clusters across the country.
- Low lead petrol with a maximum lead content of 0.15 gms/l, has been introduced throughout the country.

- Low-sulphur diesel (Sulphur content of 0.5% or less) has been introduced in the four metros of the country.
- High priority has been accorded for control of vehicular pollution in Delhi. A high-level Task Force has been set up under the chairmanship of the Lt. Governor of Delhi for formulation of plans and implementation of time-bound programmes to improve the environment of Delhi.
- Several actions have been initiated to control pollution in the Agra-Mathura Trapezium and to preserve the Taj Mahal and other monuments of Agra. A special cell has been constituted in the Ministry for implementation of a green belt development plan around the Taj Mahal.
- Three Specific Authorities have been constituted in the States of Tamil Nadu, Maharashtra and the NCR, under the Environment (Protection) Act, 1986 in compliance with various Supreme Court orders.
- Effluent and Emission Standards for 15 categories of industries were finalised and notified in the Gazette of India during the year. National Ambient Air Quality Standards were also notified.
- Out of 1551 industries belonging to the 17 categories of highly polluting industries, 1259 industries have already installed adequate pollution control facilities and 112 have been closed down.
- Under Section 5 of the Environment (Protection) Act, 1986, show cause notices have been issued to 189 units all over the country.
- During the year, 568 industrial pollution complaints were received and attended to.
- The Ministry of Environment and Forests is the National Focal Point for India for the NETTLAP of UNEP, which consists of institutions and individuals active in environmental education and training at the tertiary level in the Asia-Pacific region.

Central Pollution Control Board

- Monitoring of the rivers Ganga and Yamuna have been taken up at 13 locations falling in the Himalayan segments.
- Monitoring of river Yamuna during 1996 has revealed that the stretch of the river between Wazirabad and Etawah is highly degraded and does not meet the desired water quality standards.
- The monitoring programme of River Cauvery was reviewed during the year to rationalise and optimise it.
- A detailed study on the water quality profile of the river Rapti has been carried out.
- Ground water monitoring conducted at four potential sites of Kanpur have shown that the groundwater at all 4 sites contain excessive levels of flouride, chromium, coliforms, DO, iron and significant amounts of lindane and DDT.
- Monitoring of ambient air quality was continued under several programmes such as the National Ambient Air Quality Monitoring, continuous automatic air quality monitoring in Delhi, ambient air quality monitoring in NCR etc.
- CPCB is authorised to check the calibration of the instruments and checking procedures being adopted by the Pollution Checking Centres (PCCs) authorised by the Delhi Administration. Twenty six PCCs were inspected by the CPCB during the year.
- A survey was carried out in 23 metropolitan cities to ascertain status of municipal solid waste generation, their collection and disposal.
- A comprehensive study of Jammu city was undertaken during December 96 for monitoring the total environmental quality.
- Forty eight water testing kits were distributed to NGOs and schools throughout the country and financial assistance were provided to 10 NGOs for organising mass awareness programmes.
- Two video films were produced during the year and a set of VHS cassettes has been provided to all SPCBs and PCCs. Twenty publications were brought out.
- Inventorisation of hazardous waste generation in the States of Orissa, Kerala and Maharashtra has been completed.

Hazardous Substances Management

- Several new off-site Emergency Plans have been commissioned during the year after successful completion of hazard analysis studies.
- A Crisis Alert System has been established and E-mail connectivity and NICNET connection have

been established at the Central Control Room of the Ministry.

- Ten hazard analysis studies have been initiated during 1996- 97.
- The 9th Regional Register for Potentially Toxic Chemicals has been established at CIF, Maharashtra.
- Rules on "Emergency Planning Preparedness and Response to Chemical Accidents" have been notified on 2nd August, 1996.
- A draft notification on the "Prohibition of the Handling of Azodyes" has been brought out which proposes a ban on manufacture and use of 74 Azodyes.
- Draft notifications prohibiting imports of asbestos, PCB, PCT and PBB contaminated wastes, selenium, thallium and beryllium containing wastes and open burning of waste oil have been issued.
- A National Plastic Waste Management Task Force has been constituted to formulate a strategy and prepare an Action Programme for management of plastic waste.
- A project on "Industrial Safety Disaster Prevention and Hazardous Waste management" is being prepared with Japanese and Dutch assistance.
- The draft scheme for the Environment Relief Fund (ERF) under the PLI Act has been recast.

Regeneration and Development

National River Conservation Directorate

- Out of the 261 schemes of pollution abatement sanctioned at a total cost of Rs. 462.04 crores under GAP Phase I, 248 schemes have been completed upto 31st December 1996.
- Under the Indo - Dutch Sanitation Project, a common conveyance and treatment system has been commissioned for the 175 odd tanneries at Jajmau and Kanpur.
- Under GAP, Phase I, a total of 730 mld of sewage has been prevented from direct discharge into the river as against the target of intercepting, diverting and treating 873 mld of sewage.
- The present estimated cost of the scheme of cleaning the river Yamuna is Rs. 479.56 crores and it covers 21 towns in three States. Projects amounting to Rs. 290 crores have been approved under this scheme.
- Under Gomati Action Plan, works have been initiated in Jaunpur and Sultanpur. A Master Plan for Kanpur is being prepared under this Plan.
- The scheme of pollution abatement of river Damodar has been approved by the Government in October 1996 at an estimated cost of Rs. 14.47 crores. Works are proposed in 8 towns of Bihar and 4 towns of West Bengal.
- Under the NRCP (National River Conservation Plan), pollution abatement works have been taken up in 46 towns located along 18 inter-State rivers in 10 States.
- Implementation of conservation schemes in respect of Bhoj Wetlands, Bhopal has commenced.

National Afforestation and Eco-development Board

- All the Centrally Sponsored Schemes relating to promotion of afforestation, wasteland development, fuelwood and fodder production, raising of non-timber forest produce, seed development etc. were continued during the year.
- Wasteland maps for 229 districts have been prepared and distributed to the concerned State and district level agencies.

Research

Environmental Research

- Under the three major research schemes viz., Man and the Biosphere Programme, Environment Research Programme and the Action oriented Research, Demonstration and Extension Programmes on Eastern and Western Ghats, a total of 17 new projects were sanctioned, 28 were completed and 175 projects were serviced during the year.
- Studies conducted under the project "Environmental Impact of increased UV-B radiation on fresh water algae" have indicated that processes such as nitrogen fixation and photosynthesis are extremely sensitive to UV-B radiation and increased UV-B radiation is found to be harmful to a number of algae which may affect biological productivity.

- India participated in the II conference of Parties to the Frame work Convention on climate change as well as in the meetings of the various bodies set up under the Convention. The Second Assessment Report brought out by the Inter-Governmental Panel on Climate Change (IPCC) during the year provides latest information on various aspects relating to climate change.
- The G.B. Pant Institute of Himalayan Environment and Development concentrated on further strengthening of its R & D activities and upgradation of infrastructural facilities. Several new projects were initiated and some on-going and completed projects have been documented for effective dissemination.
- Four research projects on Biosphere Reserves and two on Wetlands were sanctioned during the year.

Research under NRCP (National River Conservation Plan)

- A cost effective sewage treatment technology through aquaculture has been developed and field tested. This technology requires no energy component and yields rich resource recovery besides requiring lesser land as compared to various versions of pond system and sewage treatment. A workshop was held in January 1997 to disseminate information about this technology.
- Studies taken up in collaboration with the Ministry of Non Conventional Energy Sources on the optimisation of bio-gas production from activated sludge process based STPs were completed during the year.
- Water quality monitoring has been initiated for the rivers Sutlej in Punjab and Betwa, Tapti, Khan Kshipra, Narmada, Wain Ganga and Chambal in Madhya Pradesh. All the participating laboratories involved in water quality monitoring were subjected to analytical quality control by the CPCB and the results of this exercise was discussed in a workshop held in December 1996.

Forestry Research

- The Indian Council of Forestry Research and Education (ICFRE), Dehradun continued to co-ordinate, direct and oversee the research activities in the field of forestry of the 11 research institutes and centres under its administrative control.
- A five years long project titled "Studies on Himalayan Pines" has been initiated by ICFRE during the year with US assistance.
- The Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore continued to carry out research on various aspects of saw milling and plywood aimed at reducing pressure on natural forests.

Wildlife Research

- The Wildlife Institute of India (WII), Dehradun continued to carry out research projects covering a wide range of ecological, management and socio-economic aspects of wildlife conservation in India. Out of 36 on-going research projects, 8 were completed during the year.
- Two scientists of WII have been selected for participation in the XVI Indian Expedition to the Antarctica.
- The Salim Ali Centre for Ornithology and Natural History (SACON) continued to conduct research activities relating to different aspects of ornithology and natural history.

National Natural Resources Management System (NNRMS)

- Under this scheme, 9 new projects were sanctioned and progress of nine on-going projects were reviewed by the Standing Committee on Bio-resources during the year.

Education, Training and Information

Forestry Education, Training and Extension

- The Indian Council of Froestry Research and Education (ICFRE) and its institutes organised a number of Seminars, Conferences, Consultations and short-term courses during the year on various aspects of forestry.
- FRI (Forest Research Institute) continued with its regular M.Sc., programmes and other diploma and short-term on different aspects of forestry. A Forestry Statistics India - 1996 has been compiled by FRI.
- The Indira Gandhi National Forest Academy (IGNFA) continued to impart in-service professional training to the IFS probationers. Computer training has been further strengthened

and a Micro Earth Station has been set up at the Academy.

- The three State Forest Service Colleges at Dehradun, Coimbatore and Burnihat and the Eastern Forest Rangers College, Kurseong continued with their regular diploma courses and in-service training programmes for SFS officers and forest rangers.
- Several vocational training courses and the regular PG diploma course on various aspects of saw-milling and plywood were organised by the Indian Plywood Industries Research and Training Institute, Bangalore.
- The Indian Institute of Forest Management (IIFM), Bhopal organised several Management Development Programmes, seminars, workshops etc. on various aspects of forestry management for officers from IFS, Forest departments, Forest Development Corporations and forest-based industries.

Wildlife Education and Training

- The Wildlife Institute of India (WII), Dehradun organised a large number of workshops, training programmes and seminars for orienting and training in-service personnel at various levels for conservation and management of wildlife resources. It also continued with its regular M.Sc, diploma and certificate courses on Wildlife Management.
- E-mail connectivity has been installed and a home page of WII has been developed and put up on the Internet.
- A Directory of Forestry Education in India has been compiled by the Institutes' Library.

Non-formal Environmental Education and Awareness

- The main theme for the National Environmental Awareness Campaign (NEAC), 1996-97 was "Medicinal Plants". Twenty seven organisations located all over the country were designated as Regional Resource Agencies (RRAs) and these RRAs assisted the Ministry in conducting the NEAC
- About 3500 Eco-clubs have been funded so far.
- The tenure of the 130 Paryavaran Vahinis set up earlier is over, and these are therefore being reconstituted.
- Production of four films on different environmental themes was supported during the year.

Centres of Excellence

- The Centre for Environment Education (CEE), Ahmedabad and the CPR Environmental Education Centre (CPREEC), Madras continued to organise activities aimed at creating environmental awareness among all sections of the society, especially the students and teachers.
- Besides several short-term training programmes, the CEE, Ahmedabad also conducts a 8-months long 'Training in Environmental Education' and a 3-month 'Certificate Course in Environmental Education".
- The CEE and the CPREEC brought out a number of environmental educational resource materials for different target groups during the year.
- The Centre of Mining Environment located at the Indian School of Mines, Dhanbad continued to carry out research and training in the area of mining environment. A microbiology lab has been established at the centre.
- Four short-term courses on different aspects of mining and Environment were organised for in-service personnel.
- The Centre for Ecological Sciences, Bangalore continued its investigations of pure and applied ecology with special reference to the Western Ghats.
- The faculty members of the Centre contributed to the preparation of the Second Assessment Report on "Impacts, adoption and mitigation of climate change' being published by the IPCC.
- The Salim Ali Centre for Ornithology & Natural History (SACON), Coimbatore, in collaboration with the 'Birdlife International' organised the First Pan Asian Ornithological Congress at Coimbatore during 9th-18th November, 96 to commemorate the birth centenary of Dr. Salim Ali.

National Museum of Natural History (NMNH)

- The NMNH continued to promote non-formal environmental education and create conservation awareness among the people through various in-house and out-reach activities.

- A computer based interactive multi-media exhibit has been added to the permanent exhibit gallery of the museum during the year.
- The first phase of construction of the museum building along with its galleries are ready in respect of the Regional Museum of Natural History, Bhopal. The RMNH at Bhubaneswar is at an advanced stage of construction.

Fellowships and Awards

- The Indira Priyadarshini Vrikshamitra Awards (IPVM) and the Mahavriksha Puraskar for 1994 have been announced.
- The Pitambar Pant National Environment Fellowship award for 1996 has been awarded to Dr. L.C. Rai of Banaras Hindu University. The B.P. Pal National Environment Fellowship award for Bio-diversity for 1996 has been awarded to Dr. Parthasarathi Roy of the Indian Institute of Remote Sensing, Dehradun.

Environmental Information

- An ENVIS Centre on "Forestry" has been established at the FRI, Dehradun during the year. The ENVIS (Environmental Information System) Network thus consists of 22 subject specific centres engaged in collection, collation, storage, retrieval and dissemination of information on various aspects of environment to a wide range of users.
- A UNDP assisted project "Establishment of Sustainable Development Networking Programme" has been approved for implementation by the ENVIS Focal Point during the year.
- The ENVIS Network responded to a total of 9779 queries during the year, out of which 8880 were national and 899 were international.

Legislation and Institutional Support

- Tribunal benches at New Delhi, Mumbai, Calcutta and Chennai are being set up under the National Environmental Tribunal Act, 1995.
- The National Environment Appellate Authority Ordinance, promulgated by the President of India on 30th January, 1997 provides for the establishment of a National Environment Appellate Authority to hear appeals with respect to site-restriction of developmental schemes and projects.
- Chairmen of CPCB, SPCBs and PCCs have been delegated powers under various sections of the Environment (Protection) Act, 1986.
- A draft Notification has been issued under the Environment (Protection) Act, 1986 to prohibit and regulate certain processes and operations in the states of Arunachal Pradesh, Assam, Nagaland and the UT of Andaman & Nicobar Islands except with the prior permission of the Central Government.
- Two workshops - one international and the other national relating to environmental legislation were organised during the year at New Delhi.
- Out of a total of 6460 cases filed by the CPCB and SPCBs under Water and Air Acts, 2826 cases have been decided and 3634 cases are pending in various courts.

International Co-operation

- In pursuance of the Environment Action Programme 1993, a "India: Environment Management Capacity Building Technical Assistance Project" has been initiated with assistance from the World Bank. The 61.48 million dollars project will be implemented through the Ministry of Environment & Forests, Department of Ocean Development and the State of Gujarat.
- India participated in the 8th GEF Council Meeting held in Washington during 8th-10th October, 1996.
- An Indian delegation participated in the Fourth Session of the Commission on Sustainable Development (CSD) held in New York during 18th April to 3rd May, 1996 and made a special intervention on the cross sectoral issues with particular reference to the critical elements of sustainability.
- The first meeting of the Steering Committee under the Indo-US Common Agenda for Environment was held during the year.
- A Common Agenda for Environment has been signed by the Government of India and Brazil to promote closer and long-term co-operation in the field of environment.
- Six projects have been approved for funding under the ICEF (Indo-Canada Environment Facility).
- Under the UNDP-GEF Small Grants Programme,

22 projects have been approved at a total cost of US$ 246,530.

- Several workshops were held for small and medium sized enterprises to disseminate information on ODS phase out to industries and others. International Ozone Day was observed throughout the country.
- India continues to be a member of the Executive Committee of the Multilateral Fund set up under the Montreal Protocol on Substances that Deplete the Ozone Layer.
- Thirteen forestry projects are under implementation in various States of the country with assistance from external donor agencies such as the World Bank, SIDA, OECF, EEC, ODA etc.
- The World Bank aided Industrial Pollution Control Project continued to be implemented.

Advisory Inputs, Administration, Plan Co-ordination and Budget

Advisory Inputs

- The Social Audit Panel set up by the Ministry in 1995 has submitted three reports on: Issues relating to sustainable and equitable management of forests; Issues relating to environment awareness and education programmes; land, water and bio-diversity (culture & equity) during the year.

Administration

- Under IFS cadre management, cadre reviews of the State cadres of Uttar Pradesh, Rajasthan, Karnataka and Haryana were carried out. Forty two direct recruits and 84 SFS officers have been recruited/inducted into the service during the year.
- A total of 709 Parliament questions relating to various aspects of environment and forests were answered during the year.
- Staff requirements of the National Afforestation and Eco-development Board was assessed during the year by the IWSU.
- The Ministry was awarded the Indira Gandhi Rajbhasha Shield by the Hon'ble President of India for its outstanding performance with regard to implementation of the official language policy of the Government during the year.
- Eleven officers under the Ministry were inspected to ensure effective implementation of the official language policy.

Civil Construction Unit (CCU)

- The CCU of the Ministry has taken up 80 major schemes so far at a total estimated cost of Rs. 91.91 crores. The works consist of construction of office-cum-labs, herbariums, Museums of Natural History and other institutions of the Ministry and residential quarters for staff of these institutes located all over the country.
- During the year, the building of G.B. Pant Institute of Himalayan Environment & Development at Kosi, Almora was inaugurated. Foundation for the office-cum-residential complex for the Regional Office of the Ministry at Bhubaneswar was laid in November, 96.

Plan Co-ordination and Budget

- The Budget Allocation of the Ministry for 96-97 was Rs. 469.4 crores as against Rs. 370.5 crores for 95-96.
- The total outlay for the Ministry for 97-98 is Rs. 543.70 crores.

2

SURVEY OF NATURAL RESOURCES

Survey of Flora

Botanical Survey of India (BSI)

The Botanical Survey of India (BSI) established in 1890 with the objectives of surveying and identifying the land resources has its headquarters at Calcutta and nine circles located in different phyto-geographical regions of the country.

The activities of the BSI during the year are summarised below :-

Survey of Plant Resources of the Country : Forty exploration tours were undertaken by various circles and units of the Survey in different priority areas of the country during which 4000 specimens were collected. These are being processed and studied.

Studies on Rare and Endangered Species : The Red Data Book of Indian Plants, Vol. 4 is in press.

Environmental Impact Assessment : EIA reports of the following projects were completed during the year :-

- Nambiar Reservoir Project in Tirunelveli District, Tamil Nadu.
- Mara Pump Storage Scheme at Sidhi, Madhya Pradesh.

Biodiversity Project : Under the Biodiversity Conservation Programme the following works were undertaken;

- Manuscript on Plant Diversity along the river Ganga has been completed.
- Manuscript on Plant Diversity on the Gouri Ganga Hydro electric project submersible area has been finalised.
- The manuscript on the Biodiversity of the proposed Namdapha Biosphere Reserve, Arunachal Pradesh is in press.

Other Activities

- Under INMEDPLAN plant nomenclature and botanical profile of 144 species of plants have been completed and computerised.
- Micropropagation of Cymbidium sp. and Trachycarpus takil is being undertaken through tissue culture.
- Industrial Section of the Indian Museum of the BSI is engaged in maintaining the Botanical Gallery

Fig 3. Silk Cotton in bloom

alongwith the Economic Herbarium for providing public education and awareness in various fields of plant ecology. Modernisation of the existing Botanical Gallery is in progress.

- The ENVIS Centre on flora bio-diversity continued its activities.
- Special occasions such as the World Environment Day, Van Mahotsava and Biodiversity Day were observed by organising special activities.
- Three scientists of the BSI, viz. Dr. N.P. Singh, Dr. L.K. Banerjee and Dr. S. Karthikeyan have so far been awarded the Vishisht Vaigyanik Puraskar by the Ministry of Environment & Forests.
- Dr. V.J. Nair, Deputy Director, Southern Circle, Coimbatore was awarded a Gold Medal for outstanding contribution in the field of Plant Taxonomy by the Calicut University, Kerala.
- BSI continued to interact with several scientific Institutions of the country.

Fig 4. Flowers head of *Saraca indica*; commonly known as Sita Ashok

- Interaction with different Universities were undertaken through refresher courses to create awareness regarding the convention on Biological Diversity.
- The following books of the BSI were released by various dignitaries during the year.
  - Plant Wealth of Nanda Devi Biosphere Reserve by the Hon'ble Minister for Environment & Forests.
  - The Ethnobotany of Eastern Ghats in Andhra Pradesh, India by the Governor of Andhra Pradesh.
  - Moliolales of India, by the Secretary of the Ministry of Environment & Forests.
  - Bharat ki Vanaspati Vividhita- by Shri N.R. Krishnan, ex-Secretary of the Ministry of Environment & Forests.
- Scientists of the survey attended several international and national meetings during the year and presented scientific papers.
- A scientist of the Northern circle of the BSI participated in the Antarctica Expedition.

Publications of the BSI

- Bharat ki Vanaspati Vividhita
- Plant Wealth of Nanda Devi Biosphere Reserve
- The Ethnobotany of Eastern Ghats in Andhra Pradesh, India

Fig 5. *Pentapenax* sp. at Mehao Wildlife Sanctuary, Arunachal Pradesh

Fig 6. Nipa Palm – an endangered species

Fig 7. *Scapigera* – impatience flower from Western Ghats

- Meliolales of India
- Materials for the Flora of Arunachal Pradesh Vol. I
- Fascicles of Flora of India No.22
- Banaspati Bani Vol.7 (Hindi)
- Parijat — (Hindi)
- Flora of Maharashtra State (Monocotyledones)
- ENVIS Newsletter, Vol.3

The following documents are under publication

- Flora of India, Introductory Volume - Part I
- Flora of Sikkim (check list) vol.I
- Red Data Book of Indian Plants, Vol.4
- Conservation Status of the Endemic Plants in Peninsular India: An Evaluation
- A contribution of Flora of Namdapha, Arunachal Pradesh
- Flora of Madhya Pradesh Vol.II
- Status Report on Bio-diversity of Indian Hot Spot.
- Floristic Diversity and Conservation Strategies in India, Vol. I& II.
- Flora of Hazaribagh District
- Flora of Andaman & Nicobar Islands (Vol.I)
- Flora of West Bengal Vol. I (English)
- An account of the additional elements in Indian Flora
- Flora of West Bengal Vol.I (Bengali)

Fig 8. *Rhododendron arborcum* – Himalayan pride

Fig 9. Poppy – an ornamental flower

Fig 10. *Agapetes* sp. at Mehao Wildlife Sanctuary

- Bulletin of the Botanical Survey of India Vol.34
- Bulletin of the Botanical Survey of India Vol. 35
- Flora of Mahanadi Delta.
- Flora of Bilaspur Vol.II
- Flora of Champaran District, Bihar
- Annual Report for the year 1990-91, 91-92, 92-93, 1993-94 & 94-95

Survey of Fauna

Zoological Survey of India (ZSI)

Established in 1916, the main objective of ZSI is exploration and survey of the faunal bio- diversity of the country. The headquarters of ZSI is at Calcutta and it has 16 regional stations located in different parts of the country.

Highlights of various activities of ZSI during the year are as follows :-

Exploration and Survey of Faunal Resources :

Ecosystem Survey

A total of 54 surveys covering 60 districts falling under different eco-systems was conducted by the scientists of the survey during the period under report.

Freshwater Ecosystem : Explorations of Kondakaria lake in Andhra Pradesh and Loktak lake in Manipur were undertaken.

Coastal and Marine Ecosystem : This ecosystem was explored by conducting surveys of Andhra Pradesh Coast and Gulf of Mannar Biosphere Reserve.

Fig 11. *Bruguiera gymnorrhiza* (Linn.) Lamk – mangroves showing the viviperous germination

Fig 12. Cactus in bloom

Wetland Ecosystem : Ujani Wetland in Maharashtra, Harike Wetland in Punjab, Sambhar and Pichola Lakes in Rajasthan and Doon Valley in Uttar Pradesh were surveyed.

Estuarine Ecosystem : Under this ecosystem the newly emerged Nayachar island of Sunderban delta in West Bengal was explored.

Desert Ecosystem : Exploration of Ladakh Cold Desert Region in Jammu & Kashmir and Desert Biosphere Reserve area of Jaisalmer and Barmer districts in Rajasthan were carried out.

Tropical Rain Forest Ecosystem : Faunal exploration was undertaken in Idukki district of Kerala State.

Conservation Area Survey

Faunistic surveys were conducted in conservation areas covering Valmiki Tiger Reserve in Bihar, Sanjay Gandhi and Tadoba National Park in Maharashtra, Desert National Park in Rajasthan, Anaimalai Reserve Forest in Tamil Nadu, Parambikulam Wildlife Sanctuary in Kerala, Govind Pashu Vihar in Uttar Pradesh, Mahatma Gandhi Marine National Park in Andaman & Nicobar Islands and Bethuadhari Reserve Forest in West Bengal.

Fig 13. *Haliatus leucogaster* – a whitebellied sea eagle

State Fauna Survey

Under the district wise survey programme of the Department, explorations were carried out in Arunachal Pradesh, Bihar (Araria, Jahanabad, Katihar, Kishangang, Nawada and Prunea districts), Madhya Pradesh, (Guna and Shivpuri Districts), Rajasthan (Jaisalmer and Barmer Districts), Sikkim, Tamil Nadu (Chingleput, Ramanathapuram, Tuticorin, Tiruchendur and Kanniya Kumari Districts), and West Bengal (Darjeeling, Jalpaiguri and Purulia Districts and Sunderban Mangroves).

Environmental Impact Assessment Studies

The Environmental Impact Assessment surveys were conducted in Gadchiroli district of Maharashtra for inspection of Tutli Project site and Hooghli River (in and around Haldia) of West Bengal.

Faunistic Studies

During the year, faunistic surveys were undertaken in 11 states, 9 conservation areas and 7 specialized ecosystems.

State Fauna : Details of collections made during the faunistic surveys to different states are presented in Table-1.

Fauna of Conservation Areas, Wildlife Sanctuary, National Parks and Tiger Reserves

- Parambikulam Wildlife Sanctuary, Kerala : 57 examples (8 species) of Hymenoptera, 39 examples (7 species) of Amphibia and 14 examples (5 species) of Reptillia were studied and identified.
- Tadoba National Park, Maharashtra : 35 examples (4 species) of Thysanoptera, 9 examples (3 species) of Cladocera and 3 examples (1 species) of Arachnida were identified.
- Pench National Park : 25 examples (3 species) of Thysanoptera were determined.
- Mt. Harriet National Park, South Andaman : 10 examples (4 species) of Hemiptera and 33 examples (14 species) of Lepidoptera were studied and identified.
- Eravikulam National Park : 15 examples (2 species)

Fig 14. A moth at WII campus

Fig 15. Wild ass – an endemic species

of Mollusca, 34 examples (6 species) of Lepidoptera, 35 examples (4 species) of Hymenoptera, 10 examples (2 species) of Amphibia, 8 examples (3 species) of Reptilia and 1 example (1 species) of Mammalia were studied and recognised.

- Govind Pashu Vihar, U.P. : 1 example (1 species) of reptile was identified.
- Melghat Tiger Project Area : 11 examples (3 species) of Rotifera, 25 examples (6 species) of Mollusca, 8 examples (2 species) of Orthoptera 6 examples (3 species) of Cladocera, 31 examples (4 species) of Amphibia, 24 examples (3 species) of Reptilia and 6 examples (3 species) of Mammalia were studied and determined.
- Valmiki Tiger Reserve, Bihar : 108 examples (6 species) of Amphibia and 32 examples (2 species) of Reptilia were studied and identified.
- Gulf of Mannar Biosphere Reserve : 1 example (1 species) of Crustacea was studied and recognised.

Fauna of Specialised Ecosystems

Wetland Ecosystems :

- Harike Wetland, Punjab : 33 examples (3 species) of Oligchaeta, 29 examples (8 species) of Lepidoptera, 99 examples (4 species) of Pisces and 54 examples (4 species) of Amphibia were studied and identified.
- Sukhna Wetland, Chandigarh : 4 examples pertaining to 1 species of Oligochaeta were studied and determined.

Fig 16. A panoramic view of Kedarnath Wildlife Sanctuary

Table - 1 : Groups of Animal Collected

(Total number of specimans and species in parenthesis)

States Surveyed	*Protozoa*	*Nemathel-minthes*	*Platyhel-minthes*	*Annelida*	*Bryozoa*	*Sipuncu-lida*	*Rotifera*	*Aptery-gota*	*Thysano-ptera*	*Odonata*	*Isoptera*	*Hemip-tera*	*Lepido-ptera*	*Coleo-ptera*
A & N Islands	-	-	-	-	-	-	-	-	-	41(10)	-	49(12)	235(25)	4(3)
Andhra Pradesh	-	-	-	130(4)	17(2)	-	-	-	-	-	-	-	50(6)	22(2)
Arunachal Pradesh	40(4)	-	-	-	-	-	-	-	-	-	-	-	-	-
Assam	-	-	-	-	-	-	1(1)	-	-	-	-	-	-	-
Bihar	-	22(3)	-	-	-	-	-	-	-	-	-	-	-	-
Delhi	-	-	-	-	-	-	-	-	-	254(20)	-	-	-	-
Gujarat	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Himachal Pradesh	-	-	-	38(4)	-	-	-	-	-	-	-	-	30(5)	-
Kerala	-	-	-	-	-	-	-	-	-	-	-	-	50(5)	-
Madhya Pradesh	-	-	-	-	-	-	-	-	-	39(4)	-	-	147(11)	-
Maharashtra	-	-	-	-	-	-	-	-	11(2)	-	-	4(3)	-	-
Manipur	20(2)	400(40)	-	-	-	-	-	-	-	-	30(3)	370(20)	45(6)	-
Meghalaya	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mizoram	-	-	-	-	-	-	-	-	-	188(15)	-	50(10)	30(4)	-
Nagaland	-	-	7(7)	-	-	-	-	-	-	20(8)	-	-	-	-
Rajasthan	-	16(2)	-	-	-	-	-	-	-	-	-	-	30(4)	-
Sikkim	65(20)	-	2(1)	-	-	-	-	389(4)	89(8)	50(10)	370(8)	384(28)	96(8)	231(15)
Tamil Nadu	-	-	-	-	-	-	-	-	9(9)	-	-	-	-	-
Tripura	50(5)	-	-	-	-	-	15(6)	245(6)	-	-	-	15(6)	250(52)	466(17)
Uttar Pradesh	-	-	-	-	-	-	-	-	-	-	75(4)	-	-	-

Table - 1 : (Contd.)

States Surveyed	*Ortho-ptera*	*Diptera*	*Hymeno-ptera*	*Crustacea*	*Millipede*	*Archinida*	*Acarina*	*Mollusca*	*Pisces*	*Amphibia*	*Reptilia*	*Aves*	*Mammalia*
A & N Islands	11(8)	-	-	-	-	-	-	-	-	-	-	-	-
Andhra Pradesh	-	-	-	50(3)	-	-	-	-	40(15)	-	-	-	81(7)
Arunachal Pradesh	-	-	-	-	-	-	-	-	814(23)	-	-	-	-
Assam	-	-	-	8(6)	-	-	-	-	-	-	-	-	-
Bihar	-	-	-	-	-	-	-	-	-	-	-	-	-
Delhi	-	-	11(5)	-	-	-	-	-	-	-	-	-	-
Gujarat	-	-	-	70(7)	-	-	-	-	-	-	-	-	-
Himachal Pradesh	53(11)	-	-	-	-	-	-	-	-	33(6)	-	-	-
Kerala	-	-	-	-	-	-	76(2)	78(4)	219(13)	-	10(2)	-	-
Madhya Pradesh	-	-	-	150(6)	-	-	-	-	31(9)	-	-	-	-
Maharashtra	-	-	-	-	-	-	135(15)	40(10)	-	-	-	-	-
Manipur	-	-	-	147(5)	-	-	-	-	-	-	-	-	-
Meghalaya	-	-	62(4)	-	-	220(15)	55(17)	96(10)	170(5)	-	-	-	-
Mizoram	32(3)	-	-	-	-	-	-	-	-	-	-	-	-
Nagaland	-	-	-	-	-	-	-	126(3)	-	-	-	-	-
Rajasthan	-	-	-	-	-	-	-	-	32(5)	-	-	-	-
Sikkim	-	-	375(7)	-	-	-	120(25)	-	-	-	-	-	-
Tamil Nadu	-	7(3)	-	26(7)	120(3)	3(1)	-	-	733(37)	-	-	-	-
Tripura	55(6)	-	80(8)	17(5)	-	-	35(9)	-	-	-	-	-	-
Uttar Pradesh	-	-	69(4)	-	-	-	-	-	218(25)	-	-	-	-

- Wetland of Doon Valley : 694 examples (8 species) of Pisces, 62 examples (3 species) of Amphibia and 4 examples (3 species) of Reptilia were studied and recognised.
- Pichola Lake of Rajasthan : 322 examples belonging to 6 species of Pisces were studied and identified.

- **Estuarine Ecosystem Godavary Estuary :** 72 examples (7 species) of Mollusca, 445 examples (13 species) of Polychaeta and 597 examples (59 species) of Pisces were studied and determined.
- **Fauna of Tropical Forest Ecosystem of Western Ghats, Kerala :** 30 examples (8 species) of Hymenoptera, 3 examples (2 species) of Arachnida, 263 examples (11 species) of Pisces, 115 examples (13 species) of Reptilia and 10 examples (2 species) of Aves were studied and recognised.
- **Fauna of Desert Ecosystem :** 14 examples (1 species) of Oligochaeta, 7 examples (3 species) of Lepidoptera and 127 examples (3 species) of Pisces of Ladakh cold desert region of Jammu and Kashmir were studied and identified.
- **Fauna of Western Himalayan Ecosystem :** 56 examples pertaining to 6 species of Oligochaeta were studied and determined.

Fig 17. Lesser Pied Kingfisher

Fig 18. Spoonbills – regular visitors to wetlands

Fig 19. The Himalayan Marmot (*Marmota bobak* (Mueller)) in Ladakh (J&K)

- **Fauna of Coastal and Marine Ecosystem :**
  - **Andhra Pradesh Coast :** 103 examples (4 species) of Polychaeta, 78 examples (3 species) of Sipuncula, 3 examples (2 species) of Echiura, 925 examples (70 species) of Pisces and 8 examples (2 species) of Reptilia were studied and recognised.
  - **Orissa Coast :** 73 examples belonging to 50 species of Pisces were studied and identified.
  - **Gujarat Coast :** 4 examples (2 species) of Decapoda and 13 examples (7 species) of Pisces were studied and determined.
  - **Madras Coast :** 2 examples comprising 2 species of pisces were studied and recognised.
  - **West Coast :** 287 examples pertaining to 77 species of Pisces were studied and identified.
  - **Digha Coast :** 10 examples belonging to 2 species of Pisces were studied and determined.

Fig 20. Jewel Beetle (*Chrysochroa bicolor*) – a rare and endangered species from Eastern India

- **Fauna of newly emerged Nayachar Island, Sunderban :** 25 examples (3 species) of Apterygota and 30 examples (10 species) of Acarina were studied and recognised.
- **Fauna collected from Sagar Sampada Cruises :** 6,455 examples (13 species) of Chaetognatha were studied and identified.

Development of National Zoological Collections

The National Zoological Collections were further enriched by the addition of 29,386 identified specimens pertaining to 357 species. It includes 4 species (71 examples) new to science out of which 2 species were described by the staff of the Survey.

Following is the list of new taxa described

Phylum	Arthropoda
Class	Insecta
Order	Diptera
Family	Chloropidae

1. Anacamptoneurcem typica Cherian
2. Sepsidoscinis Quardrusita Cherian

Identification and Advisory Services

ZSI continued to render identification and advisory services to various research and teaching institutes in India and abroad, different Central and State Government Departments and individuals. During the period under report 548 zoological specimens pertaining to 180 species were identified. In addition 219 inquiries of scientific and technical nature requiring information and advice on various zoological and allied problems were also attended to.

Fig 21. Black bucks in natural surroundings

Fig 22. Nilgiri Tahr – needs immediate protection

Other activities

- The Fourth Leadership training Course in Environmental Awareness and Wildlife Conservation was organised from 9th to 12th January 1996 at ZSI, Calcutta.
- A one-day training programme on "Conservation of faunal diversity in Bay Islands was organised in July, 96 for the field investigators of the project "Peoples Strategy for Biodiversity Conservation in Andamans" of the Society for Andaman & Nicobar Ecology.
- A seminar cum exhibition on primitive tribes, organised by Andaman Adim Janjati Vikas Samiti was held at ZSI, Port Blair on 19.9.96.
- World Environment Day and Wildlife Week were observed by organising special activities for school children and the general public.
- A training programme on Community Biodiversity was jointly conducted by ZSI and British Council, Calcutta from 15th to 20th January, 1996.
- The Hon'ble Minister for Environment and Forests and Secretary(E&F) visited the Headquarters of ZSI during the year and addressed the staff.
- The director and other staff members of the ZSI participated in several national and international seminars, workshops, conferences etc. during the

year and presented scientific papers.

- State level faunal documents relating to the states of Meghalaya and West Bengal were published during the year.

Forest Survey of India (FSI)

Established in June, 1981 the Forest Survey of India (FSI) is entrusted with the task of survey of forest resources in country. Besides the headquarters at Dehradun, the FSI has four zonal offices located at Bangalore, Calcutta, Nagpur & Shimla.

The objectives of FSI are as follows :

- To prepare a comprehensive State of Forest Report (SFR) including National Forest Vegetation Map (NVN) once in every two years; also prepare thematic maps through use of remote sensing data with minimum essential ground truth verification in 10 years circle.
- To collect, store and retrieve necessary forestry and forestry related data for national and state level planning and to create a computer based National Basic Forest Inventory System (NBFIS).
- To design methodologies relating to forest surveys and subsequent updating. This would include methodology for:-

Fig 23. Mountain goat : generally seen in Poonch area of Jammu & Kashmir

Fig 24. Rain forest at Annamalai, Tamil Nadu

Fig 25. A canopy of Bangitappal Shola forest

  - Vegetation mapping including thematic maps through use of satellite imagery/aerial photographs.
  - Ground Truth verification.
  - Growing stock and volume assessment.
- To undertake work in regard to preparation of forest inventory in selected States/UTs on agency basis until establishment of their own resources survey units.
- To impart training in modern forest survey techniques to foresters at various levels of responsibility in States/UTs/GOI.
- To advise the States/UTs on design and development of regional NBFIS.
- To support and oversee technique/inventory work undertaken by State/UT forest departments.

The activities of FSI during the year were as follows :-

Vegetation Mapping

One of the main objectives of FSI is to assess the extent of forest cover and monitor on a two years cycle the broad changes in forest vegetation cover of the country by using multi-satellite data on 1:250.000 scale.

The first attempt to assess the forest cover of the country by visual interpretation of satellite imageries was made in 1984-85 and the first National Vegetation Map was prepared in 1987 on 1:1 million scale. FSI has now completely switched over to the Indian Remote Sensing Satellite for the assessment of forest cover. Besides visual interpretation of the satellite data, the survey is gradually switching over to digital image analysis, for which purpose, it has an image analysis system configured around VAX-11/780.

The State of Forest Report, 1995, which is the fifth assessment of the forest cover of India based on visual and digital interpretation of the satellite data pertaining to the period 1991-93 was published during the year. As per this report the total forest cover of the country is 639.600 sq. km. which is 19.45% of the total geographic area of the country. The density class wise

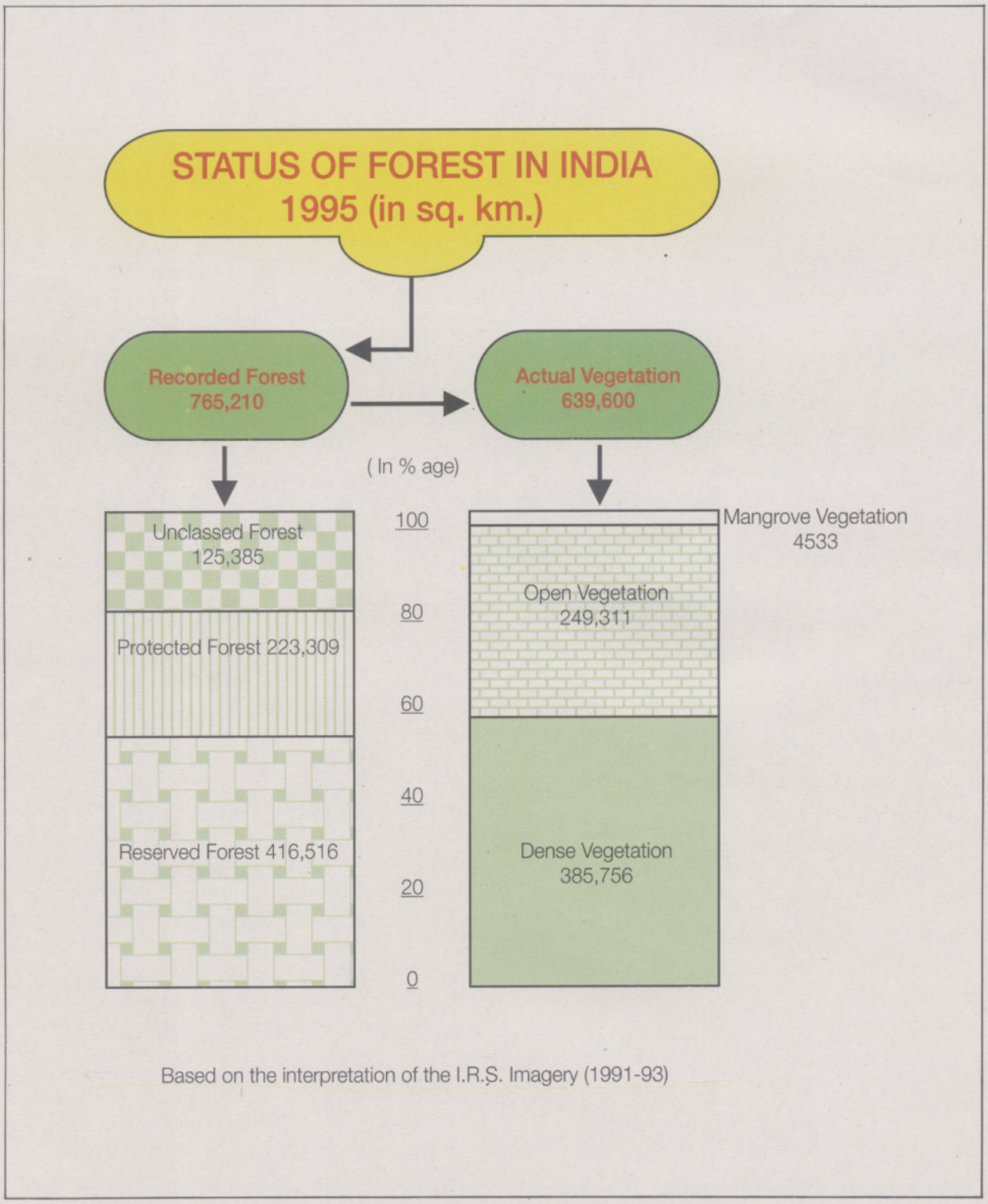


Fig 26. Status of forests in India, 1995

Sl. No.	State/UTs	1995 Assessment	1993 Assessment	Changes in 1995
1.	Andhra Pradesh	47,112	47,256	-144
2.	Arunachal Pradesh	68,621	68,661	-40
3.	Assam	24,061	24,508	-447
4.	Bihar	26,561	26,587	-26
5.	Delhi	26	22	+4
6.	Goa, Daman & Diu	1,250	1,250	No change
7.	Gujarat	12,320	12,044	+276
8.	Haryana	603	513	+90
9.	Himachal Pradesh	12,501	12,502	-1
10.	Jammu & Kashmir	20,433	20,443	-10
11.	Karnataka	32,382	32,343	+39
12.	Kerala	10,336	10,336	No change
13.	Madhya Pradesh	1,35,164	1,35,396	-232
14.	Maharashtra	43,843	43,859	-16
15.	Manipur	17,558	17,621	-63
16.	Meghalaya	15,714	15,769	-55
17.	Mizoram	18,576	18,697	-121
18.	Nagaland	14,291	14,348	-57
19.	Orissa	47,107	47,145	-38
20.	Punjab	1,342	1,343	-1
21.	Rajasthan	13,280	13,099	+181
22.	Sikkim	3,127	3,119	+8
23.	Tamil Nadu	17,766	17,726	+40
24.	Tripura	5,538	5,538	No change
25.	Uttar Pradesh	33,986	33,961	+25
26.	West Bengal	8,276	8,186	+90
27.	A & N Islands	7,615	7,624	-9
28.	Chandigarh	7	5	+2
29.	Dadra & Nagar Haveli	204	206	-2
30.	Lakshadweep*	–	–	–
31.	Pondicherry*	–	–	–
	Total	6,39,600	6,40,107	-507

*No discernible forest cover.

Fig 27. Comparative situtation of Forest Cover in 1993 and 1995 Assessment for India (in sq km)

area of forest cover as per 1995 assessment is given in Table 2

Table-2

Class	Area sq. Km.	% of Geographic Area
Dense forest (Crown density 40% and above)	385,756	11.73
Open forest (Crown density 10% to less than 40%)	249,311	7.58
Mangrove	4,533	0.14
Scrub Area (Tree land with less than 10% crown density)	60,528	1.84
Non-forest	25,87,135	78.71
Total	32,87,263	100.00

Comparison of 1995 assessment with that of 1993 reveals that there has been a decrease of 507 sq. km. in the extent of actual forest cover of the country i.e., an annual reduction of 25,350 hectares. While the forest cover in the states of Delhi, Gujarat, Haryana, Karnataka Rajasthan, Sikkim, Uttar Pradesh and West Bengal and in the Union Territory of Chandigarh has increased, the forest cover in the states of Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab and the Union Territories of Andaman & Nicobar Islands and Dadra and Nagar Haveli has decreased. There has not been any change in the forest cover in the states of Goa, Daman & Diu, Kerala and Tripura. In the Union Territories of Lakshadweep and Pondicherry, there is hardly any discernible forest cover.

During the period 1989-93, forest cover in the North-Eastern Region of the country was reduced by 1418 sq. km. while in the rest of the country, the forest cover has increased by 933 sq. kms.

Thematic Mapping

FSI is engaged in preparing thematic maps on a scale of 1:50,000 by interpretation of aerial photographs. These maps depict the forest types, species composition, crown density of the forest cover and other land uses. These maps are prepared for the entire country on a 10-years cycle. Every year about 5,000 aerial photographs corresponding to 260 topographical sheets are interpreted.

Electronic Data Processing

The objective of the Electronic Data Processing unit is to provide qualitative and quantitative information about the forest resources of the country. This unit functions as national forest data bank by storing relevant data on forest inventory which includes the following information:

- Area estimates
- Topographic description
- Classification of forests into industrial, social and environmental forests
- Composition by species in 10 cm diameter class intervals
- Status of forests - healthy or degraded
- Ownership pattern
- Estimation of volume and other growth parameters such as height and diameter in different types of forests
- Estimation of growth, regeneration and mortality for important species, volume equations etc.
- Wood consumption study of the inventory area

Training

FSI organises a number of training programms for forestry personnel on various aspects such as application of remote sensing techniques in forestry including GIS, forest inventory management; electronic data processing; and ground truth verification of vegetation/thematic maps. The duration of training varies from 1 week to 6 weeks depending on the level of personnel and the objective of the training. One-week training is imparted to officers of the Indian Forest Service for exposing them to remote sensing techniques and its applications in forestry. Two weeks training is imparted to working plan officers to train them on the use of remote sensing techniques in preparation of working plans, updating stock maps, ground inventory and data processing. Four weeks training is imparted to forest range officers to train them in interpretation of aerial photographs and satellite data.

Digital Cartography System (DCS)

During the year, a highly sophisticated Digital Mapping System has been procured at a cost of Rs. 7.75 crores for the purpose of preparing vegetation and

Fig 28. View of an Indian rain forest

thematic maps. Major components of the system include a Server, Raster Scanner, Manual Digitizing Subsystem, Graphics Edit Subsystem, Host Computer, Data Transfer Subsystem, Digital Photogrammetry Subsystem and a Cartographic Film Plotting Subsystem.

Once the DCS is commissioned, FSI will be able to publish the "State of Forest Reports" as well as the National Vegetation Maps digitally. The digital Photogrammetry subsystem alongwith analytical one shall allow FSI to update existing thematic maps as well as produce new maps/records containing species, volume and growing stock information. Several important studies like monitoring hot spot areas including highly deforestation prone or fire prone areas can also be undertaken which were hitherto not possible.

Publications of the FSI brought out in 1996

- State of Forest Report 1995.
- Fuelwood, Timber and Fodder from Forests of India.
- Volume Equation for Forests of India, Nepal and Bhutan.
- Bamboo Area and Growing Stock.
- Inventory of Forests Resources of India.
- Vegetation map of India.

3

CONSERVATION OF NATURAL RESOURCES INCLUDING FORESTRY AND WILDLIFE

National Conservation Strategy and Policy Statement on Environment and Development

The National Conservation Strategy and Policy Statement on Environment and Development, 1992, the National Forest Policy 1988 and the Policy Statement for Abatement of Pollution, 1992 are the major policy instruments of the Government for dealing with various instruments of the environment and development in a comprehensive manner. These documents also form the basis for devising strategies, schemes and programmes and regulations for ensuring integration of environmental considerations in the development activities of the various sectors, thus paving the way for achieving sustainable development.

Biosphere Reserves

India's immense biological diversity which is estimated to be over 45,000 plant species and 81,000 animal species, represents about 7% of world's flora and 6.5% of world's fauna, respectively. Nearly 15,000 flowering plants are endemic to the country and in the case of fauna, the extent of endemism is estimated at about 62%.

The Biosphere Reserve Programme is a pioneering effort at pursuing the increasingly difficult yet urgent task of conserving ecological diversity under mounting pressures. The Biosphere Reserves set up so far not only aim to protect representative ecosystems, but also serve as laboratories for evolving alternative models of development. Eight Biosphere Reserves have been set up so far and the details of these are given in Table 3.

Table-3

Sl. No.	Biogeographic Region	Name of the Biosphere Reserve and State	Date of Setting up
1.	West Himalaya	Nanda Devi (U.P.)	18.1.1988
2.	N.E. India	(a) Nokrek (Meghalaya)	1.9.1988
		(b) Manas (Assam)	14.3.1989
3.	Gangetic Plains	Sunderbans (W.B.)	29.3.1989
4.	Coastal	Gulf of Mannar (T.N.)	18.2.1989
5.	Western Ghats	Nilgiri (Karnataka, Kerala, T.N.)	1.8.1986
6.	Islands	Great Nicobar	6.1.1989
7.	Deccan Peninsular	Similipal (Orissa)	21.1.1994

Efforts are on to set up Biosphere Reserves in Little Rann of Kutch, Gujarat; Dehang-Debang in Arunachal Pradesh; Kanchenjunga in Sikkim, the Cold Desert area

Fig 29. Valley of flowers

adjoining Himachal Pradesh and Jammu and Kashmir, Abujhmarh, Kanha, Panchmarhi, and Amarkantak in Madhya Pradesh.

Wetlands, Mangroves and Coral Reefs

Wetlands

Wetlands, which encompass a wide range of inland, coastal and marine habitats, are complex ecosystems sharing the characteristics of both wet and dry environments. They exhibit enormous diversity based on their genesis, geographical location, hydrological regimes and substrate factors, and include marshes, flood plains, tidal marshes, swamps etc.

Wetlands are among the most productive life support systems and are of immense socio-economic and ecological importance to mankind. They are of critical importance for the survival of natural biodiversity and are recognised as sources, sinks and transformers of chemical and biological matter. They provide suitable habitats for fish, winter resorts for a variety of birds and are rich sources of food, fodder and other important biological products. By virtue of natural functioning, they also play an important role in the improvement of water quality, removal of sediments, production of oxygen, recycling of nutrients, control of floods, recharging of aquifers etc.

Fig 30. A mixed flock of cormorants and egrets at Asan reservoir, Dehradun

Realising the importance of conserving wetlands, a National Committee on Wetlands, Mangroves and Coral Reef has been constituted to advise the Government on Policy guidelines for implementing programmes on conservation, management and research on identified wetlands.

Based on the recommendations of this Committee, 18 wetlands have been selected for intensive conservation and management purposes on priority basis. State level Steering Committee have been constituted in the concerned States for formulation and implementation of the management action plan of the selected wetlands. The broad components of a management action plan of a wetland include survey and demarcation, notification, wildlife conservation, development of avifauna and fisheries, pollution abatement, water quality improvement, protection, environmental awareness etc. At the district level coordination committees have been constituted to implement the activities.

India is a signatory to the Convention on Wetlands of International Importance especially as waterfowl habitat generally referred to as Ramsar Convention (1971). The following six wetlands have been designated by India under this convention so far:

- Chilka (Orissa)
- Keoladeo Ghana National Park (Rajasthan)
- Sambhar (Rajasthan)
- Wullar (Jammu & Kashmir)
- Loktak (Manipur)
- Harike (Punjab)

India was a member of the Standing Committee of Ramsar Convention representing the Asian region during the last triennium i.e. 1994-1996. During the 6th meeting of the conference of the Contracting Parties of the Convention, held in Brisbane, Australia in March 1996, a report highlighting the activities carried out during the triennium to promote conservation and wise use of wetlands in the Asian region, was presented by India.

Fig 31. Little egrets in search of food at the bank of Asan river, Dehradun

Fig 32. Mangroves of Godavari-Krishna Delta, Andhra Pradesh

Mangroves

Mangroves are salt tolerant forest ecosystems, found mainly in the tropical and sub-tropical inter-tidal regions of the world. They are reservoirs of a large number of plant and animal species associated together over a long evolutionary time and exhibiting remarkable capacity for salt tolerance. They stabilise the shoreline and act as a bulwark against encroachments by the sea. The rich biological diversity of the mangroves provide sources of livelihood for the people of the area and some mangroves support flourishing apiary industries.

India harbours some of the best mangroves in the world, located in the alluvial deltas of rivers such as the Ganga, Mahanadi, Godavari, Krishna and Cauvery as well as on the Andaman and Nicobar group of islands. The total area covered by mangroves in India is estimated at about 6700 sq. km. which constitutes about 7% of the world's mangroves. The Sunderbans of West Bengal represents the largest stretch of mangroves in the country and covers an area of about 4200 sq.km. The Andaman and Nicobar Islands account for an additional 1200 sq. km. while small patches are found in the State of Andhra Pradesh, Tamil Nadu, Orissa, Maharashtra, Kerala, Gujarat, Goa and Karnataka.

The scheme on Conservation and Management of Mangroves and Coral Reefs was initiated during 1986-

Fig 33. Collection of mangrove fodder (*Avicennia marina*) in Andhra Pradesh

87. Based on the recommendations of the National Committee on Wetlands, Mangroves and Coral Reefs, 15 mangrove areas have been identified for intensive conservation and management purposes. The main activities under the scheme include implementation of Management Action Plans and promotion of Research. Management Action Plans for all the 15 identified mangrove areas have been prepared out of which the following were sanctioned during the year;

- Andaman and Nicobar Islands
- Sunderbans (West Bengal)

Coral Reefs

Coral reefs are shallow-water tropical marine ecosystems, characterised by a remarkably high biomass production and a rich faunal and floral diversity. The structure of a reef is formed by a calcareous skeleton which houses the coral, a type of soft- bodied radially symmetrical marine invertebrate belonging to phylum Coelenterata. Millions of coral skeletons cemented together over a period of time ranging from a few thousands to millions of years result in the formation of coral reefs, which are of three types:

- Fringing reef
- Barrier reef
- Atoll reef

The major reef formations in India are restricted to the Gulf of Mannar, Palk Bay, Gulf of Kutch, A&N and Lakshadweep Islands. While the Lakshadweep reefs are atolls growth the other reefs are all of fringing type. Patchy coral is present in the inter-tidal areas of the Central West Coast of the country.

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

- Lakshadweep
- Andaman and Nicobar
- Gulf of Mannar
- Gulf of Kutch

Fig 34. Soft corals (Sinularia sp.) – of Andaman & Nicobar Islands

The National Committee constituted for conservation and management of wetlands and mangroves also advises the Government on policy issues related to conservation and management of these fragile areas. State level Steering Committees have been set up for the formulation and implementation of the Management Action Plans for the identified coral reef areas and such Management Action Plans have been sanctioned for the Andaman and Nicobar and Gulf of Mannar coral reefs so far.

Biodiversity Conservation

The scheme on biodiversity conservation was initiated during 1991-92 to ensure proper coordination among various agencies concerned with issues relating to conservation of biological diversity and to review, monitor and evolve adequate policy instruments for the same.

Pursuant to the ratification of the Convention on Biological Diversity (CBD) by India on 18th Febuary, 1994, several steps have been initiated to meet the commitments under the Convention, and to realise the opportunities offered by the Convention. These efforts aim at bringing the legislative, administrative and policy regimes in tune with the three-fold objectives of Convention.

A National Action Plan on biological diversity is under finalisation. This Plan aims at consolidating the on-going efforts of conservation and sustainable use of biological diversity and to establish a policy and programme regime for this purpose.

Fig 35. A Cormatulid feather star among the rocks at Havelock Island

Fig 36. *Antheraea paphia* : a Tassar moth with cocoon

Other activities of this scheme during the year are as follows :-

Biosafety Protocol

Pursuant to the decision of the Second Conference of the parties to the Convention on Biolgical Diversity, an inter-ministerial Task Force on Biosafety was constituted to work on the elements of the protocol. The Task Force is continuing to work on these issues.

Biodiversity Information Network

An exercise has been initiated to develop a distributed Biodiversity Information Network. The existing infrastructure and systems available in various organisations are being assessed for this purpose. Work has also been initiated to standardise the data formats.

Capacity building in taxonomy

Development of perspective plan for taxonomic capacity building in the country is being considered.

Consultations with the State Governments

In order to involve the States fully in the issues of biodiversity and to encourage State-level consultations,

a detailed paper bringing out the various issues of relevance to the States on the subject of biodiversity has been prepared and communicated to the Chief Secretaries. They have been requested to organise State level inter-departmental meetings to formulate the State's views regarding the policy and strategy. Some States have already organised such meetings.

Traditional Knowledge and Benefit Sharing

Consultations have been organised with concerned Ministries, experts, NGOs, and lawyers to deliberate on these issues. A workshop is also being planned on the subject involving the industry, experts, NGOs, through the Indian Institute of Management, Ahmedabad.

In the second and the third meetings of Conference of the Parties to the CBD, India emphasised upon the inclusion of additional obligation for patent applications to : disclose the country of origin for biological material and information pertaining to knowledge, innovations and practices of indigenous and local communities; statement that Material Transfer Agreement or Information Transfer Agreement with the country of origin have been entered into upon mutually agreed terms.

Fig 37. Blue Tiger Monarch butterflies

Legislation

Work pertaining to legislation on biodiversity was continued during the year. An internal workshop was held to identify the elements for specific proposals.

Fig 38. Lioness with family at Gir forest, Gujarat

Fig 39. Clearing of forest for cultivation by tribals of Bastar, M.P.

Following discussions/consultations with lawyers, academicians, Government officials and others, further clarity has emerged on the scope of this legislation, which could be as follows :

- Legal status of conservation areas/species including ex-situ collections.
- Access regime for biological diversity
- Protection of indigenous knowledge, practices, innovations; and benefit sharing with communities
- Systems to ensure benefits to the country, as the country of origin
- Biosafety
- Any other matter

During 1996-97, India participated in the following international meetings related to biodiversity :

- Meetings of the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) established under the Convention, held in Montreal in May and September 1996.
- Third meeting of the Conference of the Parties (COP) to the Convention on Biological Diversity held in Buenos Aires, Argentina in November 1996.
- First meeting of the open-ended ad-hoc Working Group on Biosafety, held in Aarhus, Denmark in July, 1996
- Meetings on the MOU with the Global Environment Facility held in Frankfurt in May 1996.
- Meeting on Traditional Knowledge and Benefit Sharing held in Kualalumpur, Malaysia in October, 1996.

During the third COP, India was able to effectively put forth its views on all crucial issues particularly on IPRs and access to genetic resources. Effective lobbying with other developing countries enabled the Indian delegation to have India's concerns and positions reflected in the decisions of the COP on these issues.

Combating Desertification

The objective of the UN Convention to Combat Desertification in Those Countries Experiencing Serious

Drought and/or Desertification Particularly in Africa, signed by India in October 1994, is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification particularly in Africa through effective action at all levels, supported by international cooperation and partnership arrangements in the framework of an integrated approach which is consistent with Agenda 21.

India has decided to ratify the Convention Important obligations to be assumed by India on ratification of the same include :

- according adequate priority to combating desertification and mitigate the effects of drought, and allocate adequate resources in accordance with its circumstances and capabilities.
- promoting awareness and facilitating the participation of local populations, particularly women and youth, with the support of non-governmental organisations, in efforts to combat desertification and mitigate the effects of drought.
- providing an enabling environment by strengthening, as appropriate, relevant existing legislation and, where they do not exist, enacting new laws, establishing long-term policies and action programmes which address the underlying causes of desertification and paying special attention to the socio- economic factors contributing to desertification process.

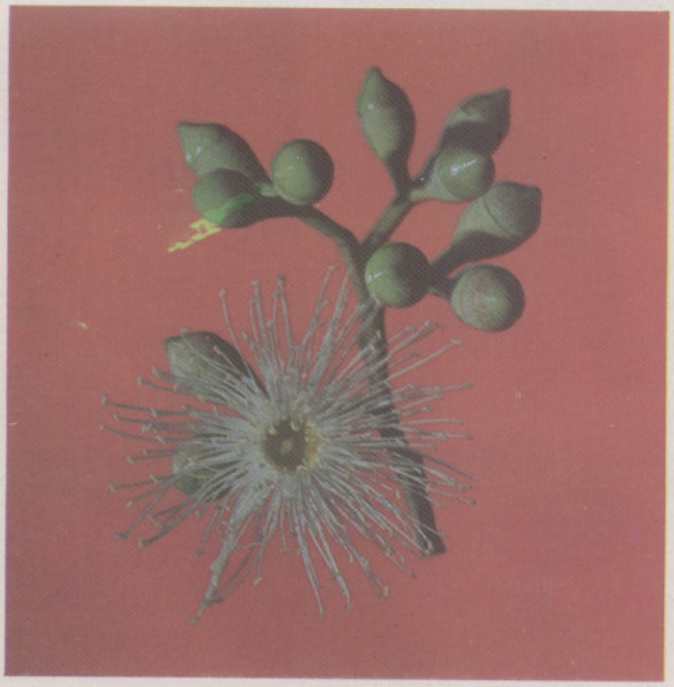


Fig 40. Eucalyptus bud

Fig 41. Estimating of phytoplankton and sea grasses in Chilka lake, Orissa

In carrying out the above obligations, a National Action Programme is required to be prepared, made public and implemented. The overall strategy of the National Action Programme shall emphasize on integrated local development programmes for affected areas, based on participatory mechanisms and on the integration of strategies for poverty eradication with efforts to combat desertification and mitigate the effects of drought.

In addition to measures being taken for preparation of National Action Programme, India continued to be represented during the negotiations in the ninth and tenth Session of the Inter-governmental Negotiating Committee on matters relating to financial mechanism, institutions and procedures and to interim arrangements and preparations for the first meeting of the Conference of the Parties (COP).

In collaboration with the Interim Secretariat of the Convention, India hosted a Regional Meeting on the Implementation of the Convention in Asia in August 1996, which was attended by representatives from Asian countries, developed countries, international organisations, and non-governmental organisations from India and the rest of Asia. It was resolved to initiate consultations among the countries of the Asian region with a view to identifying specific programmes for regional cooperation in the following areas :

- Scientific Cooperation and Technological Transfer
- Capacity and Institution Building
- Education and Awareness Raising
- Information and Assessment
- Drought Preparedness and Disaster Mitigation in the Context of Climate Change
- Research Studies on Enabling Macro-policy Framework
- Establishing Regional Cooperation on Land Degradation across different Climatic sub-regions.

Ex-situ Conservation

Assistance to Botanic Gardens

This scheme was initiated during 1991-92 to augment the activities for ex-situ conservation and propagation of rare plant genetic resources in different regions of the country through a network of botanic gardens. Under this scheme an one-time, non- recurring financial assistance is provided to botanic gardens for strengthening their existing facilities to ensure conservation and propagation of rare and endangered endemic plant species of the region.

Fig 42. Prawn culture in Chilka lake, Orissa

The Botanical Survey of India has prepared a list of endangered plants in different phytogeographic regions of the country and an Expert Group constituted by this Ministry examines the proposals received from various

Fig 43. A panoramic view of the Himalaya from Gangotri

institutions, universities and State Governments/UTs for assistance under this scheme.

Pursuant to the decision taken in the meeting of the Expert Group on botanic gardens held on 25.10.96, financial assistance amounting to a total of about Rs. 50 lakhs is being processed.

Forest Conservation

Conference of State Forest Ministers

A conference of State Forest Ministers was organised at Vigyan Bhawan, New Delhi on 26-27th August, 1996 to deliberate on a number of important issues relating to Forest Policy, Conservation and Protection of Forests, Afforestation, Cadre management, Forestry Research and Training, Conservation of Wildlife, and issues of North-Eastern States.

Forest Ministers from 18 States, the Lt. Governor of Andaman and Nicobar Islands, Forest Secretaries, Principal Chief Conservator of Forests and Chief Wildlife Wardens of States participated in the Conference. The Conference was structured into three working groups dealing with general forestry, wildlife, and issues relating to north-eastern States. The approved recommendations of the conference have been sent to all the States/UTs for necessary action.

Implementation of the Forest (Conservation) Act, 1980

Under the provisions of the Forest (Conservation) Act, 1980, prior approval of the Central Government is essential for diversion of forest land for non-forest purpose. Since the enactment of the Act, the rate of diversion of forest lands has come down to around 25,000 ha. per annum from around 1,43,000 ha. per annum before 1980.

Fig 44. A view of Deodar forest at Chakrata, Dehradun

Fig 45. A flowering desert plant, locally known as teat in Haryana

During 1996, more than 500 proposals from various State and UT Governments were processed under the Forest (Conservation) Act, 1980 out of which 263 were fresh proposals. The status of these proposals is given below :

Total received	263
Total approved (Stage-II)	239
Total approved in principle (Stage-I)	87
Total rejected on merit	36
Pending with Central Government	6
Withdrawn	-
Pending with State Government for want of information	93

Regional offices of the Ministry - Monitoring of projects approved under the Forest (Conservation) Act 1980 and the Environment (Protection) Act, 1986

The primary functions of the Regional Offices of the Ministry are to monitor and evaluate the on-going forestry projects and schemes with specific emphasis on conservation of forests and to follow-up on the implementation of conditions and safeguards laid down by the Ministry while granting environmental clearance to development projects. The Regional Chief Conservator of Forests are empowered to decide cases on diversion of forest land for non-forestry purposes upto the extent of 5 ha. except mining and regularisation of encroachments. They have also been empowered to examine cases involving forest land between 5 ha. to 20 ha. in consultation with the State Advisory Group.

During the year another Regional Office has been set up in Ranchi to cater to the State of the Eastern Plateau or Upper East. There are thus seven Regional Offices functioning at Bangalore, Bhopal, Bhubaneswar, Lucknow, Shillong, Chandigarh and Ranchi. Details of the Regional Offices and their jurisdictions are given in Annexure-II.

Region-wise targets for monitoring of cases under the Forest (Conservation) Act 1980 and the Environment (Protection) Act 1986 for the year 1996-97 and their achievements upto December 1996 are given in Table 4.

Fig 46. Nishi tribe of Arunachal Pradesh – solely dependent on forests

Forest Legislation

The Indian Forest Act, 1927 is the main Act which regulates the management of forest by the States. Work relating to the amendment of this Act is in progress.

Table - 4

Statement Showing Region-wise Physical/Financial Targets and Achievements for Monitoring Cases Under FCA 1980 and EPA 1986 for the Year 1996-97

(as on Dec. 96)

Regional Offices	Physical							Financial	
	FCA (No. of Cases)		EPA (No. of Cases)		Site Inspection	No. of Cases approved under FCA below 5ha.	No. of Cases approved under FCA 5ha. - 20ha.		
	Target	Achievement	Target	Achievement				Target	Achievement (Rs. in lakhs)
Bangalore	165	99	100	34	8	19	18	27.79	20.65
Bhopal	165	119	100	52	32	58	22	29.81	23.04
Bhubaneswar	165	73	100	58	28	54	31	32.45	28.7
Lucknow	165	105	100	79	83	62	5	29.25	23.19
Shillong	115	33	65	7	1	5	2	28.85	20.9
Chandigarh	75	39	35	20	-	27	4	21.65	14.45
RO (HQ)	-	-	-	-	-	-	-	50.2	46.08
Total	850	468	500	250	152	225	82	220	177.01

Association of Scheduled Tribes and Rural Poor in Regeneration of Degraded Forests on Usufruct Sharing Basis

Initiated during the 8th Five Year plan as a 100% Centrally Sponsored scheme, the objectives of this scheme are:-

- To improve forest based biomass resource base in degraded forests and to manage it on a sustained basis for domestic needs of the identified communities.
- To involve local scheduled tribes and other rural poor in protection and development of degraded forests.
- To provide gainful employment and a sustainable economic base to scheduled tribes and rural poor in the vicinity of their habitation.

The scheme is under implementation in nine States namely, Andhra Pradesh, Bihar, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Orissa, Rajasthan and West Bengal on the basis of projects prepared by them. The total outlay of the scheme for the 8th Plan is Rs. 735 lakhs and a sum of Rs 651 lakhs has been released to the State Governments so far.

Joint Forest Management

The National Forest Policy, 1988 envisages people's involvement in the development and protection of forests to fulfill the objectives of providing fuelwood, fodder and small timber to local communities as well as to develop the forests for improving the environment.

In order to implement the policy prescription, the Ministry of Environment and Forests issued guidelines

Fig 47. Collection of non-timber forest products by villagers at Jalpaiguri, West Bengal

Fig 48. Meeting of a village forest protection committee under Joint Forest Management Programme at Udaipur

on 1.6.1990 to involve the village communities in the development and protection of degraded forests on usufruct basis. The concept of Joint Forest Management (JFM) was accordingly initiated and endorsed to all States and Union Territories for oprationalising the same by developing appropriate mechanisms. So far 17 States have issued their resolutions for JFM. As per reports received from nine States, 4.05 million ha of degraded forests in the country are being managed and protected through approximately 40,300 village Forest Protection Committees.

National Forestry Action Programme

In order to operationalise National Forest Policy, 1988 Government of India decided to formulate a National Forestry Action Programme (NFAP) and signed a project with UNDP in June, 1993. The objective of the project is preparation of a National Forestry Action Programme and long term, medium term and short term perspective plans as well as identification and quantification of investment and technical assistance proposals in line with National Forest Policy, 1988. Implementation of NFAP will contribute to sustainable development and utilisation of forest resources on the one hand an maintenance of ecological balance of the country on the other.

A number of studies have been undertaken under the project. Zonal forest sector reviews have been completed for all states and major union territories. Sixteen subject specific studies and four subcontracts have been carried out through national consultants. Five studies have been undertaken through international consultants.

Fig 49. Collection of Sal seeds (minor forest produce) – an important forest resource

State Forestry Action Program (SFAPs) have been finalised for all the States out of which 20 SFAPs have been approved by the respective State Level Steering Committees. The final NFAP document is proposed to prepared in three volume. The first volume would deal with present forestry scenario in the country and analyse factors contributing to deforestation and degradation of forest resources. The second volume would make future projections and develop policies, strategies, programme structure and institutional framework to meet future challenges. The third volume would compile and analyse investment proposals. While the first volume has already been finalised, work on the other two volumes has also been initiated.

Other Measures for Conservation of Forests

A draft notification has been issued by the Ministry under sections 3(1) and 3(2) (XIV) of the Environment (Protection) Act, 1986 and Rules 5(1) (X) 5(2) of the Environment (Protection) Rules, 1986 to prohibit and regulate the carrying on of the following processes and operations except with the prior permission of the Central Government.

- Setting up of any new wood based unit including saw and veneer mills.
- Expansion and modernisation of existing wood based units including plywood saw and veneer mills.
- Renewal of leases of the existing wood based units including saw and veneer mills.
- Construction of any dwelling units or farmhouses, having of new transmission lines to development of any other new infrastructure, including roads, for setting up of new as well as existing wood based industries, including plywood, saw and veneer mills.

The Notification will be made applicable to Arunachal Pradesh, Assam, Nagaland and A & N Islands.

Export of Red Sanders Wood

In view of the demand from various agencies and the Govt. of Andhra Pradesh, this Ministry had, after careful consideration, recommended to allow export of value added items made of Redsanders wood by all parties and to make necessary amendments in the EXIM Policy 1992-97 in order to avoid hardship to such exporters. The recommendation of the Ministry has been accepted and the Ministry of Commerce has decided to allow the export of only value added items made out of legally procured Redsanders wood subject to specified conditions and against a valid license to be issued by the Directorate General of Foreign Trade. The Notification No. 13 dated Ist October, 1996 and the Public Notice No. 378 dated Ist October, 1996 amending the existing EXIM Policy, 1992-97 have been issued by the Ministry of Commerce.

Export of Sandalwood Oil

Sandalwood oil was considered to be a machine made product of sandalwood and its export was being allowed freely. However, the Supreme Court decree stating that sandalwood oil is a forest produce and not a machine finished product of sandalwood and is therefore not to be exported freely, has necessitated a change in the policy with regard to export of the oil. The Ministry of Environment & Forests consulted the Ministry of Commerce on the conditions under which oil could be allowed to be exported. Based on these consultations, Sandalwood oil has been brought into the restricted list of items for export which permits exports under certain conditions. Through the Public Notice No. 77 issued on 1.1.96, the Ministry of Commerce has stipulated that exports of sandalwood oil could be made subject to the exporter obtaining a certificate of origin from the State Government, a no objection certificate from the MOEF and any other conditions, including a ceiling on quantity, that may be imposed by the Director General, Foreign Trade. As per the Public Notice No. 80 issued by the Ministry of Commerce on 6.3.96, the conditions governing the export of sandalwood oil have come into effect from 1.4.1996.

Modern Forest Fire Control Methods

The centrally sponsored scheme "Introduction of Modern Fire Control Methods in India" launched in 1992-93, continued to be implemented. Under this scheme 100% central assistance is provided to the States for the following items.

- Hand tools
- Fire resistant clothing
- Wireless communication sets
- Fire finding instruments
- Fire tenders
- Creation of fire lines
- Construction of watch towers
- Training and demonstration
- Research and publicity

The scheme is under implementation in eleven selected states viz. Andhra Pradesh, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh and Tamil Nadu.

Wildlife Conservation

The activities to implement the National Wildlife Action Plan were continued during the year. The major activities during the year are as follows:

Protected Area Network

The network of protected areas now comprises 83 National Parks and 447 Wildlife Sanctuaries covering about 1.50 lakh sq. kms. area. This network is spread over all the biogeographic zones of the country including Himalayan, peninsular, marine, estuarine, riverine, mangrove and desert ecosystems.

Fig 50. Chital herd at Bandipur National Park

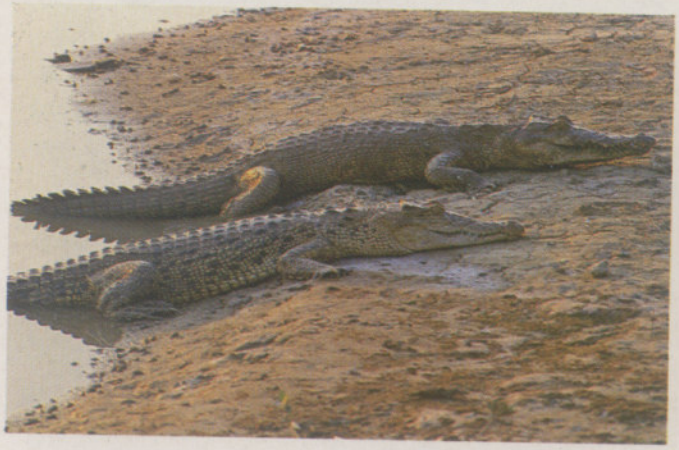


Fig 51. A pair of salt water crocodiles – needs protection

Wildlife Institute of India

Wildlife Institute of India (WII) organised five courses and 63 officers and students were trained during the year. Efforts to build-up professional managers for protected areas through training of professional cadre in all aspects of wildlife were continued at the Wildlife Institute of India. A number of research projects have been initiated and some projects have been completed (Details of the WII are given under chapters 7 and 8).

Control of Illegal Trade

Effective measures were taken for control of illegal trade in Wildlife and its products at national and international levels. The Subramaniam Committee, appointed to look into the issues related to illegal trade in wildlife and wildlife products, has recommended several measures for strengthening anti-poaching infrastructure in the country. The report of the Committee had been circulated to all the State Governments for comments, and the same have been received from most of the State Governments. Action is being taken as per their suggestions.

Wildlife Advisory Committee (WAC)

A Wildlife Advisory Committee has been constituted on 17th October, 1996 to advise on various aspects of wildlife conservation and related matters.

National Coordination Committee (NCC)

A National Coordination Committee (NCC) has been

set up under the Chairmanship of Addl. IGF(WL) to promote effective inter-departmental coordination for the control of illegal trade in wildlife and wildlife products in the country. The Committee consists of representatives from Directorate of Revenue Intelligence, CBI, BSF, ITBP, Commissioner of Police, ND, RPF, New Delhi, Deptt. of Post & Telegraph, Army Head Quarters, Traffic India and RDD's of WLP, of all the four regions. Two meetings of the Committee have been held so far.

Wildlife (Protection) Act, 1972, Revision of

In order to make the Wildlife (Protection(Act, 1972 more effective in terms of penalties, procedures and legal protection to forest and wildlife staff, an Inter-state Committee has been set up to review the Wildlife (Protection) Act, 1972 and other laws. The Committee is expected to submit its report shortly.

The reconstituted Indian Board for Wildlife (IBWL) is headed by the Prime Minister and consists of 10 non-officials, 5 NGOs, 3 MPs and 30 official members. The IBWL is the apex advisory body in the field of wildlife conservation in the country.

Fellowships/Awards

One award and two fellowships namely - Rajiv Gandhi Award and Salim Ali/Kailash Sanhkla Fellowships respectively have been instituted by the Ministry for giving recognition to eminent officers and field workers for exemplary work in the field of Wildlife Conservation and Research. The Kailash Sankhla Fellowship for the year 1996-97 has been awarded to Shri C. Laxhung Pa, Dy. Conservator of Forests, Government of Sikkim.

Fig 52. A pair of Indian otter

Fig 53. Close-up view of Sanghai (*Cirvus aeldi aeldi*)

Awareness Generation

ET&T Corporation, a GOI enterprise, was provided assistance for procurement of copyright and dubbing of video films on Wildlife and Nature Conservation as well as for producing cassettes on the subjects in Hindi and English. Copies of such cassettes have been sent to the State Governments for education and public awareness programmes in their States.

Enforcement of Wildlife (Protection) Act, 1972 and Import-Export Policy

The Wildlife (Protection) Act, 1972 and the provisions of the convention on International Trade in Endangered Species (CITES) and Export and Import Policy of India continued to be enforced through the office of the Regional Deputy Directors of Wildlife Preservation located at Delhi, Mumbai, Calcutta and Chennai, with the help of the State Wildlife Wings, the State Police, the Customs Departments, the BSF and the Coast-Guards. Several cases of poaching and illegal trade in wildlife products were detected. The proposal for shifting the sub-regional office from Pathankot to Amritsar has been agreed to.

Development of National Parks and Sanctuaries

Under the Centrally Sponsored Scheme financial assistance was provided to 19 States for development of National Parks and Sanctuaries. In all, 30 National Parks and 106 Sanctuaries were assisted during the year, and 100 percent assistance was provided for selected items of non-recurring nature to both National Parks and Sanctuaries and 50% recurring items were also supported in the case of some National Parks.

Eco-development in and around National Parks and Sanctuaries

Assistance was provided to the States for taking up programmes of Eco-development around National Parks and Sanctuaries including tiger reserves in order to achieve ecologically sustainable economic development of these areas and to reduce the biotic pressure on protected areas for ensuring conservation of ecosystems. During the year 12 National Parks and 24 Wildlife Sanctuaries were provided assistance.

Siberian Crane Experiment

India is a signatory to the memorandum of understanding (MOU) concerning the Conservation of Siberian Cranes. In addition to India, countries such as Afghanistan, Azerbaijan, Iran, Khazakistan, Pakistan, Russian Federation, Tourkien and Ujbekistan, and the Wild Bird Society of Japan are also signatories to the MOU. During the second meeting of the range states, held at Bharatpur in Rajasthan from 4th to 7th November, 1996 it was decided to place satellite telemetry transmitters on the Wild Siberian Cranes wintering at Keoladeo National Park to monitor the return migratory route of these cranes to Siberia.

Project Tiger

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

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

Fig 54. Middle Button Island National Park of Andamans

Fig 55. A pair of Siberian Cranes in Bharatpur Bird Sanctuary, Rajasthan

Presently, there are 23 Tiger Reserves in fourteen States of the country covering an area of 33,000 sq. km. The list of Tiger Reserves is given in Table-5.

- During 1996-97, an amount of Rs. 850.00 lakhs has been provided as central assistance for development and maintenance of Project Tiger areas under this Scheme. The major activities include habitat improvement, construction of various buildings, roads, water conservation and development of Communication network, setting up of Research and veterinary units and interpretation centers in the Tiger Reserve areas.
- As per the tiger population estimation (tiger census) carried out in the Tiger Reserves during 1995-96, the total number of tigers recorded in 22 Tiger Reserves is 1333. No census was carried out in Valmik Tiger Reserve, Bihar.
- Under the Scheme "Eco-development around important protected areas" an amount of Rs. 230.00 lakhs has been provided to the Tiger Reserve areas during 1996-97. Further, an amount of Rs. 317.00 lakhs is being spent under the "India Eco-

Table - 5

Sl. No.	Name of Tiger Reserve	State	Total Area (in Sq. Kms)
1.	Bandipur	Karnataka	866
2.	Corbett	Uttar Pradesh	1316
3.	Kanha	Madhya Pradesh	1945
4.	Manas	Assam	2840
5.	Melghat	Mahrashtra	1957
6.	Palamau	Bihar	1026
7.	Ranthambhore	Rajasthan	1334
8.	Similipal	Orissa	2750
9.	Sunderbans	West Bengal	2585
10.	Periyar	Kerala	777
11.	Sariska	Rajasthan	866
12.	Buxa	West Bengal	759
13.	Indravati	Madhya Pradesh	2799
14.	Nagarjun Sagar	Andhra Pradesh	3568
15.	Namdapha	Arunachal Pradesh	1985
16.	Dudhwa	Uttar Pradesh	811
17.	Kalakad, Mundathurai	Tamil Nadu	800
18.	Valmik	Bihar	840
19.	Pench	Madhya Pradesh	758
20.	Tadoba-Andheri	Mahrashtra	620
21.	Bandhavgarh	Madhya Pradesh	1162
22.	Panna	Madhya Pradesh	542
23.	Dampha	Mizoram	500
	Total		33046

Fig 56. A tiger under captive breeding programme at National Zoological Park, New Delhi

development Project" for providing assistance to seven selected Project Areas which is being funded by the World Bank under its assistance programme, Global Environmental Facility.

- Under "Beneficiary Oriented Tribal Development Scheme", for voluntary relocation of tribals outside the Protected areas an amount of Rs. 50.00 lakh is available.

Project Elephant

Project Elephant was launched in 1991-92 to assist states having free ranging populations of wild elephants to ensure long term survival of identified viable populations of elephants in their natural habitats. States are being given financial as well as technical and scientific assistance in achieving the objectives of the Project. Main activities are as follows:-

- Ecological restoration of existing natural habitats and migratory routes of elephants;
- Development of scientific and planned management for conservation of elephant habitats and viable population of wild Asiatic Elephants in India;
- Promotion of measures for mitigation of man-elephant conflicts in crucial habitats and moderating pressures of human and domestic stock activities in crucial elephant habitats;
- Strengthening of measures for protection of wild elephants from poachers and unnatural causes of death:
- Research on Project Elephant management related issues;
- Public education and awareness programmes;
- Eco-development;
- Veterinary care.

During the year an amount of Rs. 4.10 crores was allocated to the elephant range states in order to provide financial assistance for habitat management, management of man-elephant conflicts, payment of ex-gratia relief for loss of life etc., strengthening of anti-poaching measures, capture and translocation of problem elephant populations etc. Permission to capture four problem elephants in the states of West Bengal and Assam was given in order to reduce man-elephant conflicts in these states. An amount of Rs. 193.98 lakhs was provided to the elephant range states to strengthen

their antipoaching and anti depredation activities. During 1997-98, management activities are proposed to be intensified under this project.

Central Zoo Authority

The Central Zoo Authority continued to work for improving the upkeep and health care of animals in various zoos of the country. To achieve this objective, research projects on various aspects of animal management and training of zoo personnel were given priority by Central Zoo Authority. The activities of the authority during the year is as follows:

- One medium, eight small and three mini zoos were evaluated during the year, with reference to the standards and norms prescribed under "Recognition of Zoo Rules, 1992". Based on the evaluation, recognition was granted to one medium, five small and 43 mini zoos.
- Financial assistance was provided to various zoos of the country for upgradation of infrastructure and veterinary facilities with a view to improving the health care of animals.

Fig 57. A view of Mundanthurai National Park, Tamil Nadu

- Thirteen proposals for exchange/sale of animals among Indian Zoos and 10 proposals for exchange/ gift of animals with foreign zoos were approved during the year.
- Training programmes and workshops were organised for zoo directors, veterinary officers and zoo keepers.

Fig 58. Elephants bathing at Rajaji National Park, Uttar Pradesh

- Meetings and workshops were held on technical aspects of planned breeding of endangered species such as tiger, lion tailed macaque, lion, red panda and swamp deer.
- One zoo manager and one veterinary officer were deputed to a training programme on "Conservation of Endangered species" at Jersey Wildlife Preservation Trust, U.K.
- A film on "Zoos of India - centres of conservation" was produced and telecast through Doordarshan.
- Zoo education programmes were organised through the National Zoological Park, Delhi and Vatavaran- a Delhi based NGO.
- The budget allocation for CZA for 1996-97 was Rs. 3.00 crores. Of this, 80% was utilised for improvement of the upkeep and health care of animals and infrastructure development within the zoos.

Zoological Parks

National Zoological Park (NZP), New Delhi

One of the main activities of National Zoological Park at New Delhi is to create awareness among the visitors regarding nature conservation. To achieve this, the zoo organises a wide range of activities, the details of which are given below:-

- Under the programme on breeding of endangered animals, breeding of Leopard Cat was achieved for the first time after a gap of 27 years, and the Black Swan (Australia) hatched chicks after seven years. Other notable successes are the birth of Mithun, Eland, Hog deer, Thamin Deer, African Cape Buffalo, Ghoral, etc.
- More than 3000 students participated in various competitions organised by the NZP during the wildlife week.
- Zoo Foundation Day was observed on Ist November, 1996 with cultural programmes and distribution of prizes to the winners of wildlife week competitions. Hon'ble Minister for Environment & Forests was the Chief Guest.
- To remind people about their duties and responsibilities towards wild flora and fauna, a Zoo Run was organised from Jawahar Lal Nehru Stadium to NZP on 23rd December, 1996 in which a large number of students participated.
- Two pairs of fishing cats from Sri Lanka have been introduced in the zoo during the year. Efforts are underway to acquire a pair of Giraffes from Tama Zoo, Japan and a Zebra from Africa.

Padmaja Naidu Himalayan Zoological Park, Darjeeling

This Zoological Park in Darjeeling, an autonomous organisation of the State of Government of West Bengal, houses and breeds a number of endangered and rare species of wild animals and birds of Himalayan region. During the year the park continued its activities including research on the behaviour and breeding biology of the fauna of the East Himalayan region and provided visitors an opportunity to learn about the high altitude fauna and flora. Other specific activities of the park during the year are as follows :-

- A pair of Markhar and Himalayan Tahr received from Helsinki were introduced in the zoo.
- A two day workshop on Red Panda was organised in Darjeeling during 25th to 26th April, 1996.
- A survey of Red Panda population was carried out in an area of 174.88 sq. km. in the Singalia National Park and its adjoining reserved forests in the Darjeeling Division to make an assessment for re-introduction programme of Red Panda in the wild.
- To involve children in the conservation efforts, a "Sit & Draw" competition was arranged in the Park Campus in March, 1996 in which more than 1000 children from different schools participated.

Animal Welfare

The Animal Welfare Board of India was set up in 1962 with its headquarters at Chennai, under the provisions of the Prevention of Cruelty to Animals Act, 1960" (PCA Act, 1980). The Board consists of 28 members representing the Government of India, the veterinary profession, municipal bodies, practitioners of modern and indigenous systems of medicine, Animal welfare Organisation of the country and humanitarians. Two members of the Council of States and four members of Lok Sabha are also on the Board. It is an autonomous body working under the administrative control of the Ministry of Environment and Forests. The main objectives of the Board are :-

- Advise the Government from time to time on matters related to enforcement of the "Prevention of

Cruelty to Animals Act, 1960.

- Enlist the cooperation and coordinate the activities of the Animal Welfare Organisations of the country.
- Provide financial assistance for implementing various ameliorative schemes for the welfare of animals.
- Generate awareness to convert public opinion in favour of animal welfare by publications of resource materials, lectures, exhibitions, film shows, seminars, workshops, camps etc.

Activities of the Board during the year were as follows:

- In order to involve the State Governments in animal welfare activities and to effectively implement the PCA Act, 1960 all the State Governments were requested to constitute State Advisory Boards for Animal Welfare and to appoint Nodal Officers. Twenty four State/UTs have so far notified the formation of such Advisory Boards and 30 States have appointed Nodal Officers for animal welfare.
- The Board has appointed more than 6000 Honorary Animal Welfare Officers so far to check cruelty being inflicted on animals and to protect them.
- The Animal Welfare Board of India, in collaboration with the Royal Society for Prevention of Cruelty to Animals, United Kingdom, has been conducting a series of training programmes of 5 days duration each in different parts of the country to educate and train the members of SPCAs/Animal Welfare Organisations, staff of other relevant departments and the general public and to generate public awareness. During the year 1996, 175 such training camps were organised in different parts of the country.
- To prevent brutal killing of stray dogs by municipalities etc., the board has undertaken a scheme of Animal Birth Control in six metropolitan cities viz. Delhi, Mumbai, Calcutta, Chennai, Bangalore and Hyderabad. More than nine thousand sterilisations were carried out on stray dogs under this scheme upto December, 1996.

Fig 59. The Indian wolf (*Canis lupas*) – becoming endangered due to hunting by village folk

- The Board celebrates Animal Welfare Fortnight from 14th January every year. During this period, rallies for the cause of animal welfare, painting competitions, radio talks, film-shows, etc. are arranged.
- The Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), constituted as per the provisions of the PCA Act, met five times during the year and discussed a number of important issues.
- In order to facilitate the implementation of PCA Act, 1960 and to involve various organisations in the cause of animal welfare, the Board confers recognition to Animal Welfare Organisations of the country. More than three hundred such organisations have been recognised so far. Financial assistance amounting to more than Rs. 86 lakhs has been provided to 96 Animal Welfare Organisations, upto December, 1996.
- The revised budget allocation for the Animal Welfare Board of India for the year 1996-97 is Rs. 181.00 lakhs Plan and Rs. 34.00 lakhs under Non-Plan.

4

ENVIRONMENTAL IMPACT ASSESSMENT

Introduction

Environmental Impact Assessment (EIA) is an important management tool for ensuring optimal use of natural resources for sustainable development, and it was introduced in our country initially for River Valley Projects in 1978-79. The scope of EIA has been enhanced to cover other developmental sectors such as industries, mining schemes, energy etc. To facilitate project proponents in collection of environmental data and formulation of environmental management plans, guidelines have been evolved and made available. EIA is now mandatory under Environment (Protection) Act, 1986 for 29 categories of developmental activities involving investment beyond certain thresholds.

Environmental Appraisal Committees

With a view to ensuring multi-disciplinary inputs required for environmental appraisal of Development Projects, Expert Committees have been constituted for the following sectors:-

- Mining Projects;
- Industrial Projects;
- Thermal Power Projects;
- River Valley Multi-purpose and Hydro Electric Projects;
- Infra-structural Development & Miscellaneous Projects;
- Nuclear Power Projects;

Environmental Appraisal Procedure

Once an application for environmental clearance is received from a Project Proponent, alongwith requisite documents specified in the EIA Notification, the proposal is scrutinized by the technical staff of the Ministry prior to placing it before the Expert Committees. The Committees evaluate the environmental impacts of the project based on the data furnished by the project proponent and wherever necessary, site visits and independent assessment of environmental aspects are also undertaken. Based on such examination, the Committees make recommendations for approval or rejection of the proposal, which are then processed in the Ministry for approval or rejection.

In case of site specific projects such as mining, river valley, ports and harbors etc., a 2-stage clearance

procedure has been adopted whereby the project proponents have to obtain site clearance before applying for environmental clearance of the project. This is to ensure that ecologically fragile and environmentally sensitive areas are avoided while locating projects. In case of projects which are submitted with required documentation, a decision is taken within 90 days.

Monitoring

Environmental clearances issued by this Ministry are subject to implementation of stipulated environmental safeguards. These conditions are implemented, inter alia, under the provision of Water Act,1974, Air Act, 1981, Environment Protection Act, 1986 and PLI Act, 1991 alongwith their amendments and rules. Monitoring of cleared projects is undertaken by the Regional Offices of the Ministry functioning at Shillong, Bhubaneswar, Chandigarh, Lucknow, Bhopal and Bangalore. The primary objectives of such a procedure is to ensure adequacy of the suggested safeguards and also to undertake mid-course corrections required, if any. The procedure adopted for monitoring is as follows:

- Project proponents are required to report every six months on the progress of implementation of environmental safeguards stipulated by the Ministry while according clearance to the projects.
- Field visits of officers from the Ministry or its Regional Offices are undertaken periodically to collect and analyse performance data of cleared projects.
- In case of substantial deviations and poor or inadequate compliance of conditions, the issue is taken up with the concerned State Governments and nodal Ministries;
- Changes in scope of projects are identified to check whether review of earlier decisions is called for or not.

Status of Appraisal of Projects

During the year, 330 projects were reviewed for environmental clearance. Out of these, 170 projects were granted environmental clearance and 243 projects have been rejected due to non submission of information and non conformity with guidelines of siting criteria. Detailed break up of the status of environmental

Table - 6

Status of Developmental Projects from January to December, 1996

Sl. No.	Nature of the project	Project pending at the begining of the year	Projects received	Project apparaised	Project cleared	Projects rejected/ exemped	Project pending at the end of the year
1.	Mining Projects (a) Environmental Clearance	70	52	90	39	48	35
	(b) Site Clearance	60	26	00	15	64	07
2.	Industrial Projects	73	144	122	54	61*	102
3.	Nuclear Power Projects	01	00	01	00	01	00
4.	Thermal Power Projects	31	43	84	26	14	34
5.	River Valley & Hydro-electric Projects	10	23	25	06	17	10
6.	Infrastructure & Miscellaneous Projects.	66	42	93	30	38	40
	Total	311	330	415	170	243	228

* 18 Industrial projects have been exempted from taking environmental clearance

Fig 60. Eco-rehabilitation of mined areas

appraisal of various projects during the year is given in Table 6.

Mining Projects

During the year, seven meetings of Expert Committee on Mining have been held and 90 projects were appraised from the environmental angle. Out of these 39 projects were cleared and 48 projects were rejected. A total number of 26 proposals for site clearance have been received out of which 15 were cleared. A Regional EIA study on Management strategies in Mining Clusters of Ecologically sensitive areas in Alwar and Gurgaon Districts is in progress. Revised guidelines for preparation of environmental impact assessment statements alongwith environmental management plans have been prepared and are likely to be adopted shortly.

Industrial Projects

During the year 10 meetings of the Expert Committee have been held. Out of 144 projects received for environmental appraisal, 54 were granted environmental clearance, necessary safeguards for pollution control, energy conservation and waste water recycling and adoption of clean technology etc. were stipulated.

Thermal Power Projects

Nine meetings of the Expert Committee have been held during the year. Forty three projects were received and additional information was received in respect of the pending projects. Based on the information received, 84 projects were examined out of which 26 projects were accorded environmental clearance and 14 were rejected. While approving the projects, special emphasis was laid on fly ash utilisation, recycling, reuse of effluents, water conservation, green belt development, monitoring of air and water quality etc. An inter Ministerial Expert Group has been set up to examine the issue of delegation of powers for according environmental clearances for thermal power projects. Based on the recommendations of this Expert Group, action is being taken to carry out necessary amendments to the existing procedures and delegation of authority.

River Valley Projects

Seven meetings of the Expert Committee have been held during the year. Twenty three projects were received for environmental clearance and a total of 25 were examined during the year. Out of this, six projects

Fig 61. Mining operation in Aravallis

Fig 62. Preparation of plots for experimentation on utilization of flyash in reclamation and revegetation of mining degraded land

were cleared and 17 were rejected. Safeguards stipulated while according clearance focussed on catchment area treatment, command area development, rehabilitation of project affected persons, flora and fauna, health and sanitation aspects etc.

Infra-structural Development and Miscellaneous Projects

During the year, six meetings of the Expert Committee have been held. A total of 42 projects were received for appraisal. While thirty eight projects were rejected/closed as adequate information was not received, 30 projects were cleared during the year.

Nuclear Power and Related Projects

No project was received in this sector during the year.

Coastal Area Management

As per the Coastal Area Regulation Zone (CRZ) Notification dated 19.2.91, all the Coastal States/Union Territories were required to prepare their respective Coastal Zone Management Plans (CZMP) within a year of the date of the notification. Since several States had not prepared such plans within the stipulated time, the Supreme Court in its order dated 18.4.1996 directed all the States to prepare the CZMPs by the end of September, 1996. In accordance with the directions of the Supreme Court, all the States and Union Territories have submitted the plans within the stipulated time and the Central Government has approved the same on 29.9.96 with certain conditions and modifications. The States/UTs are now required to regulate development activities as per the provisions of the approved CZMPs and CRZ Notification. In accordance with the provisions under Clause 6(2) of the CRZ Notification 1991, the Coastal States have also been delegated powers to take decisions on proposals exceeding Rs.5 crores falling under CRZ II category as per the approved CZMPs.

Island Development Authority(IDA)

The sixth meeting of Standing Committee of the IDA was held on 20.12.1996 under the Chairmanship of Deputy Chairman, Planning Commission to review the progress of implementation and impact of the programme of development in the Islands of Andaman & Nicobar and Lakshadweep and to discuss various policies and programmes aimed at integrated development of these islands keeping in view the aspects of environmental protection.

No Development Zone around Kaziranga National Park, Assam

The activities of the Petroleum refinery of M/s IBP Co. Ltd. located at Numaligarh (East Kaziranga) is

Fig 63. Experimentation on vegetation cultivation in acidic soil from pyrite mines

likely to exert tremendous pressure on the natural resources and the wild-life habitat of the Kaziranga National Park and its surroundings. To protect the forests, genepool reserves, vegetation and living creatures of the Kaziranga National Park, the Ministry of Environment and Forests, through a notification issued in the Gazette of India vide S.O. 481(E) dated 5th July, 1996, has declared the area within a radius of 15 km around the said refinery site as a 'No Development Zone'.

Constitution of various authorities including those related to environmental impact assesemnt

In order to bring in transparency and accountability in environmental impact assessment procedure and to ensure smooth and expeditious implementation of developmental schemes and projects, the Ministry has constituted several Authorities headed by eminent persons and comprising experts and subject specialists. (Details of the Authorities are given at Ch. 5, p. 67).

Studies on Carrying Capacity based Regional Planning

All development projects utilise natural resources in one form or the other and, depending upon the conversion efficiency of the process, a part of the raw materials gets converted into productive goods and services with the remaining part being thrown into the ecosystem as waste in gaseous, liquid or solid form. Besides representing a resource wasted, the pollutants also create adverse effects including air and water-borne diseases, decrease land productivity, loss of bio-diversity etc. The traditional development process based on the Western model, presumes uninterrupted and abundant supply of resources in perpetuity. It is obvious that such an assumption is not correct. Natural resources are finite and all countries of the world must live and develop within the constraint of 'Limiting Resources' and must ensure optimal utilisation of resources. As such, it is necessary to develop alternative strategies for sustainable development in India.

Carrying Capacity based Regional Planning is one such strategy which takes into account not merely the availability of natural resources but also the environmental quality of the ecosystem so that welfare of the human beings is not impaired. It also takes into account the technological and management interventions

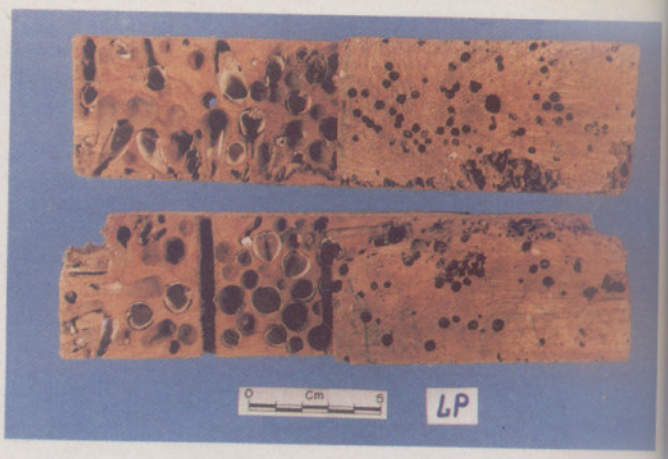


Fig 64. Panels of exposed *Lagerstroemia parviflora* - showing heavy destruction by marine borers

which can help to enhance the carrying capacity of the region. The steps involved in carrying capacity based planning are as follows:-

Resource Base:

- Available natural resources at present.
- Resource Availability and Demand in the perspective plan under
- Business as Usual (BAU) Scenario.
- Resource availability and Demand under alternative and preferred
- Scenario.

Environmental Setting:

- Environmental Quality at present.
- Environmental Quality under BAU Scenario.
- Environmental Quality under preferred Scenario.

Action Plans

- Identification of 'Hot Spots' needing immediate action.
- Implementation plans for 'Preferred Scenario' based on public consultation.

To demonstrate the viability of the carrying capacity based planning process, studies have been taken up in the following selected areas, considered to be representative of similar other problematic areas in the country:

- Ecologically fragile Doon ecosystem;
- Environmentally critical National Capital Region;

Fig 65. Air Quality Scenario in National Capital Region under Business as Usual Scenario and Preferred Scenario

- Industrially and environmentally sensitive Tapi Estuary;
- Environmentally degraded, yet resource-rich Damodar Basin.

All these studies require multi-institutional and multi-disciplinary inputs. Accordingly, a network of institutions such as Delhi University, IIT Delhi, Roorkee University, National Institute of Urban Affairs, National Environmental Engineering Research Institute, Indian School of Mines, M.S. University of Baroda, Operations Research Group, Mechanical Engineering Consultants etc. have been involved in these studies. The outcome of the studies is in form of Business As Usual (BAU) and Preferred Scenarios so that a quantitative and qualitative improvement becomes discernible in the quality of life of the citizens. The Preferred Scenario clearly brings out the improvement in the quality of life through adoption of alternative development strategy which is sustainable in the region. This is illustrated by the Air Quality Scenario in the National Capital Region under the Business As Usual and the Preferred Scenarios in Figure 65.

These studies also clearly underline the following aspects;

- Limiting Resources in the region within which the Project portfolio must be developed:
- Inherent inconsistencies in the Sectoral Policies and need for their harmonisation;
- Restructuring of the administrative and organisational set up to ensure effective implementation of the development plans.

Natural Resource Accounting in Upper Yamuna Basin

The Gross National Product (GNP) is traditionally considered to be an indicator of the economic development of a country. But it is increasingly being recognised that the consumption of natural resources per unit production of goods and services would be a far better indicator than merely its economic value, since this does not always reflect its true worth. The paradox of a natural resource rich but economically poor country like India can be explained by the fact that too much of natural resources like water, minerals, energy, etc. are consumed in per unit production of electricity, or per ton of paper, fertilizer, steel etc. Natural resources being finite and many of them being non renewable, it is imperative that natural resources budgeting is done for ensuring their optimal utilisation.

Accordingly, a study covering the upper Yamuna Basin has been taken up to prepare Natural Resource Accounts so that resource accounting, corresponding to the economic returns, can be correlated and appropriate measures devised for technological and management interventions to ensure a more consistent and better stream of benefits from the same resource base. Like the Carrying Capacity Study, this is the first study of its kind in India requiring multi-disciplinary and multi-institutional input from agencies like Delhi University, Tata Energy Research Institute, Indian Institute of Public Administration, World Wide Fund for nature, IIT Delhi, National Environmental Engineering Research Institute, Operations Research Group and many other institutions at the Centre and State level. The study is expected to be completed in May, 1997.

5

PREVENTION AND CONTROL OF POLLUTION

Introduction

The Policy Statement for Abatement of Pollution adopted in 1992 provides instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, educational programmes and information campaigns to prevent, control and abate pollution of water, air and land. Since the adoption of the Policy Statement, the focus of various programmes and schemes of the Ministry and its associated organisations, aimed at prevention and control of pollution is on issues such as promotion of clean and low wastes technologies, waste minimization, reuse or recycling, improvement of water quality, environment audit, natural resource accounting, development of mass based standards, institutional and human resource development etc. The whole issue of pollution prevention and control is dealt with by a combination of command and control methods as well as voluntary regulations, fiscal measures, promotion of awareness, involvement of public etc. Details of the schemes/ programmes of the Ministry and the Central Pollution Control Board (CPCB) are given in this chapter.

Programmes of the Ministry related to prevention and control of pollution:

Environmental Statement (as part of Environmental Audit)

Submission of an environmental statement by pollution units seeking consent either under the Water (Prevention and Control of Pollution) Act, 1974 or the Air (Prevention and Control of Pollution) Act, 1981 or both and authorisation under the Hazardous Wastes (Management and Handling) Rules, 1989, to the concerned State Pollution Control Boards has been made mandatory through a Gazette Notification issued on 1992 under the Environment (Protection) Act, 1986. The Environmental Statement enables a unit to take a comprehensive look at its industrial operations, facilitates understanding of material flows and focus on areas where waste reduction and consequently savings in input costs, is possible. During the year, the following activities were carried out under this programme: – Sector-wise environmental audit training programmes in respect of thermal power, textile ferrous and non-ferrous, pulp and paper were organised through Confederation of Indian Industry (CII).

– Training programmes are organised through Centre for Environmental Studies, Anna University,

Chennai for officials of Central and State Pollution Control Boards to enable them to acquaint themselves with the use of the software "PARYAVARAN".

- The Central and State Pollution Control Boards have been requested to hire consultants/institutions for analysis of information given in the environmental statements.
- Preparation of environmental audit manuals in respect of sugar, tanneries and lube oil refining industries are in progress.
- A project to conduct sector-wise environmental audit training programmes in respect of caustic soda, fertilizer and dye and dye intermediates has been sponsored to CII.
- A Directory of Environmental Enterprises in India has been brought out through CII which contains information relating to enterprises in the field of environmental goods and services.
- In order to make Environmental Statement more effective, form-V of the Statement has been revised and the revised form has been sent to all the State Pollution Control Boards for comments.

Environmental Statistics and Mapping

Under the 5 years long project "Environmental Statistics and Mapping using Geographic Information System and Remote Sensing with specific reference to Abatement of Pollution" sponsored to National Institute of Science, Technology and Development Studies (NISTADS), CSIR, New Delhi, in 1993, activities relating to production of computerized maps and preparation of Zoning Atlas uing GIS, for siting industries in selected districts of different States have been taken up. About 150 base and thematic maps have been prepared for districts such as Panchmahal (Gujarat), Ghaziabad (Uttar Pradesh), Singhbhum (Bihar), and four districts of Assam viz. Tarang, Sonitput, Gopalpara, and Kamrup and the entire State of Assam and submitted to the CPCB. Besides the allotted districts, NISTADS has also prepared the outline base maps of Chindwara District, Madhya Pradesh. Based on the information available in the Atlas of Forest Resources of India prepared by NATMO, base map, drainage map, forest-type map and forest status maps for the Yamuna River Basin were prepared and digitized on 1:1000,000 scale. Efforts are underway to prepare Nazafgarh Drain Map (Delhi) on 1:50,000 scale; base map of National Capital Region on 1:50,000 scale. The basic idea is to prepare an ambient air quality map of Delhi and Nazafgarh drain, a critically polluted area, depending on the availability of data.

Development And Promotion of Cleaner Technologies

Establishment of Indian Centre for Promotion of Cleaner Technologies (ICPC)

Choice of technology plays a critical role in improving the production efficiency and reducing waste/pollution. Efficient technologies help prevent pollution at source. Our emphasis on "lowest initial Investment", however, has resulted in the adoption of obsolete and outmoded technologies which waste the raw materials and generate pollution. With opening up of the economy it is all the more important that our entrepreneurs are able to access the most efficient technologies in the market. For this purpose it is necessary to carry out performance evaluation of the technologies available for sale, from within or outside the country and rank them on their performance ratings so that the entrepreneurs can negotiate from a position of knowledge while procuring technologies. The ICPC is proposed to be set up as a network of institutions which will provide necessary inputs in creating a data base on available technologies, their performance, the sources from where the technologies can be obtained, needed investment etc. The World Bank has provided a sum of $ 2.0 million for procurement of soft and hardware for the Centre. The ICPC would also undertake the following activities to serve different sectors in the country:

- Rank the available technologies on their Performance Ratings.
- Facilitate upgradation and retrofitting in existing units.
- Undertake demonstration of new and State of the Art technologies.
- Provide training at various levels for efficiency improvement in different development sectors.

The ICPC is designed to become self-sustainable within 5 years.

Fig 66. Pollution due to plastics in the Himalayas

Under the cleaner production programme through promotion of cleaner technologies, a demonstration project on "Thermo-chemical conversion reactor-utilization of distillery waste in sugar mill boilers" has been undertaken by the ESVIN Group of Companies. The objective of the proposal is to concentrate this paintwash for burning it in the boilers so that its pollution nuisance is avoided.

Adoption of Clean Technologies in Small Scale Industries

A scheme for promoting the development and adoption of clean technologies, including waste reuse and recycling has been formulated for small scale industries. The following activities were carried out under this schemes during the year:

- Training and awareness programmes for personnel in Small Industry Development Organisation (SIDO) and for entrepreneurs in Small Scale Industries (SISIs) were organised through Small Industry Service Institutes (SISIs) of DC, SSI.
- Sector-specific manuals in respect of pesticide formulation and electroplating have been prepared.
- Studies on waste minimisation and demonstration in dye and dye intermediates, edible oil industry, tanneries and in selected units of Himachal Pradesh, viz. electroplating, stone crusher, ferro alloy, lime kiln and brick kiln are in final stages of completion.

Waste Minimisation

Under the World Bank assisted Industrial Pollution Prevention Project, a project "Establishing and Running Waste Minimisation Circles in clusters of Small Scale Industries" has been launched with the National Productivity Council as the nodal agency. The objectives of the Waste Minimisation Circles (WMC) are to promote group efforts, increase productivity and improve the environmental conditions in small scale industries through adoption of waste minimisation techniques. The salient features of the WMS are as follows:

- WMC consist of a small group of entrepreneurs belonging to small scale sector.
- The units manufacture similar products and employ similar process of production.
- The circle members meet regularly and periodically in the premises of each member-unit.
- They analyse the operations of the host unit.
- They identify the sources of waste generation and implement waste minimisation measures.

This is expected to lead improvement in individual profitability and reduction in generation of pollution in all the units.

Fifteen WMCs have been established so far in different industrial clusters across the country, covering sectors with a considerable potential for waste minimisation, such as Textiles, Pulp and Paper, Tanneries, Hotels and Metal Finishing. More than 300 waste minimisation measures have been identified by the circle members so far and a majority of them have already been implemented. These measures have resulted in reduction of pollution load to the extent of 15 to 30%.

Control of Vehicular Pollution

The programme for control of vehicular pollution, presently being implemented by the Government, involves the following four major steps:

- Progressive tightening of emission norms for new vehicles.
- Introduction of cleaner fuels.
- Effective enforcement and implementation of an inspection and maintenance programme for in-use vehicles.
- Effective road network and mass transport system and traffic management.

Measures taken by the concerned Central Ministries and Departments to control vehicular pollution are as follows:-

- The programme of introduction of unleaded petrol and catalytic converter fitted vehicles would be extended to the capitals of all States and UTs and along their highways from 1.1.1999 under Phase II. Under Phase III, which would be effective from 1.4.2000, it is proposed to make unleaded petrol available throughout the country, along with leaded petrol.
- Low-lead petrol with a maximum lead content of 0.15 gms/litre has been introduced throughout the country. This measure is expected to reduce particulate lead emissions appreciably.
- Low-Sulphur diesel (diesel with Sulphur content of 0.5% or less) has been introduced in the four metros of Delhi, Mumbai, Calcutta and Chennai from 1.4.1996. Diesel with 0.25%-Sulphur is being supplied in the Taj Trapezium area from 1.9.1996.
- Tighter emission standards for vehicles at the manufacturing stage, notified by the Ministry of Surface Transport, have come into effect from 1.4.1996.
- Stricter emission norms for all categories of vehicles at the manufacturing stage are proposed to be notified by the Ministry of Surface Transport, which would be effective from 1.4.2000.
- Norms for 4-wheeler petrol vehicles fitted with catalytic converters have been finalised and recommended to the Ministry of Surface Transport for notification.
- A notification has been issued by the Ministry under the Environment (Protection) Act, 1986 on 2.4.96 specifying fuel quality for motor gasoline (petrol) and diesel. The Ministry of Petroleum and Natural Gas and the oil companies have been asked to meet the specifications as per the target dates.
- A Committee has been constituted by the Ministry under the Chairmanship of Chairman, Central Pollution Control Board to finalise the quality of 2-stroke engine oils and to recommend standards for smoke from 2-stroke vehicles (2-wheelers and 3-wheelers). These are proposed to be notified in the Environment (Protection) Act, 1986 and in the Central Motor Vehicles Rules, 1989, respectively. Implementation of these two measures is expected to reduce emissions of smoke from 2 and 3-wheelers.

Measures for Controlling Vehicular Pollution in Delhi

The Central and State Governments have accorded high priority for control of vehicular pollution in Delhi. In the Central Government, the issue of pollution in Delhi, particularly vehicular pollution, is being

monitored by the Committee of Secretaries of the concerned Departments under the chairmanship of Cabinet Secretary. A similar high-level Task Force has been set up under the chairmanship of the Lieutenant-Governor, Delhi for formulations of plans and implementation of time-bound programmes to improve the environment of Delhi.

Specific measures taken up during the year include the following :

- Enforcement measures against polluting vehicles were continued by the Transport Department of the Government of NCT of Delhi.
- The prescribed pollution checking fee for all categories of vehicles has been revised by amendment of the Delhi Motor Vehicles Rules.
- The number of petrol stations equipped with pollution check facilities for petrol vehicles have been increased to augment the facilities of the Transport Department.
- The Ministry of Petroleum and Natural Gas has decided to supply pre-mixed fuel (petrol and 2-stroke engine oil) in the specified ratio for the use of 2-stroke engined vehicles in a time-targeted manner. By June 1997, 50% of the outlets in Delhi are expected to supply pre-mixed fuel. This measure is expected to reduce emissions of smoke from 2-wheelers and 3-wheelers.
- The Government of India has approved the first phase of the project for the Mass Rapid Transport System (MRTS) for Delhi.
- Other measures such as enforcement of traffic rules, improvement and expansion of roads, specific steps for decongestion etc. were also taken up.
- To encourage the conversion of in-use vehicles to use cleaner fuels such as compressed natural gas (CNG), the Government has converted a large number of its vehicles to CNG. The Ministry of Petroleum and Natural Gas plans to expand the supply of CNG by setting up additional on-line stations along the HBJ pipe-line.
- Low-Sulphur diesel is being supplied at all outlets of Delhi since 1.4.1996.
- The number of outlets supplying unleaded petrol within city limits has been expanded from 80 as on 1.4.1995 to 97 and in the highways from 8 to 124 as on Ist November, 1996. The number of outlets are expected to be increased during the current year to 222 within the city limits and to 145 in the highways.
- Free pollution check camps continued to be organised by the Transport Department, Government of Delhi and by the automobile manufacturers.

Control of Pollution in the Agra-Mathura Trapezium

Under this programme different actions are being taken by the concerned Ministries such as Ministry of Power, Ministry of Petroleum and Natural Gas, Ministry of Surface Transport and Ministry of Urban Development. In response to a Public Interest Litigation related to the protection of the Taj Mahal, which came up for hearing first in January, 1993, various orders have been issued by the Supreme Court from time to time. The Government has responded and conformed to these orders which include the following:

- Constitution of a special cell for implementation of a green belt development plan around the Taj Mahal (order dated 11.4.96) as suggested by NEERI in its report submitted to the Court. A special Cell has been constituted by the Ministry under the Chairmanship of Joint Secretary, National Afforestation and Eco- Development Board for this purpose and funds are being provided to the State Government of Uttar Pradesh for implementation of the Green Belt Development Plan.
- Constitution of an expert committee on atmospheric environment quality and preservation of the Taj Mahal and Agra Monuments.
- Filing a positive response regarding relocation of industries in the Agra-Mathura region (order dated 1.12.95)
- A Monitoring Committee has been constituted by the Ministry of Environment & Forests on 22.12.95 under the chairmanship of the District Magistrate of Agra, to monitor the level of pollution in Agra. The Committee held quarterly meetings and reviewed the progress on various issues of pollution control recommended by the Varadarajan Committee.

New Initiatives

Constitution of Authorities under the EPA, 1986

In compliance with the various Supreme Court orders the Ministry of Environment and Forests has constituted

the following Authorities under the Environment (Protection) Act, 1986:-

1. National Environment Appellate Authority

The National Environment Appellate Authority ordinance 1997 provides for the establishment of a National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industry, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards under the Environment (Protection) Act, 1986 and for matters connected therewith or incidental thereto. (Please also see Ch. 9, p. 124).

2. Environmental Impact Assessment Authority for the National Capital Region

This Authority is also headed by a Retired High Court Judge and has eight other Members alongwith a Member Secretary. This Authority will deal with the environmental protection problems arising out of projects pertaining to the development of the International Hotel Complex or any other project which Delhi Development Authority or any other agency may initiate in future in the National Capital Region.

3. Loss of Ecology (Prevention and Payments of Compensation) Authority for the State of Tamil Nadu

This Authority, headed by a Retired High Court Judge and comprising of a Member Secretary and three other Members, shall implement the "precautionary principle" and the "polluter pays" principle. The authority shall, with the help of expert opinion and after giving opportunity to the concerned polluters, assess the loss to the ecology/environment in the affected areas and shall also identify the individuals/families who have suffered because of the pollution and shall assess the compensation to be paid to the said individuals/families. The authority shall further determine the compensation to be recovered from the polluters as cost of reversing the damaged environment.

4. Authority for Environmental Planning for Thane in the State of Maharashtra

This Authority is headed by the Secretary, Department of Environment, Government of Maharashtra and has six members alongwith one Member Secretary. The Authority will assess the environmental impact of the industries in Thane and any appurtenant area of relevance to be demarcated by the Authority for the purpose of environmental planning and for determining the future course of action including relocation of industries with the objective of attaining sustainable development in the area.

5. Dahanu Taluka Environmental Protection Authority

The Dahanu Taluka Environmental Protection Authority has been set up on 19.12.96 under section 3 of the Environment (Protection) Act, 1986 by the Ministry under the chairmanship of Justice C.S. Dharmadhikari for the protection of ecologically fragile areas of Dahanu Taluka, Maharashtra.

6. Aquaculture Authority

An "Aquaculture Authority" has been constituted on 6.2.97 under section 3(3) of the Environment (Protection) Act 1986, to deal with the situation created by the shrimp culture industry in the coastal states and Union Territories. Headed by Justice G. Ramanujam, retired Judge of the Madras High Court. This Authority consists of six other members.

Development of Environmental Standards

The Ministry in consultation with the CPCB, develops standards for emission/effluents discharged from specific categories of industries and notifies them under the Environment (Protection) Act 1986. During the year the effluent and emission standards for the following 15 categories of industries were finalised and notified in the Gazette of India:-

- Starch Industry (Maize products);
- Beehive hard coke oven;
- Nriquette Industry (Coal);
- Soft Coke Industry;
- Edible oil & Vanaspati Industry;
- Organic Chemicals Manufacturing Industry;
- Flour Mills;
- Boilers (small);
- Pesticide Industry;
- Oil Drilling and Gas Extraction Industry;
- Pharmaceuticals Industry (Bulk Drugs);
- Emission Standards for Brick kilns;

- Soda Ash Industry;
- Emission Standards for SO_2 from Cupola Furnace; and
- Specifications of Motor Gasoline for Emission Related parameters.

In addition to this National Ambient Air Quality Standards were also notified under the Environment (Protection) Act, 1986.

Status of Pollution Control in 17 categories of identified highly polluting industries

Out of the total number of 1551 industries belonging to the 17 categories of highly polluting industries, 1259 industries have already installed adequate pollution control facilities to comply with the stipulated standards. 112 industries have been closed down and the remaining 180 are in the process of installing the requisite pollution control facilities. Show cause notices have been issued under Section 5 of the Environment (Protection) Act, 1986 to all the 180 defaulting industries. Regular periodic monitoring is being carried out by the Central Pollution Control Board and the State Pollution Control Boards and legal action, wherever required is being taken against the defaulters. State-wise and industry-wise summary indicating the status of pollution control in these 17 categories of industries is given in Tables-7 and 8.

Enforcement of Environment Protection Act in relation to pollution control

Under Section 5 of the Environment (Protection) Act, 1986 show cause notices have been issued to 189 units all over the country in consultation with Central Pollution Control Board. An Action Plan has been devised for the monitoring of all the concerned units to ensure that only those industries which have installed requisite pollution control equipments and are complying with the prescribed environment norms are allowed to operate.

Recognition of laboratories under the Environment (Protection) Act

Under section 12 of the Environment (Protection) Act, 1986, the Ministry recognises certain environmental laboratories to carry out the functions entrusted to them under the Act. The powers for recognising laboratories to Govt. and autonomous organisations have been delegated to the Central Pollution Control Board, whereas the Ministry recognises laboratories in the private sector. During the year, a joint inspection team visited the State of Bihar to inspect 10 laboratories seeking recognition under the Act, and three laboratories have been recommended for recognition.

Industrial Pollution Complaints

During the year 568 industrial pollution complaints had been received and attended to. Most of the complaints relate to pollution from industries operating either amidst thickly populated area or in the immediate vicinity of human settlements. The other category of complaints relates to untreated effluents and emissions from large scale industrial units which contaminate the surface and ground water, create water logging, increase the density of SPM and Sulpher dioxide which in turn affects the crops and human health. Complaints are also received about waste dumps and burning of municipal wastes, and air and noise pollution due to vehicular traffic.

Customs and Excise Duty Reduction for Pollution Control Equipments

Under the notification of the Ministry of Finance, Customs and Excise Duty at reduced rates are provided to the industries/users for certain pollution control equipments. The industries/users apply to the Ministry of Environment and Forests and after examination of the necessary documents the certificates are issued.

In case of new equipment for consideration of customs/ excise duty exemption not covered under the notification, representations are forwarded to the Ministry of Finance.

Ecomark

The 'Ecomark' scheme was launched in 1991 to encourage consumers to purchase products which have less harmful environmental impact. The ultimate objective of the scheme is to improve the quality of the environment and to encourage sustainable management of resources.

A Steering Committee, set up in the Ministry of Environment & Forests, determines the categories of products to be covered under this scheme, while a Technical Committee set up in the CPCB identified the specific products to be selected and the individual criteria to be adopted.

Table - 7

State-wise Summary Status of Pollution Control in 17 Categories of Industries (as on December 31, 1996)

S. No.	States/UT	Total No. of units belinging to 17 categories	Status (No. of units)		
			Closed	Having adequate facilities to comply with the standards	Not having adequate having to comply with the standards
1.	Andhra Pradesh	173	24	141	08
2.	Assam	15	00	10	05
3.	Bihar	62	14	35	13
4.	Chandigarh	01	00	01	00
5.	Delhi	05	00	02	03
6.	Goa	06	00	06	00
7.	Gujarat	177	02	167	08
8.	Haryana	43	03	32	08
9.	Himachal Pradesh	09	00	09	00
10.	Jammu & Kashmir	08	03	01	04
11.	Karnataka	85	04	68	13
12.	Kerala	28	04	20	04
13.	Madhya Pradesh	78	02	57	19
14.	Maharashtra	335	17	296	22
15.	Meghalaya	01	00	00	01
16.	Orissa	23	01	12	10
17.	Punjab	45	02	25	18
18.	Pondicherry	06	00	02	04
19.	Rajasthan	49	05	42	02
20.	Sikkim	01	00	00	01
21.	Tamil Nadu	119	02	114	03
22.	Uttar Pradesh	224	15	187	22
23.	West Bengal	58	14	32	12
	Total	1,551	112	1,259	180

There are no industries of 17 categories existing (PRE-1991) in Arunachal Pradesh, Manipur, Mizoram, Andaman and Nicobar, Lakshadweep and Daman, Diu, Dadra and Nagar Haveli.

(Details of Notifications issued under this scheme are given in Chapter 9.)

Environmental Epidemiological Studies

The on-going projects of environmental epidemiological studies are under progress in certain critically polluted areas viz. Vapi(Gujarat), Chembur (Maharashtra), Cochin (Kerala), Talcher (Orissa), Mandi- Govindgarh (Punjab) and Kanpur (Uttar Pradesh). The Najafgarh Drain Basin in Delhi is also being included under this project, whose objective is to find out the extent of exposure caused to human beings due to various pollutants and the likely adverse impacts on human health.

Network for Environmental Training of Tertiary Level in India and the Pacific (NETTLAP)

The Ministry of Environment and Forests is the National Focal Point for India for the NETTLAP established by UNEP. NETTLAP consists of institutions and individuals active in environmental education and training at the tertiary level in the Asia-Pacific region and is a key activity of UNEP Environmental Education and Training Unit and the Regional office for Asia and the Pacific (UNEP/ ROAP). Under NETTLAP, a National Consultative Forum was convened during February 96 at the Centre for Environmental Studies, Anna University, Chennai

Table-8

Summary Status of Pollution Control in 17 Categories of Industries (as on December 31, 1996)

S. No.	Category	Total No. of units	Status (No. of units)		
			Closed	Having adequate facilities to comply with the standards	Not having adequate having to comply with the standards
1.	Aluminium	07	01	06	00
2.	Caustic Soda	25	00	25	00
3.	Cement	116	04	103	09
4.	Copper	02	00	00	02
5.	Distillery	177	16	122	39
6.	Dyes & D.I.	64	03	56	05
7.	Fertilizer	110	11	96	06
8.	Iron & Steel	08	00	02	06
9.	Leather	70	08	59	00
10.	Pesticides	71	06	62	03
11.	Petrochemicals	49	00	49	00
12.	Pharmaceuticals	251	25	224	02
13.	Pulp & Paper	96	15	64	17
14.	Refinary	12	00	10	02
15.	Sugar	392	21	309	62
16.	TPP	97	02	68	27
17.	Zinc	04	00	04	00
	Total	1,551	112	1,259	180

during which a detailed project proposal has been prepared for establishing a "National Partnership, in Environmental Training (NPET)-India at the Tertiary level". A presentation on the proposal was made by the National Focal Point during the Advisory Committee meeting of NETTLAP, held in December'96 at Thailand. The proposal is under active consideration of the UNDP for assistance.

Under the NETTLAP, the Ministry has nominated the Environmental Protection, Training and Research Institute (EPTRI), Hyderabad as the Sub-regional Thematic Network Node on Toxic Chemicals and Hazardous Waste Management. The aim of this Node is to assist UNEP in conducting training and resource development workshops on the subject in the sub-region and to prepare and disseminate resource materials, training packages and modules.

Central Pollution Control Board

The Central Pollution Control Board (CPCB) is an autonomous body of the Ministry set up in Sept. 1974, under the provisions of the Water (Prevention and Control of Pollution) Act, 1974. It coordinates the activities of the State Pollution Control Boards (CPCBs) and the Pollution Control Committees (PCCs). The CPCB, SPCBs and the PCCs are responsible for implementing the legislations relating to prevention and control of pollution; they also develop rules and regulations which describe the standards for emissions and effluents of air and water pollutants and noise levels. The CPCB advises the Central Government on all matters concerning the prevention and control of air, water and noise pollution and provides technical services to the Ministry for implementing the provisions of the Environment (Protection) Act, 1986.

During the year, CPCB played a significant role by providing technical inputs to the judiciary and also to the industry for securing compliance of pollution control standards. Evolving criteria of identification of hazardous industries in the National Capital Territory of Delhi as per the Master Plan of Delhi (MPD)-2001, monitoring the performance of pollution control devices in industries in the States of West Bengal, Haryana, Gujarat, Madhya Pradesh, Uttar Pradesh, Maharashtra

and Bihar are among the important activities through which CPCB was able to create a positive impact on the industries and also the public at large. Public Interest Litigations have shown that there is an urgent need to speed up implementation processes of laws and policies in consonance with the directive principles of the Constitution of India.

Details of some of the major activities of the CPCB during the year are given below :

Assessment and Monitoring of Water Quality

Water Quality Monitoring of Indian Aquatic Resources

The water quality monitoring network established by the CPCB in collaboration with the SPCBs consists of 480 stations, and functions in a 3-tier system. Tier-1 caters to the needs of the GEMS (Global Environmental Monitoring System), under which fifty stations are monitored by the SPCBs with financial and technical assistance from the CPCB. Monthly monitoring is conducted for 22 parameters and the data is sent to the WHO's (World Health Organisation) centre in Canada. Under Tier-2, water quality monitoring is conducted on monthly/quarterly basis at 430 stations, under the National programme, "Monitoring of Indian National Aquatic Resources" (MINARS). At Tier-3, water quality monitoring is done by the SPCBs at the state level in addition to the stations set up under GEMS and MINARS. The water quality monitoring network covers 14 major, 12 medium and 9 minor river basins, 16 other small rivers, 35 lakes, 24 ground waters, 3 creeks, 2 canals, 2 tanks and 1 pond.

Monitoring of River Ganga and Yamuna in the Himalayan Segment

The Ganga and Yamuna rivers are monitored only in those segments lying in the plains so far. No data are available for the Himalayan segments of these two most important rivers. Since most of the pilgrimage centres are located in the Himalayan segments of these rivers, human activities caused by the increasing number of pilgrims at these centres is contributing to significant degradation in the quality of water. Monitoring of the rivers Ganga and Yamuna has therefore been taken up at the following 13 locations falling in the Himalayan segments.

S.No.	Location
1.	Yamuna at Yamunotri*
2.	Yamuna at Hanuman Chatti*
3.	Yamuna u/s of Dam at Lakhwar
4.	Yamuna d/s of Dam at Lakhwar
5.	Yamuna at Dakpatthar
6.	Yamuna at Allahabad
7.	Ganga at Gangotri*
8.	Alaknanda b/c with Mandakini
9.	Mandakini b/c with Alaknanda
10.	Alaknanda a/c with Mandakini
11.	Alaknanda b/c with Bhagirthi
12.	Bhagirthi b/c with Alaknanda
13.	Ganga a/c with Bhagirthi

Abbreviations : a/c - after confluence; b/c - before confluence; u/s - upstream; d/s - downstream;

Note : Out of the above 13 stations, 3 stations marked with aestrisk are monitored on animal basis while the remaining 10 stations are monitored on quaterly basis.

Automatic Water Quality Monitoring of River Ganga

The Automatic Water Quality Monitoring Stations (AWQMS) installed at five stations on the river Ganga continued to monitor five parameters viz. temperature, pH, DO, conductivity and turbidity at one hour intervals. These AWQMS are parked midstream on floating platforms with solar ponds on top for changing the batteries.

During the year, a survey-cum-monitoring of a small 16 km stretch of river Ganga was taken up to relocate the Kanpur d/s station (Baksar) and the report has been submitted to the Ministry. Another detailed report titled, "Automatic Water Quality Monitoring on River Ganga" was also completed during the year which describes CPCB's experience on Automatic Water Quality Monitoring during 1992-95 and critically analyses the data generated so far. The report has been submitted to the NRCD of the Ministry.

Water Quality Monitoring of the River Yamuna under National River Conservation Programme

Under Pase II f the Ganga Action Plan (GAP), monitoring of the river Yamuna carried out by the CPCB. Since December, 1994, CPCB has modified the

monitoring of this river by increasing the sampling locations to 15 and reducing the analysis to 9 core parameters in a stretch of about 800 km starting from Hathnikund (u/s Tejawala) to downstream of Etawah City (fter confluence of Chambal river). A summary of results of the year, 1996 for relevant critical parameters, such as DO, BOD and total coliform, is presented in Fig-67. The stretch between Wazirabad and Etawah is highly degraded and does not meet the desired water quality standards of 3 mg/l BOD & 500 coliform number/100 ml as prescribed in the designated-best-use classification for this river. However, the dissolved oxygen (DO) was found to be within the desired level of 4 mg/l except in the Delhi stretch of river Yamuna.

Review of Monitoring Programme for River Cauvery

The water quality data for the river Cauvery was analysed during the year to rationalise and optimise the monitoring programme. Parameters to be monitored at all locations have been determined and changes in monitoring sites have also been recommended. The frequency of monitoring has also been charged to eight times per year instead of the present monthly monitoring. The proposed changes have resulted in the reduction of samples from 240 to 120 per year and consequently the expenditure on monitoring of river Cauvery has also been reduced by 50%.

Studies on Medium and Minor Rivers

The CPCB, in collaboration with the SPCBs has formulated a proposal for assessment of pollution loads in polluted stretches of 26 identified rivers in the States of Gujarat, Goa, Karnataka, Kerala, Tamil Nadu and Orissa through survey and monitoring of polluting sources and stream quality. These studies would be taken up under the NRAP by the Ministry.

River Water Quality Profile of River Rapti

A detailed study on the water quality profile of the river Rapti was carried out in February 1996. Rapti is an international river with a total stretch of 782 km, out of which the initial stretch of approximately 331 km falls in Nepal and rest in Uttar Pradesh. During its course, the river travels through the districts of Gonda, Behraich and Gorakhpur of U.P. and then confluences with river Ghagra in Deoria. The main towns which it passes through are Balrampur and Gorakhpur and its major tributaries are Ami and Gurra. Dissolved oxygen (DO) and bio-chemical oxygen demand (BOD) data along the river are shown in Fig.-68. The river has been classified as Class-D; however, the water quality does not meet this classification at the confluence points of its tributaries, both of which are highly polluted due to industrial discharge.

Groundwater Monitoring in Kanpur

The study was conducted in four potential zones selected on the basis of type of industrial activity and other relevant considerations. The groundwater in all the four study zones has been found to contain excessive levels of flouride, chromium, coliforms, dissolved solids, iron and significant concentration of lindane and DDT compared to the CPHEEO drinking water norms. The groundwater is predominantly hard having sizable concentration of chloride and sulphate for spatial concentration of critical parameters (Table-9.)

Table-9

Spatial Concentration of Critical Parameters (Annual maximum concentration)

Critical Parameters	Study Zones			
	Jajmau	Panki	Nauraik-heda	Rakhi-mandi
Physico-chemical				
Hardness	528.8	403.3	4,570.0	1,450.0
Fluoride	1.3	7.5	4.3	7.0
T.D.S.	634.0	1,316.0	977.0	3,874.0
Colour	10.0	50.0	120.0	200.0
Free ammonia	—	4,387.7	—	—
SAR	—	—	38.5	30.6
Metals				
Iron	3.8	40.7	351.8	5.3
Chromium (hexa)	—	0.06	6.2	11.1
Pesticides				
Lidane	1,819.4	19.4	201.6	47.8
DDT	22.2	1,023.0	577.1	706.3

Note : Pesticides in ng/l; Colour in Pt-Co scale; other parameters in mg/l; T.D.S. - total dissolved solids; and SAR - sodium absorption ratio.

Indiscriminate storage/disposal of municipal waste, chrome-rich solid waste and high ammonical effluent from a fertilizer factory are among the reasons for groundwater contamination as recorded in the study.

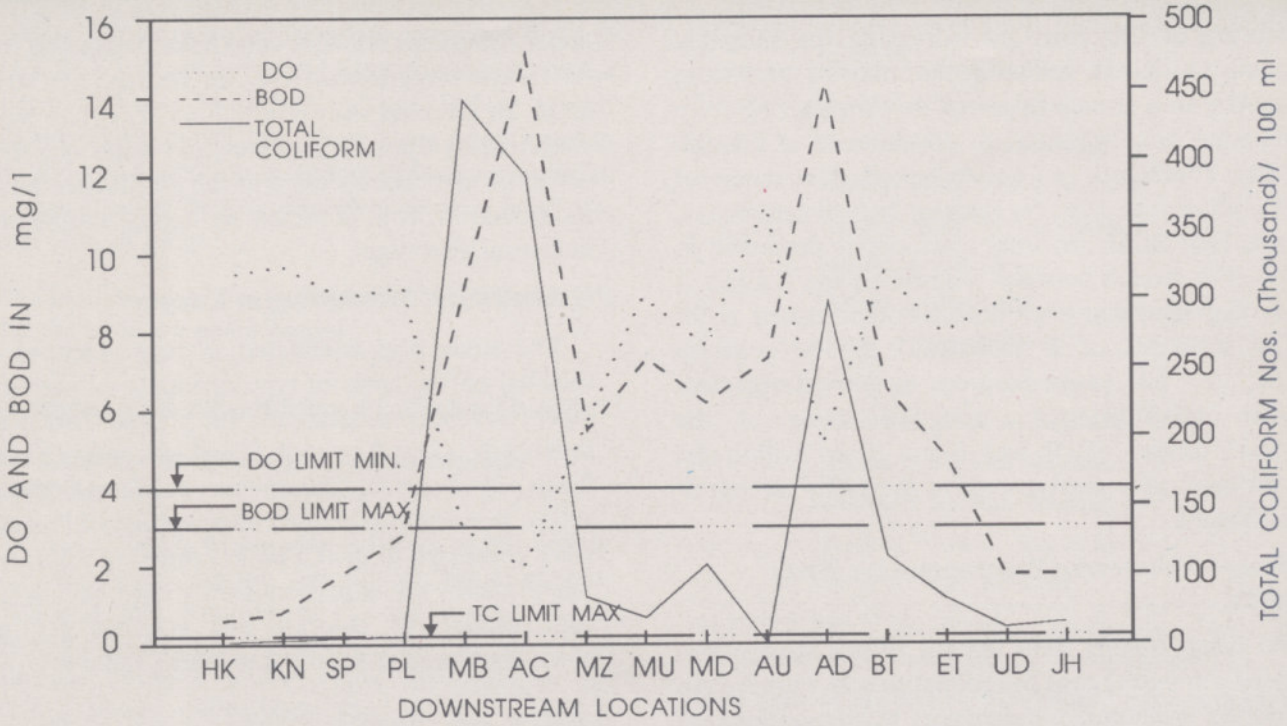


Fig 67. Water quality status of river Yamuna

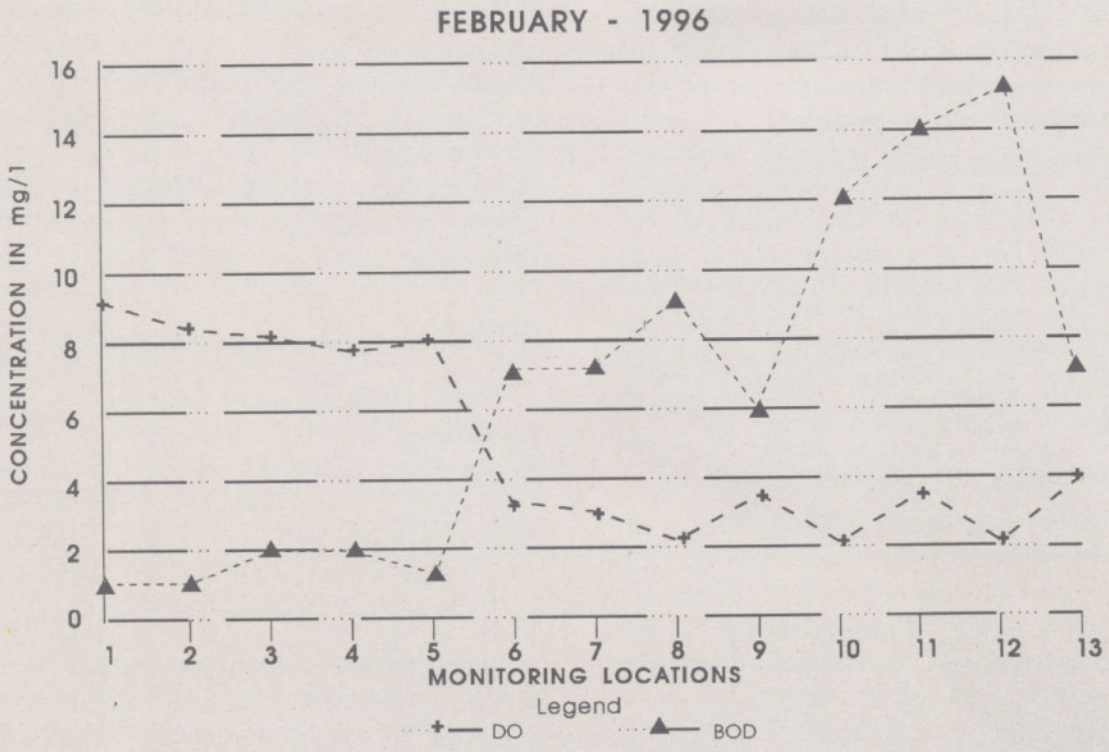


Fig 68. DO and BOD profile of river Rapti

Assessment and Monitoring of Air Quality

National Ambient Air Quality Monitoring Programme

The ambient air quality is a dynamic and complex environmental phenomenon exhibiting variations with time and space. Its evaluation is the fundamental requirement towards assessment of the nature and extent of air quality variables. Under the nation- wide "National Ambient Air Quality Monitoring (NAAQM) programme", initiated in 1984, 290 stations covering over 90 towns/cities spread over 24 states and 4 Union Territories, monitor the ambient air quality. The NAAQM network is operated through the respective State Pollution Control Boards, the National Environmental Engineering Research Institute (NEERI), Nagpur and the Central Pollution Control Board. Besides meteorological parameters like wind speed & direction, temperature and humidity, the stations also monitor pollutants such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and suspended particulate matter (SPM). In addition to these, specific parameters, like ammonia (NH_3), hydrogen sulphide (H_2S), respirable suspended particulate matter (RSPM) and polycyclic aromatic hydrocarbons (PAH) are also monitored.

Continuous Automatic Ambient Air Quality Monitoring in Delhi

The CPCB is operating two fixed and two mobile automatic air quality monitoring stations in Delhi, installed under the Indo-German bilateral project. These stations have facilities for measuring SO_2, NO, NO_2, NO_x, CO and meteorological parameters like temperature, wind speed, wind direction, humidity etc. All these parameters are measured using different Analysers, installed at these stations. Presently, these analysers are calibrated using standard gases. In order to achieve this analytical quality control (AQC) which is essential to ensure compatibility and accuracy of data Static Injection and Ring Test facilities have been developed.

National Ambient Air Quality Monitoring (NAAQM) Network in Delhi

Under the NAAQM Network, the ambient air quality of Delhi is being monitored at six different locations viz. Ashok Vihar, Siri Fort, Janakpuri, Nizamuddin (all Residential areas), Shahzada Bagh and Shahdara (Industrial areas). An integrated Air Quality Monitoring Station is also being operated at ITO intersection at BSZ Marg, Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Suspended Particulate Matter (SPM) are measured at these stations. The ambient air quality observed at these stations during 1996 is presented in Table-10. Sulphur Dioxide (SO_2), Oxides of Nitrogen as NO_2, Carbon Monoxide (CO) and Suspended Particulate Matter (SPM) are monitored at the Integrated Monitoring Station at ITO.

Ambient Air Quality Monitoring in NCR, Delhi

An ambient air quality monitoring study was initiated in the NCR of Delhi, during the year 1994-95, under which monitoring of SPM, NO2 and SO2 has been undertaken in 33 cities/towns covering Haryana, U.P. and Rajasthan besides the six locations in Delhi. While SPM is measured for 24 hours with 8 hourly sampling, NO2 and SO2 measured for 24 hours with 4-hourly samplings. Out of these 33 sites, 16 are in Haryana, 14 in U.P., and 3 in Rajasthan as per details given below :-

Haryana sub-region

1. Faridabad
2. Ballabhgarh
3. Palwal
4. Hodal
5. Kundli
6. Sonepat
7. Samalkha
8. Panipat
9. Bahadurgarh
10. Jhajjar
11. Rohtak
12. Gurgaon
13. Dharuheda
14. Sohna
15. Ferozpur Jhirka
16. Rewari

Uttar Pradesh sub-region

1. Sahibabad
2. Ghaziabad
3. Modinagar
4. Murad Nagar
5. Masuri
6. Hapur
7. Garh-Mukteshwar
8. Surajpur
9. Noida
10. Meerut
11. Daurala
12. Sikandarabad
13. Bulandshahr
14. Khurja

Rajasthan sub-region

1. Alwar
2. Behror
3. Bhiwadi

Table-10

Range of Concentration (Tav-24 Hrs.) of Ambient Air Quality Parameters Data from January, 1996 to November, 1996

Monitoring Stations	SO_2-Tav-24 Hrs.			NO_2-Tav-24 Hrs.			SPM-Tav-24 Hrs		
	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
Ashok Vihar	9	21	15	13	32	25	116	971	364
Shahzada Bagh(I)	19	27	23	35	50	42	250	1010	389
Siri Fort (R)	10	22	15	25	46	32	144	644	338
Janakpuri (R)	9	24	17	27	46	37	123	644	349
Nizamuddin (R)	13	22	17	27	43	37	125	1070	397
Shahdra (I)	6	36	21	9	54	28	142	948	451

Note : All values are in µg/m3

Abbreviations : Min. = Minimum Value; Max. = Maximum Value; Avg. = Average Value; Tav = Total average value; R = Residential Area; I = Industrial Area

Fig 69. A view of Jia Bhorali river, Bhalukpong

Assessment and Monitoring of Vehicular Pollution

The CPCB is authorised to check the calibration of the instruments and checking procedures being adopted by the Pollution Checking Centres (PCCs) authorised by the Directorate of Transport, Delhi Administration. Officials of CPCB visited 26 authorised PCCs in different parts of Delhi during 7th-14th October, 1996 during which observations in respect of the methodology, calibration, workability and accuracy of the emission checking instruments were made.

During the year, CPCB also conducted a survey for assessment of CO (carbon monoxide) emissions from the exhaust of four wheel vehicles fitted with catalytic converters and those without catalytic converters. The results of this survey is given in Table-11.

Monitoring of Solid Waste generation and disposal

Solid wastes arising from human activities have become a major environmental problem, causing extensive pollution threatening human health. The problem of solid waste disposal, both domestic and industrial, has become acute, because of limited disposal facilities. Solid wastes arising from domestic, social and industrial activities are increasing in quantity and variety as a result of increasing urbanisation and rising standards of living. The level of urbanisation in our country in 1951 was 17.29% which increased to 23.33% in 1981 and to 25.72% in 1991 and is estimated to be around 33% by the year 2001 (Fig. 71.)

To ensure environmentally sound management of municipal solid wastes, the CPCB carried out a survey to ascertain the status of solid waste generation, their collection and disposal in 23 metropolis of the country. As per the survey the total quality of municipal solid waste generated by these 23 metro cities is 30,058 tpd, of which Bombay generates the maximum, with 5.355 tdp and Visakhapatnam city, the minimum with 300 tdp. The city-wise municipal solid waste generation and per capita contribution per day are depicted in Fig.-72.

Pollution Status Report : Jammu City

A comprehensive study of Jammu city was undertaken during December, 96 for monitoring the entire environmental quality including ground water quality, drain and rivers for water quality, vehicular exhaust emission (compliance status), ambient air quality, noise monitoring etc. The final points emerging from this study are given below:-

Fig 70. River pollution due to mining

- Industrial estates are located within and around Jammu city housing around 225 industries of which about 85% are small scale industries.
- Groundwater quality has not deteriorated so far. The flouride concentration was found to be below the minimum required concentration.
- River Tawi receives around 65 MLD domestic sewage on cis- Tawi side (Old city) having a BOD load of 28 tdp. This has affected the quality of river Tawi for around 6 km. city stretch and upto 6 kms down stream of the city. Around 6 mld industrial

Table-11

Comparison of Leaded Vs. Unleaded Petrol Driven Vehicles

S. No.	Type of Vehicle	Total Vehicle monitored	Leaded Vehicle (with out catalytic converters)				Unleaded Vehicle (with catalytic converters)			
			No. monitored	% age exceeding limit	Avg. CO%	Avg. HC in PPM	No. monitored	% age exceeding limit	Avg. CO%	Avg. HC in PPM
1.	Maruti (all models)	423	285	27.36	2.41	409	138	15.20	1.87	312
2.	Fiat/118-NE	64	62	28.84	3.33	1286	2	50.00	3.40	375
3.	Contessa/ Ambassador	34	31	33.33	2.70	945	3	33.33	2.40	330
4.	Others	26	19	35.00	3.34	425	7	0.00	0.45	80

Total Vehicles Monitored = 547

water along with 9 mld sewage on trans-Tawi side finds its way to Balol Nullah.

- Jammu has around 1.1 lakh registered vehicles which is very high for a population of around 5.5 lakhs. Around one fifth of petrol driven and one third diesel driven vehicles were found to be non-complying with prescribed norms.
- Ambient air quality was found generally good except SPM which exceeds norms in residential areas. The noise level was also found to exceed norms in residential areas only during day time.
- The Jammu Municipal Corporation lacks facilities to lift 165 tdp solid waste generated within the city. Disposal of solid waste is also improper.

Other Activities

The NGO cell at the CPCB continued to enlist environmental NGOs involved in activities related to pollution control. 35 such NGOs were enlisted during the year and 48 water testing kits have been distributed to NGOs and schools throughout the country.

- A 50% rebate is extended to NGOs enlisted with the CPCB, on CPCB's technical publications.
- Financial assistance was extended to 10 NGOs for organising mass awareness programmes in different parts of the country.
- Selected booklets published by NGOs in different languages relating to environment and pollution control are procured by the CPCB, SPCBs and PCCs and distributed among the people.
- Publication of Parivesh Newsletter was continued and the ENVIS Centre at CPCB responded to 185 technical queries during the year.
- Twenty publications/Newsletters/booklets/reprints were brought out during the year.
- A 20-minute video film on "Lead in the Environment" and a 28-minutes film titled "Tale of the Trash" have been produced. A set of VHS cassettes of CPCB films viz "A matter of life and death", "Air Pollution" and "Warning Signal" has been provided to all the SPCBs and PCCs for awareness creation activities.
- Advertisements on the 'Ecomark' scheme were published by CPCB in a National newspaper and in FICCI's journal to encourage the manufacturers of products to apply for Ecomark.
- The progress in installation of pollution control systems in 1,551 medium and large scale units identified under 17 highly polluting industrial sectors were regularly monitored.
- A total of 1532 grossly polluting industries in respect of 24 States/UTs have been identified for action under the NRAP.
- Inventorisation of hazardous waste generation in the States of Orissa, Kerala and Maharashtra has been completed.

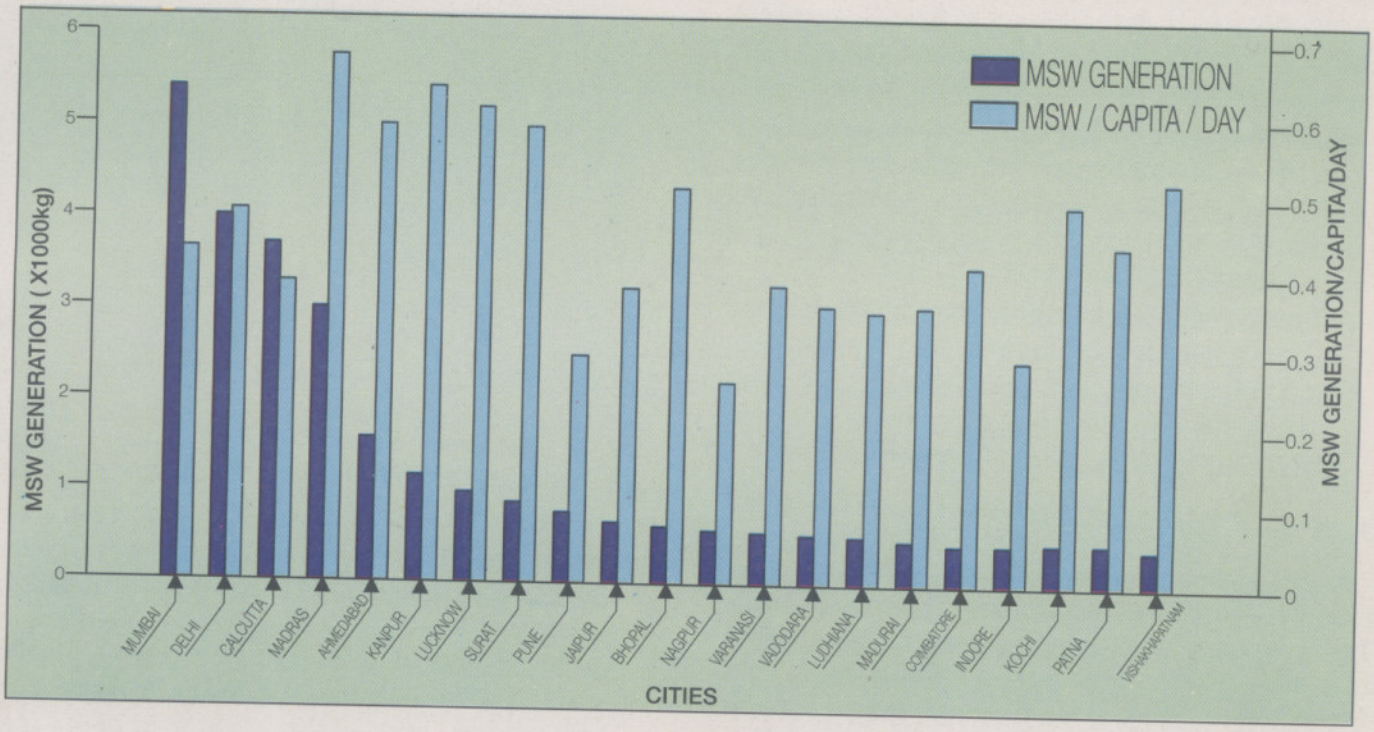


Fig 71. Level of Urbanisation in India

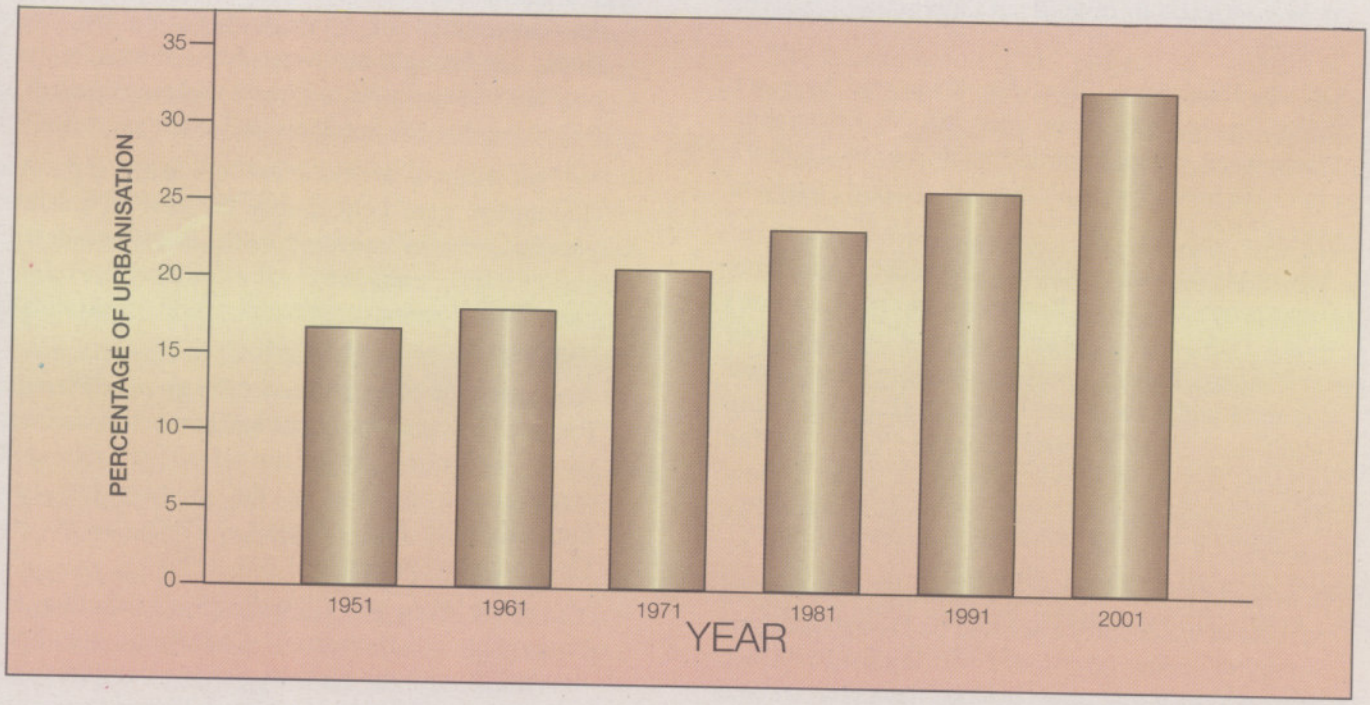


Fig 72. Municipal solid waste generation – city-wise

- Functioning of two Common Effluent Treatment Plants (CEPTs_ one at Unnao and the other at Jajmau, Kanpur was studied during the year.
- Guidelines were developed for taking up studies to assist the State Governments in identifying sites for industrial estates. Pilot studies for development of state-wise guidelines for siting industries have also been taken up for Bihar and Assam.
- A project has been taken up with the School of Planning and Architecture, New Delhi for studying the pattern of industrial land uses and environmental compatibility with other land uses in the towns of Alwar, Solan, Hissar and Bareily.

Hazardous Substances Management

Besides the three sets of rules that have been prepared under the provisions of the Environment (Protection) Act 1986, to regulate the handling of hazardous substances, the Ministry also implements several other schemes and programmes for the management of hazardous substances. Details of these activities carried out during the year are given below:-

- The "Red Book"- a directory of Chemical Emergency Experts and concerned officers in India to be contacted in case of an emergency has been updated.
- Off-site Emergency Plans for Alwar and Vapi are under finalisation. Seven new off-site Emergency Plans have been commissioned during 1996-97 after successful completion of hazard analysis studies.
- As required under the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996, a Crisis Alert System (CAS) has been established. Latest computer facilities have been procured and a local area network (LAN) is being established. The Central Control Room at the Ministry has been equipped with facilities namely E-mail connection, NICNET connection and a Fax machine.
- In order to assess the hazard potential of industrial pockets in the country a scheme on Hazard Analysis Survey of Industrial pockets was initiated in 1992, under which 35 industrial pockets have been studied so far. Seventeen reports have been accepted and nine reports are being reviewed by the Core Group. Ten hazard analysis studies have been initiated during 1996-97.
- Financial Assistance for creation of Management structures for implementation of the rules under the Environment (Protection) Act, 1986 was extended to Chief Inspectorate of Factories, Tamil Nadu.
- A Regional Register for Potentially Toxic Chemicals (RRPTC) has been established at CIF, Maharashtra. This is in addition to the 8 Regional Registers established earlier at Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Gujarat, Orissa, Kerala, Himachal Pradesh and Punjab as a part of the National Register for Potentially Toxic Chemical (NRPTC).
- Under the scheme for training of various categories of personnel in the area of Accident Prevention, three level training courses were conducted by identified institutions viz. Disaster Management institute Bhopal, National Productivity Council, New Delhi, Human Resource Development Foundation, New Delhi, Administrative Staff College of India, Hyderabad and National Safety Council, Bombay, UP (Ghaziabad) and Kerala (Cochin).
- The National Poison Information Centre, set up at the Department of Pharmacology, AIIMS, New Delhi, has brought out a number of brochures and booklets to help in the treatment and management of poisoning due to chemicals and other products.
- Two meetings of the Genetic Engineering Approval Committee were held during the year to consider various proposals dealing with, the manufacture, import and marketing of products involving hazardous micro-organisms and genetically engineered micro- organisms.
- A new set of rules entitled "Emergency Planning Preparedness and Response to Chemical Accidents" which envisages setting up of a four tier crisis management systems in the country has been notified on 2nd August, 1996 under the Environment (Protection) Act, 1986.
- The draft rules on Classification, Labeling and Packaging of Hazardous Chemicals are being dovetailed with the globally harmonised legislation on the same subject drafted by an Expert Committee of the United Nations (UN).

Fig 73. Publications released by Poison Control Centre at AIIMS, New Delhi, set up by Ministry

- Based on the wide ranging discussions with the concerned ministries, experts and the industry, the Ministry of Environment and Forests has brought out a draft notification on the Prohibition of the Handling of Azodyes for inviting objections from the public on the proposed ban on manufacture and use of 74 Azodyes which are harmful to health and the environment. The objections received have been examined.
- Amendments to the Manufacture, Storage and Import of Hazardous Chemicals Rules have been finalised based on the decision of the Working Group constituted by the Ministry of Labour and comments from the implementing agencies. The draft is being communicated to the Ministry of Law and Justice for vetting.
- Rules on Bio-medical Waste have been finalised and are being vetted for final notification. The rules also provide the standards for treatment and disposal.
- Amendments to the Hazardous Waste Management and Handling Rules are also being sent to Law Ministry for vetting.
- A notification on prohibition on the import of arsenic, cyanide and mercury has been issued after having obtained the views of the public.
- A draft notification on the prohibition on imports of asbestos (dust and fiber), PCB, PCT, and PBB contaminated wastes, selenium, thallium and beryllium containing wastes has been issued.
- Another draft notification prohibiting the open burning of waste oil has also been issued. Further wastes are being considered for prohibition to import by a Technical Expert Committee under the chairmanship of the DG, CSIR. The Committee is also examining the hazard characterisation and environmentally sound recycling practices.
- The second edition of the "Guide to Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989" incorporating all amendments and necessary interpretations has been finalised and approved for printing.
- "An introduction to Vulnerability Analysis of Airborne Releases of 8 Hazardous Chemicals" is being finalised after incorporation of comments.
- Under the scheme for survey of Municipal Solid Waste, financial assistance has been given to 34 cities in order to have an estimate of the existing system of waste collection and recycling and also to know the quantity and quality of garbage being generated by various cities. Most of the reports are awaited from the Municipal bodies.
- Pilot plants for conversion of Municipal Solid Wastes into manure and energy have been sanctioned to Hyderabad Municipal Corporation and H.P. Pollution Control Board. The plants are yet to be set up.
- The interim-report of the project on "Utilisation of Flyash in Mine Fills" is under review. The interim report on assessment study for plastic recycling industry has also been received from the National Productivity Council.
- A National Plastic Waste Management Task Force has been constituted under the chairmanship of Chairman, CPCB to formulate a strategy and prepare an Action Programme for management of plastic waste and to prepare guidelines for packaging material.
- The following developmental studies/projects sponsored by the Ministry are being conducted by various scientific institutions of the country.
- A study on "Pesticides contamination in Nilgiri district with special reference to avifauna" by SACON, Coimbatore.
- A project on "Thermal decomposition of carbamate pesticides" by the NCL Pune and the CLRI, Madras.

- A project on "Application of clay soil and indigenously available synthetic membranes for living landfill for hazardous waste disposal" by the NEERI, Nagpur.
- A project on the "utilisation of flyash for agriculture" by the MP Pollution Control Board.
- A project on "utilisation of municipal solid waste in road construction" by the Central Road Research Institute.
- A study for "superimposing hazard analysis information on to the GIS by the National Informatics Centre, New Delhi.
- A software on "Development of Chemical Response Manual" has been developed by the ERM (J) Pvt. Ltd., and licensed to the Ministry.
- A State-of-Art Report on Azodyes and Arylamines is being prepared by the Ministry with the help of CLRI, Madras.
- A country report on "Emergency Preparedness for Chemical Hazards" sponsored by the WHO, has been finalised.
- A project on " Industrial Safety Disaster Prevention and Hazardous Waste Management" is being prepared with Japanese assistance of US $ 910,000 and Dutch Grant of US $ 150,000. Feasibility studies for various components of the project have been initiated.
- A project on "Hazardous Waste Management" for setting up of - Treatment, Storage and Disposal Facilities (TDS) in the States of Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu will be ready for appraisal shortly. World Bank funding is expected to be extended to one more State to set up TSD facilities.

Implementation of Public Liability Insurance Act 1991

The draft scheme for the Environment Relief Fund (ERF) has been recast as amendments to the Public Liability Insurance Rules, 1992. After considerable deliberations, it has been decided to seek the concurrence of the Committee of Secretaries for approving the General Insurance Corporation as the administrator of ERF.

6

REGENERATION AND DEVELOPMENT

Ganga Action Plan Phase - I (GAP - I)

The activities of the Ganga Action Plan Phase - I, started in 1985 were continued. During the year, the Steering Committee of the National River Conservation Authority (NRCA) under the Chairmanship of Secretary, Ministry of Environment & Forests met three times to review the progress of the GAP and the other on-going schemes relating to river cleaning. The Monitoring Committee of the NRCA, under the Chairmanship of Member Incharge of Environment, Planning Commission met twice to review the progress of various schemes and their impact on the river water quality. The Research Committee of the National River Conservation Directorate (NRCD) under the Chairmanship of eminent Scientist, Dr. M.S. Swaminathan, held one meeting to review the Research activities under the Action Plan.

Progress of Implementation

Out of the 261 schemes of pollution abatement sanctioned at a total cost of Rs. 462.04 crores under the GAP Phase - I, 248 schemes have been completed till 31.12.1996, and the remaining 13 schemes are expected to be completed shortly. The state-wise distribution of schemes sanctioned and completed is given in Table 12. The total expenditure incurred on the implementation of the programme till 30.09.1996 is Rs. 406.69 crores.

Industrial Pollution

Monitoring of the 68 gross polluting industries located along the river Ganga continued. Of these 68 industries, Effluent Treatment Plants (ETPs) have been installed in 55 units and the remaining 13 units have been closed down.

Under the Indo-Dutch Sanitation project, a common conveyance and treatment system has been commissioned for the 175 odd tanneries at Jajmau and Kanpur. This has helped in preventing the discharge of untreated/partly treated effluents of tanneries into the river.

Impact on River Water Quality

On the basis of the flow data of 1985, a total of 873 million litres per day (mld) of sewage was to be intercepted and diverted for treatment from 25 Class - I towns. As against this target, capacity to treat 540 mld has been commissioned. In addition, in Kanpur and

Table-12

Statewise and typewise distribution of schemes sanctioned and completed (as on 31.12.1996)

Type of Schemes	Uttar Pradesh	Bihar	West Bengal	Total
1. Sewage Interception & Diversion	40 (40)	17 (17)	29 (31)	86 (88)
2. Sewage Treatment Plants	11 (13)	3 (7)	12 (15)	26 (35)
3. Low Cost Sanitation	14 (14)	7 (7)	22 (22)	43 (43)
4. Electric Crematorium	3 (3)	8 (8)	15 (17)	26 (28)
5. River Front Facilities	8 (8)	3 (3)	24 (24)	35 (35)
6. Other Schemes	28 (28)	3 (3)	1 (1)	32 (32)
Total	104 (106)	41 (45)	103 (110)	248 (261)

(Figures in the brackets indicate number of schemes sanctioned and figures outside indicate number of schemes completed)

Allahabad, where sewage treatment plants are still under construction, a total of 190 mld of sewage is being diverted for sewage farming. Thus, under GAP Phase - I, a total of 730 mld of sewage has been prevented from direct discharge into the river.

The water of river Ganga is monitored regularly by independent Institutions at 27 monitoring stations located along its stretch from Rishikesh in Uttar Pradesh to Uluberia in West Bengal. As a result of the schemes completed under GAP Phase - I the water quality of the river Ganga in respect of bio-chemical oxygen demand (BOD), a major indicator of pollution, has improved throughout the stretch from Rishikesh (U.P.) to Uluberia (WB). The water quality along the stretch from Kanpur to Allahabad, though improved significantly, is still above the desired standard of 3 mg/l of BOD. The summer average value of the two important river water quality parameters at some of the important monitoring stations is given in Table-13.

Evaluation of Ganga Action Plan

A comprehensive evaluation of GAP was undertaken in April, 1995 through independent agencies (universities and R&D institutions. The conclusions and recommendations of this evaluation have been used to bring about improvements in GAP Phase - II and the National River Conservation Plan schemes. A cost benefit analysis of GAP has also been undertaken with the assistance of the Overseas Development Administration (ODA) of U.K.

Operation & Maintenance

Under GAP Phase - I, the cost of operation & maintenance of major assets like main pumping stations and sewage treatment plants has been shared on 50% basis between the Central and the concerned State Governments. A provision of Rs. 25.3 crores was therefore made in the approved cost of the scheme towards the Central share. This provision is now nearly exhausted. In order to make the programme sustainable, the State Governments will now be required to make necessary provision in their Annual Budgets to bear the entire cost of operation & maintenance of such assets.

Table-13

Summer Average Values for Water Quality on Main Stem of River Ganga

Station Name	Dissolved Oxygen* (mg/l)		Biochemical Oxygen** Demand (mg/l)	
	1986	1996	1986	1996
Rishikesh	8.1	8.9	1.7	1.0
Kanpur U/S	7.2	7.8	7.2	2.8
Kanpur D/S	6.7	6.4	8.6	4.1
Allahabad U/S	6.4	8.9	11.4	2.5
Allahabad D/S	6.6	8.5	15.5	3.3
Varanasi U/S	5.6	8.0	10.3	2.2
Varanasi D/S	5.9	7.7	10.6	2.3
Patna U/S	8.4	7.3	2.0	2.0
Patna D/S	8.1	7.0	2.2	1.6

* DO should be 5 mg/l or more

** BOD should be less than 3 mg/l

Note U/S stands for upstream and D/S stands for downstream

Training

Regular training programmes are arranged for the operating staff of pumping stations and sewage treatment plants to ensure proper maintenance of these.

Resource Recovery

The programme lays due emphasis on maximization of resource recovery from sewage treatment to improve its sustainability. These include utilisation of bio-gas for co-generation of power, sale of treated sewage and sludge as bio-fertilizer for agricultural purposes. Pisiculture is carried out in most of the stabilisation ponds constructed under GAP.

Public Participation

Public involvement in the schemes of GAP are sought to be achieved by creating awareness through exhibitions, seminars, padyatras, shramdans and involvement of students and NGOs. Citizen Monitoring Committees have also been constituted in the concerned States to maximise local participation. A NGO has been commissioned to develop an effective model through surveys to ensure greater involvement of the public in the programme.

Ganga Action Plan Phase - II (GAP - II)

Unlike GAP Phase - I, GAP Phase - II is a Centrally Sponsored Scheme with equal cost sharing between the Central and the State Governments. Besides covering abatement works on the main stream of river Ganga not covered under GAP Phase - I, GAP Phase - II also includes additional works on its major tributaries namely; Yamuna, Gomati, and Damodar. The scheme has been approved in phases. The present approved cost of the scheme is Rs. 1281.17 crores; and covers pollution abatement works in 95 towns in five States namely; Haryana, Delhi, U.P., Bihar and West Bengal. Out of the total approved cost, pollution abatement works amounting to Rs. 438.59 crores covering 50 towns have been approved under the directions of the Supreme Court. This includes a common effluent treatment plant at a cost of Rs. 65 crores for 540 odd tanneries of Calcutta to be relocated under the directions of the Court.

Yamuna Action Plan

Approved in April, 1993, the present estimated cost of the scheme of cleaning the river Yamuna is Rs. 479.56 crores spread over 21 towns in 3 States namely; Haryana (12), Delhi (1) and U.P.(8). Projects amounting to nearly Rs. 290 crores have been approved and an

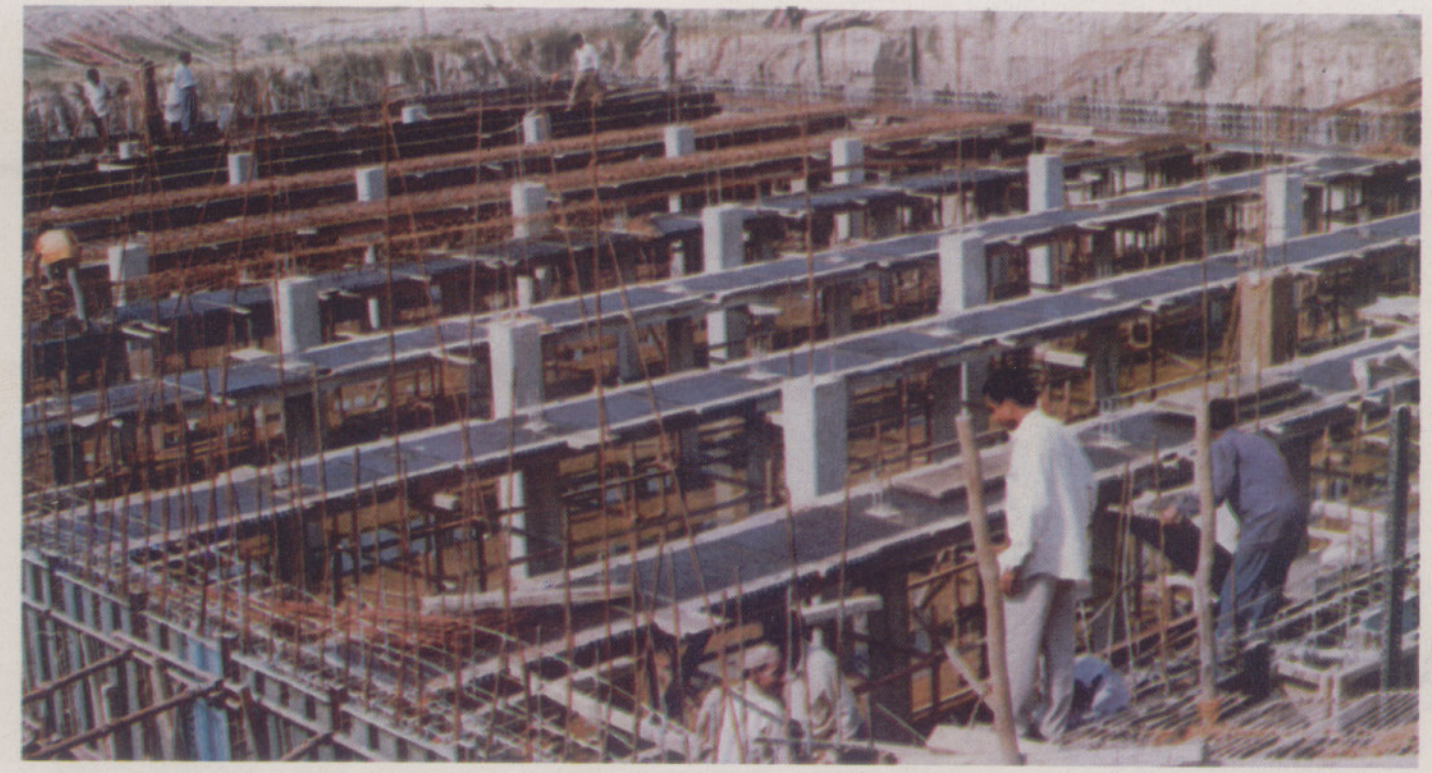


Fig 74. Construction of Sewage Treatment Plant, Zone-I at Faridabad, Haryana

amount of Rs. 59 crores towards the Central share has been released to the State Governments for implementation. The scheme is likely to be completed by March, 1999. External assistance to the tune of 17.77 billion yen is available for this scheme from the Overseas Economic Fund of Japan.

Gomati Action Plan

Also approved in April, 1993 at an estimated cost of Rs. 64 crores, works under the Gomati Action Plan are proposed in 3 towns namely; Lucknow, Jaunpur and Sultanpur in U.P. Works in Jaunpur, Sultanpur, which are funded by internal resources, have been initiated. External assistance amounting to U.K.ú 4 million from ODA, U.K. is available for certain emergency works of Phase - I and for preparation of the Master Plan for Lucknow. Based on the Master Plan, which is likely to be finalised during 1997-98, funding of the second phase covering major works of Lucknow will be considered by the ODA.

Damodar Action Plan

The scheme of pollution abatement of river Damodar has been approved by the Government in October, 1996 at an estimated cost of Rs. 14.47 crores. The works are proposed in 8 towns of Bihar and 4 towns of West Bengal. Preparatory work on the scheme has begun.

Action Plan for Main Stem of Ganga

Under this component, works amounting to 723.14 crores have been approved for 59 towns out of which a sum of Rs. 8.7 crores has been released to the State Governments towards Central share for preparation and implementation of the scheme.

National River Conservation Plan (NRCP)

Like the GAP Phase II, the NRCP approved in July, 1995 is also a Centrally Sponsored Scheme with equal cost sharing between the Central Government and the concerned State Governments. Under this scheme, Pollution abatement works in 46 towns located along 18 inter-State rivers in 10 States have been taken up. The sanctioned cost of these works is Rs. 772.09 crores. The list of towns and inter-state rivers covered under the programme is given in Table-14

Fig 75. 36 MLD tannery waste water UASB treatment plant at Jajmau, Kanpur

Projects amounting to Rs. 83.5 crores have been approved and Central share amounting to Rs. 20 crores have been released to the concerned States. The total implementation period of the scheme is 10 years.

National Lake Conservation Plan (NLCP)

The National Lake Conservation Plan (NLCP) proposes to augment the on-going programme on wetlands by undertaking large scale conservation activities in selected urban lakes which are highly degraded due to pollution, encroachments and habitat degradation and are not covered under the existing programmes of wetlands. 21 lakes have been identified under the plan, which is proposed to be undertaken in two phases, the first phase covering 11 lakes and the remaining under the 2nd phase. Pre-feasibility reports for the lakes selected for the first phase have been prepared. However, implementation of NLCP has not been initiated since it has not been approved by the Planning Commission under the VIII Five Year Plan. Efforts are being made to include this programme in the IX plan as many states have shown interest and submitted proposals for taking up the conservation of polluted urban lakes in their States.

Meanwhile, implementation of the conservation schemes in respect of Bhoj wetlands in Bhopal, Madhya Pradesh has commenced for which a long term loan of Rs. 210 crores is available from Overseas Economic Co-operation Fund (OECF) of Japan.

Table-14

The list of towns State-wise for inter-state rivers to be covered under National River Conservational Plan

Sl. No.	Town	River
Andhra Pradesh		
1.	Mancharial	Godavari
2.	Bhadrachalam	Godavari
3.	Rajamundri	Godavari
4.	Ramagundam	Godavari
Bihar		
5.	Ranchi	Subarnarekha
6.	Jamshedpur	Subarnarekha
7.	Ghatshila	Subarnarekha
Gujarat		
8.	Ahmedabad	Sabarmati
Karnataka		
9.	Shimoga	Tunga (Krishna)
10.	Harihara	Tungabhadra (Krishna)
11.	Bhadravati	Bhadra (Krishna)
12.	Davanagere	Tungabhadra (Krishna)
13.	K.R. Nagar	Cauvery
14.	Kollegal	Cauvery
15.	Nanjagud	Cauvery
16.	Sri Rangapatnam	Cauvery
Madhya Pradesh		
17.	Indore	Khan
18.	Ujjain	Kshipra
19.	Burhanpur	Tapti
20.	Mandideep	Betwa
21.	Bhopal	Betwa
22.	Vidisha	Betwa
23.	Jabalpur	Narmáda
24.	Seoni	Wainganga
25.	Chapra	Wainganga
26.	Keolari	Wainganga
27.	Nagda	Chambal
Maharashtra		
28.	Karad	Krishna
29.	Sangli	Krishna
30.	Nasik	Godavari
31.	Nanded	Godavari
Orissa		
32.	Cuttack	Mahanadi
33.	Talcher	Brahmini
34.	Chandbali	Brahmini
35.	Dharmashala	Brahmini
Punjab		
36.	Ludhiana	Satluj
37.	Jallundhar	Satluj
38.	Phagwara	Satluj
39.	Phillaur	Satluj
Rajasthan		
40.	Kota	Chambal
41.	Keshoraipatta	Chambal
Tamil Nadu		
42.	Kumarapalayam	Cauvery
43.	Bhawani	Cauvery
44.	Erode	Cauvery
45.	Trichy	Cauvery
46.	Palli Palayam	Cauvery

National Afforestation and Eco-development Board

The National Afforestation and Eco-development Board (NAEB), constituted in August, 1992 is responsible for promoting afforestation, tree planting, ecological restoration and eco-development activities all over the country, with special attention to degraded forest areas and lands adjoining forest areas, national parks, Sanctuaries and other protected areas, as well as ecologically fragile areas viz. the Western Himalayas, Aravalli's, Western Ghats, etc. The National Wasteland Development Board (NWDB), responsible for regenerating degraded non-forest land and private lands in the country functions under the Ministry of Rural Development. In drawing up the plans for afforestation and eco- development, the NAEB ensures the following:

- Evolve mechanisms for ecological restoration of degraded forest areas and adjoining lands through systematic planning and implementation, in a cost effective manner.
- Restore through natural regeneration or appropriate intervention the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities.

Fig 76. Regeneration efforts in and around mining areas at Aravallis

- Restore fuelwood, fodder, timber and other forest produce on the degraded forest and adjoining lands in order to meet the demands for these items;
- Sponsor research and extension of research findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;
- Create general awareness and help foster a movement for promoting afforestation and eco-development with the assistance of voluntary agencies, non-government organizations, Panchayati Raj institutions and others and promote participatory and sustainable management of degraded forest areas and adjoining lands;
- Co-ordinate and monitor the Action Plans for Afforestation, tree planting, ecological restoration and eco-development; and
- Undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco- development activities in the country.

In order to achieve its objectives, NAEB implements a number of schemes, the details of which are as follows:-

Afforestation under 20-Point Programme

From 1990-91 the targets under 20 - Point Programme for afforestation and eco-development activities are set in two mutually exclusive viz. 'seedling distribution' for planting on private lands and 'area coverage' in respect of public lands, including forest lands. The targets and achievements for the year 1995-96 and 1996-97 are given below:

	1995-96		1996-97	
	Target	Achieve-ment	Target	Achieve-ment
(i) Area coverage (public lands including forests lands). (area in lakh ha.)	11.24	8.23*	11.38	4.30
(ii) Seedling distribution (for planting on private lands). (seedlings in crores)	113.55	90.32*	111.36	31.23 (upto 30.11.96)

*Tentative

Integrated Afforestation and Eco-development Projects Scheme (IAEPS)

This scheme promotes afforestation and development of degraded forests and adjoining areas through an integrated approach on a watershed basis. The objectives of schemes are to:-

- augment availability of biomass, fuelwood and fodder
- extend and disseminate proven afforestation and management technologies to fulfill larger objectives of sustainability, equity and environmental conservation with participation of the local communities.
- generate employment.

Under this scheme projects are prepared through micro- planning exercise and submitted to the Board by the implementing agencies like District Rural Development Agencies (DRDFA) and State Forest Department.

During 1996-97 the target is to cover 57000 ha at an estimated cost of Rs. 30 crores.

Area Oriented Fuelwood and Fodder Projects Scheme (AOFFP)

This scheme is meant to augment the production of fuelwood and fodder in identified fuelwood deficient districts of the country. A total of 196 districts have been identified as fuelwood deficient. The expenditure

Fig 77. Biological reclamation in the degraded lands of BCCL under the programmes of NAEB

under this scheme is on 50:50 basis between the Centre and the State. The target for 1996-97 is to cover 68000 ha and the central share is Rs. 40 crores.

Raising of Non-Timber Forest Produce including Medicinal Plants

The objective of the scheme is to survey, conserve as well as to increase production of non-timber forest produce including medicinal plants, with a view to improve and replenish the stock of indigenous forest produce and medicinal plants which are fast depleting due to over exploitation. At the same time, the scheme aims at augmenting the income of tribal and rural poor living in and around forest areas. During 1996-97, the target is to raise NTFP plantations over 19000 ha. at an estimated cost of Rs, 10.75 crores.

Seed Development Scheme

The basic objective of this scheme is to generate quality seeds which would lead to the growth of healthy and better quality trees. Under this scheme, the State Governments are given financial assistance to develop facilities for collection, storage, testing, certification and distribution of quality seeds. The financial outlay for 96-97 is Rs. 2.50 crores for this scheme.

Grants-in-Aid Scheme

In tune with its philosophy of eliciting and encouraging people's participation, the Board provides financial assistance to Non-governmental Organisation (NGO's) and Voluntary Agencies (VAS) for afforestation and tee planting activities. The financial target for 96-97 is Rs. 1.50 crores.

Monitoring and Evaluation of Afforestation Activities

The National Afforestation and Eco-development Board in the Ministry of Environment & Forests is the nodal agency for afforestation activities taken up under point No. 16(A) and 16(B) of the 20 Point Programme. While Point No. 16(A) refers to public lands including (Forest lands) brought under vegetative cover, both through natural regeneration as well as planting, point No. 16(B) refers to seedlings distributed for planting on private lands. Two kinds of monitoring are therefore done for afforestation activities under 20 Point programme:-

- The State Governments are asked to provide Block and village level afforestation data annually. This information is kept in the Library of Parliament as well as in the Library of MOEF to enable elected representatives to access the data easily.
- Every year 10 percent (about 50) districts of the country are selected with appropriate regional distribution, for evaluation of afforestation activities taken up in the previous years by autonomous institutions/NGOs/VAS/regional centres of NAEB/ Retired Forest Officials. The evaluation reports are analysed in NAEB. A copy of the report is sent to the concerned State Governments and districts for information and for taking necessary remedial measures. Second round of evaluations is being done in the same districts which were evaluated in 1992-93 to determine the survival rate and growth of plantations over last 3 years.

There is also a provision for concurrent evaluation of the projects implemented under Centrally Sponsored Schemes of NAEB. Reputed Non-Government Organisations (NGOs) and Institutions/Experts are engaged by NAEB for carrying out these evaluations. The three main schemes of NAEB viz, Fuelwood and Fodder Projects Schemes and Non-timber Forest Produce Scheme (NAEB) have been evaluated by the National Centre for Human Settlements & Environment, Bhopal and the report submitted by them is being examined.

Fig 78. Successful cultivation of *Salvadora persica* on a salt land

Fig 79. Studies on *Harduickia binata* based agro-forestry system

Other Activities of NAEB

Eco-Task Forces

Four Eco-task Forces (ETF) of ex-servicemen are being funded by serving JCOs and Commissioned Officers. Forest Departments of the State Government, in which the ETFS are located, provide technical support to the ETFs. The activities undertaken include afforestation, pasture development, soil and water conservation and other restorative works.

Technical Extension

In order to harness and extend technology inputs for eco- development and regeneration of degraded forests, a technology extension programme has been initiated in the Board. Demonstration projects, to regenerate various types of degraded lands, like usar, arid and dry areas, gullied and ravinous lands & marshy and waterlogged areas, have been launched with the assistance of various scientific and technical institutions/departments, Universities and voluntary agencies. Central Assistance is also being provided to State Governments for conducting field trials of Tissue Culture seedlings raised in collaboration with the Department of Bio-Technology. Proven technologies are documented and disseminated to field level functionaries.

Regional Centres

The board has seven Regional Centres located in Universities and other National level Institutions. These Centres help NAEB in promoting extension of replicable technologies and in dissemination of research

findings. They provide technical and extension support to the State Forest Departments in preparing projects for regeneration of degraded forests and adjoining lands with people's participation, had also act as a forum for the exchange of ideas and experiences amongst the States of the region as well across the regions. In addition, these centres carry out problem- specific studies as well as evolution of NAEB's programmes in the field, and organise training programmes and workshops. The names and addresses of these Centres and the States they cover, are given in Annexure-II.

Mapping of Wastelands

A National Wastelands Identification Project (NWIP) was initiated in 1986 in collaboration with the National Remote Sensing Agency and the Survey of India to prepare district-wise Wastelands maps on 1:50,000 scale by using satellite data. Wastelands maps for 229 districts have been prepared and distributed to the concerned State and district level agencies. Maps for 91 districts are under preparation. Selection of these districts is based on the criterion that 5% or more of the area of these districts is estimated to be Wastelands.

Geographical Information System (GIS)

Ten GIS projects were taken up in the various agroclimatic zones of the country in collaboration with some of the leading scientific/technical Institutions of the country. The aim of these projects is to study the possible utilisation of GIS technology for land use management, decentralised planning and the programme for developing degraded lands. The pilot phase of these projects has been completed.

7

RESEARCH

Environmental Research

The Environmental Research Programme aims at developing strategies, technologies and methodologies for better environmental management in India. It also seeks to strengthen facilities and infrastructure to facilitate research and training of manpower for undertaking environmental research. The programme particularly aims at attempting solutions to the practical problems of resource management and provides necessary inputs for development and formulation of Action Plans for conservation of natural resources and restoration of degraded ecosystems.

Research projects are funded in multidisciplinary aspects of environment protection, conservation and management at various universities, research and development institutions and reputed non-governmental organisations of the country. These are supported under the following main schemes:

- Man and Biosphere (MAB) Programme :
- Environment Research Programme (ERP) :
- Action-oriented Research Programme for Eastern and Western Ghats: and
- Climate Change

The MAB Programme is an inter-disciplinary programme of research which emphasizes interrelationship between man and the environment, and seeks to generate needed scientific knowledge to manage the natural resources in a sustainable manner. The ERP covers chemical, bio-chemical, engineering, technology development for waste minimisation, waste recycling, resource recovery and effluent treatment; and environment management studies. The Action-oriented Research Programme addresses itself to location-specific problems of resource management in the Eastern and Western Ghat regions of the country.

During the year, 17 new projects have been sanctioned, 28 projects were completed and 175 projects including the new projects, were serviced. Annual workshops were organised to monitor the progress of the research projects. The lists of projects sanctioned and completed during the current year are given in Annexure III and IV respectively.

Highlights of some of the completed projects

Under the project on "Human Nature Interaction in and around the National Parks and Sanctuaries",

detailed studies have been undertaken which analyse human interaction with practices and pressure in the context of the Rajaji National Park (UP), Sariska National Park (Rajasthan), and Great Himalayan National Park (Himachal Pradesh).

Under the project on "Environmental Impact of increased ultra violet-B radiation on fresh water algae", studies on the impact of increased ultraviolet-B radiation on growth, survival and certain vital metabolic processes of fresh water algae were undertaken. Field experiments were also conducted to assess the impact of ambient UV-B radiation on growth and productivity of certain algae. Based on the information, processes such as nitrogen fixation and photosynthesis were found to be extremely sensitive to UV-B radiation and increased UV-B radiation was found to be harmful to a number of algae which may thus affect biological productivity.

Under the All India Coordinated Research Project on Ethnobiology, ethnobiological information has been collected from the states of Maharashtra, West Bengal, Daman, Diu & Nagar Haveli, Rajasthan, Gujarat, Assam, Karnataka, Sikkim and Tripura through the participation of Botanical Survey of India, Tropical Botanic Garden and Research Institute, Thiruvanthapuram and Nagpur University, Nagpur.

Under the project "Standardization of Reference Seed Culture for BOD Estimation", a national level study has been conducted for the validation of developed dehydrated microbial mixture (BODSEED). The BODSEED can be used as standard seeding material for reproducible BOD (water pollutional strength) analysis after it is certified by Central Pollution Control Board, for which clearance is still awaited. By replacing conventional BOD seeding material (sewage) with BODSEED, the extent of water pollution can be measured very accurately. Since BODSEED has been upgraded in the form of immobilized beads to be used as ready to use seeding material, it makes BOD analysis an easy, clean and convenient laboratory test.

Indigenous solid state gas sensors have been developed by the Department of Physics, Nagpur University for assessing the concentrations of SOx and COx pollutants in the ambient air and in the industrial process control. These have potential for commercial use.

The reduction of concentration of the air pollutant due to the presence of greenbelt was investigated by the Department of Physics, IIT, Kanpur. The greenbelt which acts as a sink, is assumed to be located between the source and the receptor and lies some distance away from the source in the wind direction extending symmetrically in the cross wind direction. If the source height is greater than the greenbelt, the latter should be located as close as possible to the receptor to obtain maximum reduction in pollutant. When the source height is less than or equal to the height of the greenbelt, it should be located as close as possible to the source. In both the cases, for maximum concentration reduction at the receptor site, the height of the receptor should be as small as possible. The above conclusions also hold good for the steady state.

Framework Convention on Climate Change

The Framework Convention on Climate Change (FCCC) - a multilateral treaty to which India is a party, aims to achieve stabilisation of greenhouse gas concentrations in the atmosphere of a level that would prevent dangerous anthropogenic interference with the Climatic System. As per the existing provisions, India is not required to adopt a national greenhouse gas or carbon dioxide reduction target. Developed country parties are required to adopt policies and take corresponding measures for mitigation of climate change and are bound by specific commitments laid down in the Convention.

Deliberations on various issues relating to Climate Change are currently undertaken under the aegis of the Subsidiary Body for Implementation (SBI), Subsidiary Body for Scientific and Technological Advice (SBSTA), Ad-hoc Group on Berlin Mandate (AGBM) and Ad-hoc Group on Article 13 - a multilateral consultative mechanism for resolution of questions regarding implementation of the Convention. During the year India participated in the meetings of these bodies.

India also participated in the Second Conference of Parties (COP 2) held during July 8-19, 1996 in Geneva, which discussed various aspects of issues such as:-

- Strengthening of commitments of the developed country parties vis-a-vis policies and measures, quantified limitation and reduction objectives within specified time frames;

- Possible features of a protocol or another legal instrument;
- Memorandum of Understanding between COP and the Council of the Global Environment Facility;
- Methodological issues vis-a-vis long-term programme of work, revision of the guidelines for preparation of communication by the developed countries;
- Activities Implemented Jointly.

Since the discussions under these issues were not conclusive, these are currently being discussed at other meetings of these bodies.

Inter-Governmental Panel on Climate Change

The Inter-Governmental Panel on Climate Change (IPCC) is a scientific body supported by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP). The second Assessment Report (SAR 95) brought out by the IPCC during the year provides latest information on various aspects relating to climate change such as its science, impacts, mitigation, adaptation and socio-economic issues.

Asia Least Cost Green House Gas Abatement Strategy Project (ALGAS)

India is participating in the ALGAS Project funded by the Global Environment Facility (GEF). While the Asian Development Bank is the executing agency for this project, the United Nations Development Programme is its implementing agency. The ALGAS India Project consists of:-

- Development of a National Inventory of Greenhouse Gases (GHGs) source and sinks
- Identification of options for Mitigation/Abatement of GHGs and
- Development of a Least Cost Strategy for Mitigation/Abatement of GHGs.

The National Physical Laboratory and the Tata Energy Research Institute have been identified as the technical institutions for undertaking the work related to the above components and work relating to verification of methodologies and preparation of inventories is currently in progress.

Fig 80. A cidarid sea urchin from Henery Lawrence Island

G. B. Pant Institute of Himalayan Environment and Development

This Institute was established in 1988 as an autonomous organisation of the Ministry. Besides the headquarters at Almora, this institute has units located at Kullu, Sikkim. During the year, the institution concentrated on further strengthening of its R & D activities and upgradation of infrastructural facilities. Several new projects were initiated and some on-going projects have been documented for effective dissemination.

Highlights of the R & D activities of the institute centred around six designated core programmes are summarised below;

- Methods for resources management through peoples' participation are being developed in selected villages of Nanda Devi Biosphere Reserve. Resource use in Kullu Valley has also been studied to evolve sustainable practices.
- Based on the geoenvironmental conditions of the rural Himalayas, a three tier sustainable resource planning has been recommended for the region.
- Results of the studies on integrated watershed management in selected areas of Garhwal, Kumaun and Sikkim have been disseminated to the people.
- While the technology package developed by the Institute for rehabilitating degraded lands in some selected areas have been taken over the inhabitants of the area, ecological monitoring is managed by the Institute.

- Hydrological growth records of experimental plantations are being continued under integrated watershed management in rural Himalaya. Demonstration of agro-forestry and crop interventions are also being continued in selected watersheds of Sikkim.
- Studies similar to those carried out on spring water of Almora town, are being carried out for management of irrigation systems of rural water supply in other parts of central Himalaya.
- Studies on Conservation of Biological Diversity has yielded important information on the status of sensitive elements of biodiversity in selected protected areas of west Himalaya.
- Conservation science programmes including training workshops are being conducted periodically for the people of rural Himalaya with special focus on students and teachers of the region.
- Badrivan Restoration Programme has been further extended and strengthened in the villages in and around Badrinath Dham.
- Propagation protocols of several important multipurpose tree species and threatened medicinal plants have been developed through biotechnological means. The technology has been disseminated through different awareness and education programmes organised by the Institute.
- Based on the in-depth studies undertaken in the Valley of Flowers area to evaluate the impact of tourism and other biotic processes, a status paper is being prepared on the environment management plan for the Valley of Flowers and Kullu Manali area.
- Efficient phosphate solubilising fungal isolates have been selected and are being tested at various temperature levels. A detailed survey has been made on the use of N_2-fixers in the cultivation and natural occurrence in upland farming systems of a selected watershed in Sikkim.
- The most suitable time for mass propagation of Taxus baccata, an important medicinal plant has been found to be the monsoon season followed by winter and autumn. Enhancement in net photosynthesis was observed in some alpine medicinal Herbs as a result of elevated CO_2 concentration.
- The Integrated Eco-development Programme has been further strengthened through interactions with the Faculty of the Universities, Research Institutions and NGOs.
- A number of seminars, symposia, training workshops, brain storming session etc. were organised during the year to obtain inputs from identified specialists/institutions.

Research on Biosphere Reserves, Wetlands and Mangroves

Biosphere Reserves

Research activities under the Biosphere Reserves Programme are overseen by a specific Advisory Committee. While four new projects were sanctioned under this programme during the year, three on-going research projects were completed. The lists of sanctioned and completed projects are given in Annexures III and IV.

Wetlands and Mangroves

During the year, meetings of the National Committee on Wetlands, Mangroves and Coral Reefs and its Research Sub-committee were held to review the progress of the scheme. A review meeting was also held in August, 96 to review the progress of the on- going research projects. The lists of projects sanctioned and completed during the year under this programme are given in Annexures III and IV. No new project was sanctioned under the Mangrove programme during 1996-97.

Fig 81. Cultivation of Commercial American Strain (R-26) on the saw dust bag-logs of mixed hardwood sp.

Details of Research Activities under the NRCP

The thrust of the research activities under National River Conservation Plan (NRCP) is on scheme specific and site specific research which could be directly utilised in the implementation and assessment of the efficacy of the schemes taken up under the action plan.

A cost effective sewage treatment technology through aquaculture has been developed and field tested. This technology requires no energy component and yields rich resource recovery besides requiring lesser land as compared to various versions of pond system of sewage treatment. It is proposed to adopt this technology in at least one town of each state participating in the NRCP. A workshop was held in January, 1997 to disseminate information relating to setting up, operation and maintenance of STPs based on this technology.

The stretch wise research projects undertaken for bio-conservation and bio-monitoring of the river Ganga using indicator species approach were completed during the year. The results of these projects are being compiled and synthesized for necessary follow-up actions by the concerned state govt. and institutions.

The studies taken up in collaboration with the Ministry of Non-conventional Energy Sources on the optimisation of biogas production from activated sludge process based sewage treatment plants were completed. Based on the recommendations of these studies, the state govt. of Uttar Pradesh is negotiating with the Ministry of Non-conventional Energy Sources, the possibility of co-funding of biogas packages in the sewage treatment plants which are under construction at Kanpur and Allahabad. While experimental work using UV and Gamma Radiation for controlling microbial pollution has been completed, experiments on chlorination and biological control using rotifers for the same purpose is continuing. On completion of these experiments, the results would be compared and evaluated to find the most cost effective and feasible solution for controlling microbial pollution.

The Central Pollution Control Board in collaboration with the pollution control boards of the coastal states has initiated surveys and studies to assess the actual pollution load in the 26 medium and minor rivers in the states of Goa, Tamil Nadu, Gujarat, Kerala and Orissa. Similar surveys and studies will also be taken up for the states of Andhra Pradesh, Maharashtra and Karnataka on receipt of proposals.

Besides, continuing the water quality monitoring of rivers Ganga, Yamuna, Gomti, Hindon and Western Yamuna Canal, under Ganga Action Plan phase I and II, water quality monitoring has been initiated for the rivers Satluj in Punjab and Betwa, Tapti, Khan, Kshipra, Narmada, Wain Ganga and Chambal in Madhya Pradesh. Suitable institutions have been identified for taking up water quality monitoring in other rivers covered under NRCP and the process of monitoring shall be initiated shortly. All the participating laboratories involved in water quality monitoring have been subjected to analytical quality control by the Central Pollution Control Board. Results of the two rounds of AQC were discussed in a workshop held in December, 1996.

Forestry Research

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

The ICFRE was established in 1986 at Dehradun and was granted autonomy on Ist June, 1991. The mandate of the Council is to advise the Government of India on formulation of forestry research policy and to organise, direct and manage research and education in the forestry sector. The major objectives of the ICFRE are:-

- To undertake, aid promote and coordinate forestry education, research and its application;
- To act as a clearing-house for research and general information related to forestry and wildlife;
- To develop forestry 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 develop, and maintain National Library and Information Centre for forestry and allied sciences;
- To do other things considered necessary to attain the above objectives.

The following research institutes function under ICFRE and are responsible for undertaking research related to their respective eco-climatic zones.

- Forest Research Institute(FRI), Dehradun.
- Institute of Wood Science and Technology (IWST), Bangalore.
- Institute of Forest Genetics & Tree Breeding (IFG &TB), Coimbatore
- Tropical Forest Research Institute (TFRI), Jabalpur
- Institute of Rain and Moist Deciduous Forest Research (IRMDFR), Jorhat
- Arid Forest Research Institute (AFRI), Jodhpur
- Temperate Forest Research Institute, Shimla
- Institute of Forest Productivity, Ranchi.
- Institute of Social Forestry and Eco-rehabilitation, Allahabad.
- Institute of Forestry Research and Human Resources Department, Chhindwara
- Advance Centre for Bio-technology and Mangrove Forests, Hyderabad.

Highlights of the research activities undertaken and research findings made by the Council and its institutes during the year are as follows:

- Wood properties and performance evaluation of strengths and physical properties of furniture made of MDF and other plantation timbers were conducted. Factory trials have been conducted for making pencils and poplar logs.
- Physical and mechanical properties of species like *Eucalyptus tereticornis, Tecomella undulata* and *Cuperssus* were evaluated in detail. Plantation species for use in catamarans were evaluated after using different environment friendly preservatives.
- Standardisation of cultivation techniques of important medicinal plants like *Rheum emodi, Digitalis purpurea, Costus speciosus* and *Curcum caesia* were undertaken.
- Clonal seed orchards, seedling seed orchards and multiplication gardens of species like teak, sisham, *Eucalyptus, Albizia* and other pines have been established in different parts of the country. Plus trees and seed production areas have been identified and demarcated in various states in collaboration with the state forest departments.

Fig 82. Conservation of medicinal plants at FRI, Dehradun

- Biomass productivity and nutrient cycling studies have been done both in natural forests and plantations.
- Seed collection, storage and germination studies were conducted on important tree species.
- Engineering and biological technological packages for reclamation of mined lands in central India (coal, copper and iron) and western Himalayan foothills (limestone) have been developed through systematic research.
- Regular and systematic studies were continued in natural forests, nurseries and plantations to assess the damages and devise control measures for insect pests and diseases.
- Studies were conducted for soil-water-plant relationships in various site conditions for important tree species of the arid zone.
- Different tree species were evaluated in forestry plantations and agroforestry.

The ICFRE and its Institutes also undertake specific research projects funded by international and national agencies. Details of internationally funded research projects are as follows:

ICFRE-UNDP Project on strengthening and developing ICFRE

The project which is being implemented from September, 1992 aims at enhancing the contribution of forestry for rural development in India by strengthening the capability of ICFRE institutions for carrying out research in specific areas inclusive of training of scientists and foresters engaged in research abroad.

The project also envisages developing mechanisms for effective transfer of technology to users for sustainable development of forests and environment. This project is expected to end in August, 1997.

ICFRE-US Assistance Project

The project "Studies on Himalayan Pines" has become operational from September, 1996 for a period of 5 years. It aims at development of technologies to replace presently used polythene bags with reusable cost effective root trainers, production of quality bare-root seedlings, selection of superior provinces, raising of seed orchards for quality seed production, establishment of clonal multiplication gardens for cloning of identified superior provenance's, disease resistance types and individuals, biological rejuvenation of genotypes adapted to stress sites using micorrhizae and studies on seed biology of pines for enhancing their viability and storage life.

ICFRE-ODA Research Project on Forest Genetics and Tree Breeding

The three years long project aims at establishing a specialised cell in the Institute of Forest Genetics and Tree Breeding, Coimbatore for general development of tree improvement programmes, particularly the creation of a nucleus for production of high quality planting material, using both conventional and advanced techniques such as biotechnology, tissue culture and somatic embryogenesis.

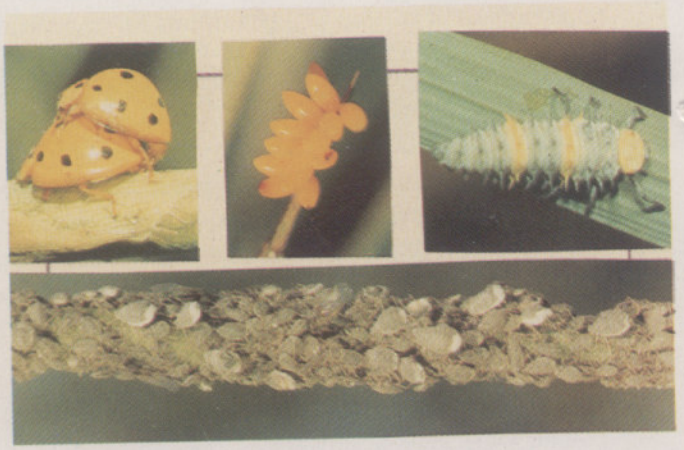


Fig 83. Coccinellid beetle : studied for bio-control of bamboo infesting Aphids (clockwise from top : mating adults, egg cluster, larva and Aphid colony on young bamboo shoot)

Fig 84. Roadside plantations of poplars

ICFRE-World Bank - Forestry Research Education and Extension Project (FREEP)

The World Bank aided 5 years long project on forestry research, education and extension is being implemented from September, 1994. The major components of this project are:

- Development of ICFRE and its Institutes
- Research Management
- Research Programme Support
- Forestry Education
- Forest Policy and Preparation.

Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore

The IPIRTI, an autonomous organisation of the Ministry, is a centre of expertise in mechanical wood

industries technology sector and is equipped with modern facilities for research and training in saw milling and plywood. While the headquarters of IPIRTI is in Bangalore, it also has offices in Calcutta and Tinsukia. The main objective of IPIRTI is to enlarge service life of wood and wood products, economise wood volume in end use and reduce wastage in conversion as well as application, with a view to reducing pressure on natural forests. The IPIRTI plays a catalyst role in the effective utilisation of research results to maximise productivity and to keep the industry posted concerning latest trends in research. Get-together meetings of IPIRTI- industry, workshops, demonstrations in mills on process improvements are arranged regularly to disseminate research findings to industries.

The R&D activities of IPIRTI focused on the following areas during the year:

- Development of an economical treatment method for veneers and plywood made of non-durable and imported species with NaTCP (Sodium Trichlorophenate)
- Extender from some indigenous oil cakes for development of UF and PF resin adhesives for the manufacture of plywood for general purposes
- Remedial treatment against insect attack on wood and wood based panels in storage
- Development of protective measures for plywood using a new insecticide-Imidachloprid
- Development of a dryer performance monitoring system

Fig 85. Eucalyptus furniture developed at FRI-an economical and good substitute of expensive woods

Fig 86. Tissue culture experiment at FRI, Dehradun

- Investigation on the effect of copper-chloride as hardener and preservative in UF resin adhesive
- Determination of optimum temperature for drying veneers in thematic fluid heated dryers.
- Evaluation of exterior grade (PF bonded) veneered and pre- laminated particle board for concrete shuttering.
- Total Quality Control in saw milling and QC applications in saw milling

Besides these, the Institute continued to work on sponsored research projects on wood substitutes and development of corrugated Bamboo Board for Roofing Sheets and provided consultancy services to industries.

As in the previous years, scientists of IPIRTI published papers in reputed national and international journals.

(Details of training and extension activities of IPIRTI are given in Chapter 8).

Fig 87. Successful experimentation of bajra plantation on washery degraded soil

Indian Institute of Forest Management (IIFM), Bhopal

The IIFM is a management institute in forestry sector which focuses mainly on the economic and social aspects of forest management. It has also undertaken ecological and silvicultural research during the year, and 11 such research projects are in progress.

(More details on IIFM are given in Chapter 8).

Wildlife Research

Wildlife Institute of India (WII), Dehradun

WIIs research covers a range of ecological, socio-economic and management aspects of wildlife conservation in India, and aims to strengthen conservation efforts through the generation of scientific information and by creating a group of trained field biologists and wildlife managers. Out of 36 research projects, eight research projects have been completed during the year. The studies in Great Himalayan National Park and Kalakad Mundanthurai Tiger Reserve under the World Bank schemes are in progress. The research project under West Bengal elephant and rhino study is the part of World Bank Forestry Project in that state. The eight projects undertaken in collaboration with the US Fish & Wildlife Service (USFWS) and one with US Forest Service (USFS) were continued during the year. WII's participation in the Indian Expedition to Antarctica continues with the selection of two scientists for participation in the XVI Indian Expedition to Antarctica.

The following projects were completed during the year :

- Assessment of animal damage to woody vegetation in Rajaji National Park.
- Establishing Geographical Information System (GIS).
- Designing a long-term monitoring programme for mammals and birds in India Ocean, Dakshin Gangotri and Maitri regions of Antarctica - Phase-II.
- Relative abundance estimation of carnivores by camera traps in Melghat Tiger Reserve.
- Responses of arboreal mammals with special reference to squirrels to selective logging in Arunachal Pradesh.
- Conservation status of otters and associated wetland fauna in the lower Himalayas and in the Terai of Uttar Pradesh.
- Study of wild animal damage problems in and around PAs in India - Phase-II
- Development of a user-friendly wildlife monitoring methodology for PAs in India.

Details of the on-going research projects are as follows :

- An ecological study of the montane grasslands in the Valley of Flowers (Garhwal Himalayas) and Eravikulum (Western Ghats) National Park with a view to develop baseline information on grasslands for conservation planning.

- Evaluation of elephant habitat in Singhbhum, Bihar in relation to fragmentation, degradation, mining and other disturbance factors.
- Developing area specific management guidelines for conservation of biodiversity in the Satpura Conservation Area taking into account the forestry objectives and needs of local people.
- Behavioural ecology of caracal in Sariska Tiger Reserve, Rajasthan.
- Release of captive Himalayan Must Deer in Kedarnath Wildlife Sanctuary.
- Establishing computerised wildlife database for conservation and evaluation in Tadoba National Park, Maharashtra.

Fig 88. Seed testing at FRI, Dehradun

Fig 89. A group of spoonbills in its natural habitat

- An ecological analysis of critical sea turtle habitats along the Orissa coast for the development of a scientific sea turtle management strategy.
- A study on the conservation status of high altitude forests in Garhwal Himalayas with special reference to landuse practices and tourism.
- Ecology of Gaur (*Bos gaurus*) in Pench Tiger reserves, M.P.
- Impact assessment of tourism in Corbet National Park, M.P.
- Ecology of tiger: To enable a realistic projection of the requirements needed to maintain a viable population in India; Sub-Project : Conservation of fragmented populations around Bandhavgarh National Park.
- Ecology and management of problematic sloth bear (Melursus ursinus) In North Bilaspur Forest Division.
- A preliminary study on the ecology of leopard in the Sanjay Gandhi National Park, Maharashtra.
- Ecological dependence of forest dwellers on the proposed lion reintroduction sites, Kuno Wildlife Sanctuary, Madhya Pradesh.

WII USFWS/USFS Collaborative Projects

- Conservation of Indian Wolf.
- Ecology and genetics of Capra ibex in India.
- The ecology and conservation of Indian Giant Squirrel.
- The relationships among large herbivores, habitat, and humans in Rajaji-Corbett National Parks.

Fig 90. Ibex at Pin Valley

- Impact of fragmentation on the biodiversity of rain forests of the Western Ghats.
- Identification of potential areas for conserving biodiversity in the Indian Himalayas.
- Evaluation of Panna National Park with special reference to the ecology of sloth bear.
- Establishment of a wildlife forensic capacity at WII.
- Development of an Indian Cooperative Wildlife Health Programme and Technical Assistance in WII's Wildlife Health Programme.
- Management of forests in India for biological diversity and forest productivity - A new perspective.

Other Sponsored Projects

- An ecological study of Kalakkad-Mundanthurai Tiger reserve - An Ecodevelopment Approach.
- Developing approaches to the management of elephant populations in West Bengal for mitigating man-elephant conflicts.
- An ecological study for the conservation of biodiversity in the Great Himalayan National Park (GHNP).
- A study on socio-economic aspects for the sustainable development of dependent population with reference to the Nanda Devi Biosphere Reserve, U.P.

Consultancies

The Environmental Impact Assessment cell of WII continued to undertake impact assessment studies for various agencies. The major Consultancies undertaken during the year are listed below:-

- Environmental Impact Assessment of Bina-Jhansi-Khanpur Pipe Line Project with special reference to impacts on wildlife values (In Progress).
- Environmental Impact Assessment of proposed LPG Recovery Plant at Usar with special reference to wildlife values (completed).
- An evaluation of the proposed Nuclear Power Station site at Nagarjunsagar with special reference to its conservation value (Completed).

Besides these EIA studies, the following consultancy studies are also being carried out:

- The Conservation of Biodiversity Component under the Forest Research Education and Extension Project is continuing at two sites namely the Great Himalayan National Park in Himachal Pradesh and Kalakad -Mundanthurai Tiger Reserve in Tamil Nadu.
- Project on Elephants in West Bengal on Developing Approaches for the Management of Elephant

Fig 91. *Nephila maculata* : a predator of bamboo defoliator

populations in West Bengal for mitigating man-elephant conflicts is in progress.

- A project for developing training packages for front line staff of Madhya Pradesh Forest Department has been taken up under the World Bank supported forestry project of Madhya Pradesh.
- A study on Rhinoceros has been initiated under the World Bank Forestry Project in West Bengal in which Rhino population estimation exercise has been undertaken in the Jaldapara Wildlife Sanctuary and Gorumara National Park. Habitat assessment and utilisation pattern of habitat by Rhinos have been taken up during the year.

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

This Centre was established in 1990 with the major objective of conducting research and extension activities relating to different aspects of ornithology and natural history.

During the year the Centre carried out research on the following topics:

Impact assessment of human interference on birds and plants, ecology of small carnivores, status of wildlife corridors, pesticides contamination of avi-fauna and endemic fishes of Nilgiri Biosphere Reserve, ecology of rare birds and status of sea-grass habitat in Andaman and Nicobar Islands, conservation of Lesser /Florican and fragmented rain forest of Western Ghats.

Fig 92. Demoiselle cranes - a migratory sp. generally found in Gujarat and Rajasthan

Fig 93. Jungle Babbler

(Details of extension activities of SACON are given in Chapter 8).

National Natural Resources Management System (NNRMS)

The NNRMS is envisaged to be a management system for monitoring the use of natural resources. The main objective of NNRMS is utilisation of remote sensing technology with conventional methods to monitor our natural resources such as land, water, forests, minerals, oceans etc. for attaining sustainable development by addressing the following aspects.

- Optimal utilisation of the country's natural resources by a proper and systematic inventory of the resource availability.
- Reducing regional imbalances by effective planning and in tune with the developmental efforts.
- Maintain the ecological balance with a view to evolve and implement the environmental guidelines.

A Standing Committee on Bio-resources (SC-B) constituted by the Planning Commission advises the Ministry on the methods of using remote sensing technology for optimal use and management of natural resources of the country.

During the year out of 15 on going projects, the committee reviewed the progress of nine projects and recommended nine new projects to various organisations of the country. The Committee also reviewed six completed projects. The lists of sanctioned, completed and on-going projects are given in Annexures III, IV and V respectively.

8

EDUCATION, TRAINING AND INFORMATION

Forestry Education, Training and Extension

Indian Council of Forestry Research and Education (ICFRE)

The ICFRE, Dehradun, an autonomous organisation of the Ministry of Environment & Forests, Govt. of India, organises and manages research, education and extension in the field of forestry. Details of ICFRE's activities relating to forestry research are given in Chapter 7. Details of activities relating to forestry education, extension and training undertaken by the Council and its institutes during the year are as follows:

- In the Forest Research Institute, a Deemed University, 15 students are enrolled for the award of M.Sc. Forestry.
- A total number of 17 students are enrolled for M.Sc. Wood Technology.
- A total number of 30 students are enrolled for the Diploma Courses on Plantation Technology and paper and pulp technology.
- Three research management training courses were conducted in which 72 scientists were trained.
- Two one-week in-service courses on Forestry Extension and Non-wood Forest Product Management Technology were conducted.
- A bar code system, and international data bases were procured for the National Forest Library and Information Centre.
- Various training programmes were conducted for librarians, researchers and scientists in India and abroad.
- Computerisation of library catalogue and bar coding for books, have been completed.
- Films on medicinal plants, seed testing technology, rain water harvesting in arid areas and integrated pest management are under preparation.
- Quarterly bulletins regarding data on timber, poles, firewood and bamboo from prominent markets were published and distributed to the users, tree growers and researchers.
- "Forestry Statistics India-1996" has been compiled based on the data collected from the State Forest Departments, Forest Corporations, National Statistical Organisations and other related organisations.

Indira Gandhi National Forest Academy (IGNFA), Dehradun

The IGNFA was established in May 1987 by upgrading the Indian Forest College and functions directly under the Ministry of Environment & Forests. The Academy imparts in service professional training to the Indian Forest Service (IFS) officers and has so far trained 1677 IFS officers and 228 foreign trainees from neighbouring countries. Currently, two batches are undergoing training in the Academy. While there are 39 officers in the 1995-98 course including three foreign trainees, 38 officers are enrolled in 1996- 99 course. The officers of 1995-98 course also underwent parliamentary attachment for a week during July 1996 during which they had an opportunity to call on the Hon'ble President and Hon'ble Prime Minister. Hon'ble Minister for Environment & Forests and veteran parliamentarians also addressed the officers.

Details of other activities of the Academy during the year are as follows:

- The first batch of officer trainees under the new sandwich pattern of training left the Academy in March 1996 for on-the-job training in their respective cadres. The training in field was regularly monitored by the faculty of the Academy. After completion of the 8 months on the job training, the officers have returned to the Academy for completing the advanced phase of training involving forestry and general management and administration.
- IGNFA participated in the 5th All India Forest Sports and Games Meet held at Bhopal from 7th to 12th January, 1997.
- Faculty members of the Academy have been sent to UK for undergoing training in forestry education.
- Computer training in the Academy has been further strengthened, with the acquisition of new computers. The Academy is now in the National Network of Information Technology. A Micro Earth Station has been set up which provides access to NIC-NET data bases in all the districts of the country and research centres of the world.
- The following special in-service training courses were conducted during the year;
- A one week compulsory course on Policy and Legal issues in Forestry for IFS officers.

Fig 94. Seed technology training at FRI, Dehradun

- A two weeks course on People's Participation in Forestry for IFS officers.
- A 10-weeks long induction training programme for SFS officers promoted to IFS.

Directorate of Forest Education

The Directorate is responsible for controlling, coordinating and managing all the regular training courses of State Forest Service (SFS) and Forest Range Officers in the country. It also organises short term special Refresher/Computer Application in Forestry Courses and Rural Development Courses for in-service officers.

Three State Forest Service College located at Dehradun(UP), Coimbatore (Tamil Nadu) and Burnihat (Assam) as well as the Eastern Forest Rangers College, Kurseong (West Bengal) are under the administrative control of the Directorate.

In addition to these, the five State run Forest Rangers Colleges viz. Forestry Training Institute, Haldwani (UP), Forest Rangers College, Balaghat, (MP), Forest Rangers College, Angul (Orissa), Gujarat Forest Rangers College, Raipipla (Gujarat) and North Eastern Forest Rangers College Jalukbari (Assam) are also technically controlled by this Directorate since it looks after the admission, curriculum and examinations.

Details of various courses organised by the Directorate and its colleges during the year are as follows :

- The two years Diploma course in Forestry was conducted in SFS college, Dehradun and 30 SFS trainees have completed the same.

- Forty one Range Officers have completed the two years training course from Eastern Forest Rangers College, Kurseong.
- Seven Refresher courses of two weeks duration were conducted and five more are to be conducted by the end of the year, for in- service SFS officers.
- Five short-term courses on computers have been completed and two more are to be conducted during the year.
- A special course of two weeks duration on Forestry and Sustainable Rural Development was organised.
- Computer laboratories have been established at SFS College, Dehradun and Coimbatore. Six courses on 'Computer Application in Forestry' of three weeks duration each were organised in these two colleges for in-service SFS officers. In all 66 officers were trained during the year.

Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore

The IPIRTI, Bangalore was added as an autonomous organisation of this Ministry on its transfer from the Ministry of Industry on 1.5.1990. It is recognised internationally as a centre of expertise in the mechanical wood industries technology sector and is equipped with modern facilities for research and training in saw-milling and plywood. It has a well-stocked library which provides referral services to industry and scientific community apart from Institute staffs and students.

Highlights of the achievements of the Institute during the year are given below:

- Several Vocational Training Courses on plywood manufacturing (Dry end), Resin Manufacture, pre-pressing and hot pressing and testing of wood based panels were conducted.
- Thirty seven candidates from various States successfully completed the one year Post-Graduate Diploma Course during September, 1996 and 25 candidates have been admitted to the 8th batch of this course in October, 1996.
- Under its extension and training activities, the scientists of the Institute continued to visit mills to carry out demonstrations of new techniques, improved process methods, maintenance and calibration of instruments etc.
- As in previous years, the Institute attended to a number of technical inquiries received from the industry, consultants, and Departments, Public Undertakings, potential entrepreneurs, research workers etc.

(Details of research activities of the Institute are given in the Chapter-7).

Indian Institute of Forest Management (IIFM), Bhopal

The IIFM, Bhopal was established in 1982 and is an autonomous organisation under this Ministry, its objective is to provide training in management and related subjects for officers from Indian Forest Service, Forest Departments, Forest Development Corporations and Forest related industries with a view to inculcating professionalism in forestry management.

Details of the activities of the Institute are as follows:

- The Ninth batch of students will be completing the two-year PG Diploma in Forestry Management in March, 1997.
- The one-year M.Phil course on Resource Management is being continued.
- Three categories of short duration Management Development Programmes viz. General Management Development Programmes, Secotral Programmes and Functional Programmes are being conducted for in-service officials of the forestry sector.
- A total of 90 Management Development Programmes and 22 seminars and workshops on various aspects of forestry management have been conducted so far.
- The Institute's library has a total collection of 21,445 books and subscribes to 257 journals and magazines.
- The Institute has a well equipped computer centre which has state-of-the-art facilities for Geographic Information System and Digital Image Processing. A number of micro-computers connected from a Local Area Network provide additional support for teaching, research and institutional activities.

Wildlife Education and Training

Wildlife Institute of India (WII), Dehradun

The Wildlife Institute of India, was established in 1982 and is an autonomous organisation under the

Ministry of Environment and Forests. Besides carrying out research on various aspects of Wildlife, WII is also responsible for orienting and training in- service personnel at various levels for conservation and management of wildlife resources. (Details of WII's research activities are given in chapter 7).

During the year, the following regular long and short term training courses, workshops/seminars etc., were organised and conducted by the WII.

- The regular nine months Diploma Course for PA managers of various State Governments was continued. The latest batch of the course includes 19 trainees of which three are from Bangladesh and one each from Nepal and Malaysia.
- The three month certificate course in Wildlife Management held during May - August 1996 was attended by 16 trainees representing 10 States/UTs.
- The MSc, Wildlife Science Course of 2 years duration is also being continued and the present batch has 11 Students including one from Nepal.
- A planning workshop on "Biological Diversity and Forest Productivity - A New Perspective was held during 10th to 12th June, 1996, to evolve strategies for integrated management of conservation areas such as Annamalai, Satpura, the Terai and the Garo Hill.
- A workshop on "Action Plan for Conservation and Management of Elephants in India" was organised during 13-15 June, 1996.
- A workshop on course curriculum development designed to meet the requirements of modular approach of the nine month Diploma Course was organised for WII Faculty during 17-20 June, 1996.
- A three days workshop on Geographical Information System was organised with the objective of transfer of technology from lab to field for field researchers and wildlife managers during 12-20 August, 1996.
- A total of 8 workshops/training programmes were organised under the project "Building Partnerships for Biodiversity Conservation in Rajaji National Park" for the benefit of front line park staff.
- A one week Compulsory Course in Wildlife Management held during 2-6 September, 1996, for IFS Officers with the objective of acquainting the participants with the critical issues in protected areas management, was attended by 15 participants from eight States.

Fig 95. Educating children on wildlife (a snake show)

- A three days Annual Research Seminar was organised during the month of September, 1996 to review the progress of WII's research programme and to discuss coordination and monitoring of Regional/National Wildlife research priorities.
- Under the UNDP project on "Strengthening Wildlife Management and Ecodevelopment Capabilities" a national workshop was organised in the month of November, 1996, and a total of 8 scientists were sent abroad to avail study tour/fellowships in their areas of specialisation.
- An Environmental Impact Assessment workshop on current trends and practices was organised during 26-28 December, 1996, which was attended by 47 participants.
- A three week Compulsory Course in Wildlife Management, organised during 2-20 December, 1996 for IFS Officers was attended by 7 participants from five States.
- A Capsule Course for Zoo Directors was organised during 11th - 20th December, 1996 at Bhubaneswar to formulate the improved management strategies for captive wildlife.
- Wildlife Week was celebrated by organising a drawing competition for the children of Chandrabani village.
- A three days workshop for PCCFs/CCFs on "Integrated Forestry Programmes to support

Biodiversity Conservation" was held in the month of January, 1997 with the objective of focusing on orientation of forestry programmes to support conservation of Biodiversity.

A course on Biodiversity Conservation for Sustainable Development is scheduled in March 3-7, 1997 for All India Service and Centre Service Officers.

Computer, GIS and Data Base

The computer facility of the institute was further strengthened by the procurement of new hardware/ software and upgradation of its old systems through funding from WII grant-in-aid, UNDP, USFWS and USFS projects. The Computer Centre conducted training courses on the use of computers and various software packages for the officer trainees of Wildlife Management Courses. Faculty and staff of WII underwent an advanced computer training in Australia and the USA. A FAO consultant on GIS worked in WII during the year between May-June and October-December 1996. During his stay the consultant conducted training courses on Arc/Info and undertook GIS analysis of some of the research projects of WII.

E-Mail connectivity has been acquired through VSNL and a home page of the Institute has been developed and put up on the Internet via Smithsonian Institute, Washington DC.

The ESRI/ERDAS User's conference conducted by ESRI-India, NIIT GIS Ltd., at New Delhi from 15-16 November, 1996, was attended by five people from WII.

Library and Documentation Centre

During the year approximately 1200 books/ monographs, 300 reprints, 1200 newspaper clipping have been added to the library collection. The Institute's Library receives 300 National and International Journals. Apart from the lending and reference services, WII's Library and Documentation Centre provides, Current Awareness Service (CAS), Retrospective Search Service (RSS), Bibliographic Services on Demand & Anticipation, Inter Library Loan (ILL) Service and Photocopying Service. Further augmentation of the CD - ROM database, along with the establishment of CD-NET have been planned to provide an Electronic Reference Library.

A Database of WII Serial Holdings has been developed during the year. The Library responded to 250 queries from external users. Apart from the bibliographical compilations, a Directory of Forestry Education in India has also been compiled by the library. A separate children's section has been established to encourage environment awareness among the children.

Environment Education, Awareness & Training

Formal Environmental Education

The Ministry of Environment and Forests interacts actively with the University Grants Commission (UGC), National Council of Education Research & Training (NCERT) and the Ministry of Human Resources Development (MHRD) for introducing and expanding environmental concepts, themes issues, etc. in the curricula of schools and colleges. The two Centres of Excellence on Environmental Education of the Ministry are also fully involved in the activities of the UGC, MHRD & NCERT related to formal environmental education.

Non-formal Environmental Education and Awareness

Environmental Education Awareness and Training plays a significant role in encouraging and enhancing people's participation in activities aimed at conservation, protection and management of environment, essential for achieving sustainable development. The Ministry, therefore, accords priority for the promotion of non-formal environment education and creation of awareness among all sections of the society through diverse activities using traditional and modern media of communication.

National Environmental Awareness Campaign (NEAC) 1996-97

The National Environmental Awareness Campaign (NEAC), started in 1986 for creating environmental awareness at all levels of the society, was continued during this year. The main theme for NEAC this year was 'Medicinal Plants'. Twenty seven organisations located in different parts of the country have been designated as Regional Resource Agencies (RRAs) for assisting the Ministry in conducting this campaign. Besides helping the Ministry in selecting participating organisations, these RRAs are also responsible for physically monitoring and evaluating the activities

conducted by various organisations under NEAC in their areas of jurisdiction.

A large number of NGOs, schools, colleges, universities, research institutions, women and youth organisation, army units, State Government Departments etc., from all over the country are provided financial assistance for organising various awareness creating activities such as padayatras, rallies, public meetings, exhibitions, folk dances, street theatres, essay/ debate, painting/poster competitions for school children, seminars, workshops, training courses etc. and for preparation and distribution of environmental education resource material. Diverse target groups ranging from students/youth/teachers to tribals, rural population, professionals, etc., were covered under the campaign.

Eco-Clubs

To impart environmental education and to encourage and mobilise participation of school children in various environmental conservation activities in their localities, the Ministry provides financial assistance for setting up of Eco-clubs in schools. These clubs are established in Govt. recognised schools and each club has 20-50 members taken from among the students of Class VI to X. A group of 20-50 Eco-clubs in one or more geographically contiguous districts are serviced by coordinating agency which may be an educational institution, a NGO or a professional body. More then 3500 clubs have been funded so far.

Paryavaran Vahinis

Paryavaran Vahini scheme was launched by the Ministry during 1992-93 to create environmental awareness and to encourage involvement of people through active participation as well as to report illegal acts pertaining to forests, wildlife, pollution and environmental degradation. One Paryavaran Vahini is constituted for each district especially identified for this purpose. The selection of the districts is made on the basis of high incidence of pollution, density of tribal population and forest cover. Till now, 184 districts have been selected for this purpose. The tenure of 130 Paryavaran Vahinis are over and these Paryavaran Vahinis will be reconstituted this year. Each Paryavaran Vahini has about 20 members which can go up to 100. The membership is restricted in the initial stages and may be increased upto 100 with the progress of the scheme.

Token grant of Rs. 200/- p.m. is given to the member of the Vahini to partially reimburse expenditure incurred by him/her for attending monthly meetings and other tasks of the Vahini. The funds for distribution of grants to members of Paryavaran Vahinis are provided by the Ministry periodically through the District Collectors.

Seminars/Symposia/Workshops/Conferences

The objective of this scheme is to provide a common forum to professionals for sharing upto date knowledge on various technical issues related to environment and to create environmental awareness about specific issues under this scheme, financial assistance is provided to Universities/Academic Institutions/Non-Governmental Organisations for organising seminars/symposia/ conferences/workshops on environment related issues. During the year 25 proposals were supported for financial assistance.

Films on Environment related areas

Recognising the role of electronic media in spreading the message of environmental conservation and creation of environmental awareness, the Ministry of Environment and Forests has been extending financial assistance to film producers for production of films on various aspects of environment, forests and wildlife. Some of these films are telecast by Doordarshan through the National Network as well as through Regional Kendras. Other TV networks such as Zee, Star, BBC etc. are also being encouraged to telecast the films supported by the Ministry. Seventy six films have been produced so far and 35 have been forwarded to TV Networks for telecast. Films produced during the year are given in Table-15.

Communication and Awareness Programmes of NAEB

New technologies and methodologies of participatory management, eco-development and regeneration of degraded forests are being progressively developed. In order to share such experiences and technologies widely, NAEB documents these developments and information in the form of publications, films and audio- visual and shares these with State Governments, NGOs and all concerned. The Board has commissioned/produced 12 films so far and has brought out a number of publications for the purpose of dissemination.

Table-15

Sl. No.	Title	Format & duration of the film	Language	Subject
1.	The fading call of Siberian Crane	U-matic High Band 30 mts.	English	Record of the events of Reintroduction of Siberian Crane at Bharatpur Sanctuary
2.	Unleaded petrol	Betacam 2 mts. 23 sec.	English	On use of unleaded petrol and Role of catalytic converters in checking vehicular pollution
3.	In search of greener pastures	U-matic High Band 35 mts.	Hindi & English	Lives of Gaddi People, their occupation culture and change of life style due to environmental degradation of their grazing land
4.	Jeevan Jal Strot	Betacam 24 mts. 30 sec.	Hindi	Environmental awareness on issues of water pollution with reference to river Ganga

Centres of Excellence

The following five Centres of Excellence have been set up so far by the Ministry with a view to strengthening awareness, research and training in priority areas of Environmental Science and Management.

- Centre for Environment Education, Ahmedabad (linked with Nehru Foundation for Development, Ahmedabad).
- CPR Environmental Education Centre, Madras (linked with Sir C.P. Ramaswamy Aiyar Foundation, Madras).
- Centre for Ecological Science (linked with the Indian Institute of Science, Bangalore).
- Centre for Mining Environment, Dhanbad (linked with the Indian School of Mines, Dhanbad).
- Salim Ali Centre for Ornithology and Natural History, Coimbatore (linked with the Bombay Natural History Society,Mumbai).

Centre for Environment Education (CEE), Ahmedabad

The CEE, Ahmedabad was set up in 1984 to develop programmes and materials to promote environment education and awareness through out the country. Highlights of the activities conducted by the Centre during the year 1996-97 are as follows:

- Under the NEEPs (National Environmental Education Programme in schools) an educational package consisting of a poster and a teacher's manual to create awareness about Ozone Depleting Substances is being developed for the Ozone Cell of the Ministry.
- A training package for environmental orientation to teacher education consisting of a video and a manual; for pre-service teacher training; and a teacher's manual on environmental action projects 'Joy of Action' are being developed with support from the Ministry of Human Resources Development (MHRD).
- Work relating to the development of text books on Environmental Studies for Standards III, IV and V for Macmillan Publishers is continuing.
- The adaptation and translation of three CEE publications, 'Joy of Learning', Approaches to Environmental Education in Schools' and 'Bird Observation Book' into Assamese, Khasi and Mizo languages have been initiated by CEE-North East with support from MHRD. While the Assamese versions have been published, work on Mizo and Khasi translations is going on.
- Four posters and a book have been brought out on the subject of oceans for youth.
- A manual for NGOs on environment education and an English- Kannada dictionary of environmental terms are being prepared by CEE-South.
- Under the EE Bank/ENVIS, EE information

Fig 96. Annual presentation of eco-club activities by school children at CEE, Ahmedabad

continued to be added. Workshops were held at Ahmedabad, Bangalore, Guwahati and Pune, to help educators access this information, adapt it for their use and develop locale-specific EE materials.

- More than a dozen eco-clubs were set up in schools of Ahmedabad.
- A project on Biodiversity Awareness Integration through Documentation's of Indigenous Knowledge (Baidik) has been undertaken with MHRD's support.
- A directory of training materials on Biodiversity Management to be brought out in both printed and disc formats is being developed with support from the Common Wealth Secretariat.
- A teacher's manual and a classroom kit titled," Enviroscope: Biodiversity" has been published. A second manual on "Citizen Action" is being developed.
- EE modules for inclusion in the B.Ed. course are being developed and tried in selected colleges in Karnataka.
- CEE continued to work with identified colleges and higher education institutions such as Gargi College, Delhi; Indian institute of Management, Ahmedabad; Centre for Environmental Planning and Technology, Ahmedabad and the Bhavnagar University, Bhavnagar, to introduce EE courses of tailor-made EE modules within existing courses.
- Clean Green project, a month long awareness cum training programme for youth on urban environmental issues, with emphasis on garbage management and air pollution was conducted at Ahmedabad during the summer vacation.
- CEE facilitated the formation of a club for young people in the age group of 15 to 25 in Ahmedabad to focus on initiatives for enhancement of the urban environment.
- Activities under the project, "Rochak" which seeks to orient college students of Ahmedabad city to issues of garbage management and elicit their participation in creating awareness on the same, are being continued. Four video spots and two video films about garbage management have been developed by the Rochak team.
- The first phase of the interpretive programme for the Bharatpur Bird Sanctuary has been completed.
- The Gujarat State Archaeological Department has commissioned CEE to develop and install interpretive signages for over 200 monuments in Gujarat.
- An interpretation programme for Sundarvan Nature Discovery Centre's wetland and animal exhibits has been initiated.
- The seventh training course of 'Training in Environmental Education (TEE)' of eight months duration, initiated in November, 1995, has been completed. The eighth TEE is in progress.
- Short duration training programmes conducted during the year included 'Environmental Law: An Overview", a programme on 'Environmental Education' for educators from the rural areas of Gujarat, 'Women, Environment and Development': with special focus on rural areas, etc.
- Monthly packages of environmental news, features, articles, etc. are being brought out under CEE-NFS, in English and Hindi, and are supplied to newspapers, magazines, NGOs, etc. A Kannada edition of CEE-NFS has also been launched.
- Various programmes for eco-development of the villages around the Ranthambore National Park and Hingolgadh Sanctuary are in progress.
- Work on creating awareness and education on issues related to drinking water is in progress in 41 villages of Amreli district.
- The Ministry of Environment and Forests has commissioned CEE to carry out an evaluation of the

eco-development programmes implemented by the forest department around six protected areas in the country.

- Sundarvan Nature Discovery Centre's activities were continued. Nature camps were organized at Beyt Dwarka and Bakore for youth and adults. Slide shows on environment and live snake shows were also organized in several schools of Ahmedabad.
- A "florican watch" and a "Sarus watch" were organized to create awareness about the ecology and conservation of greenland and wetland habitats.
- Work has been initiated towards the preparation of a manual "Model Marine Turtle Conservation Education" for teachers and NGOs involved in EE.
- CEE-South, involved 20 colleges in environmental quality monitoring of 9 districts in Karnataka, including monitoring of biomass and soil. A manual "Biomass Studies" has been prepared by CEE South, as a field guide for college students and teachers. The EQM data collected by the participating colleges are proposed to be analysed and incorporated into a digitized map using GIS.
- The communication strategy for the Ganga Action Plan has been finalized and guidelines have been formulated for facilitating participation of different agencies in the Yamuna Action Plan.
- CEE South, continued to carry out programmes towards better management of garbage in Bangalore city. A model hospital waste management project has been initiated in the Kampegowda Institute of Medical Sciences, a 500 bed hospital in Bangalore. A survey was conducted to study the existing methods of hospital waste management in various hospitals of Bangalore. A training manual for hospital staff on the subject is being prepared. A data base on solid wastes is also being prepared.
- Under the project "Production of Fuel and Manure from Human Solid Waste", production of three films viz., 'Recycling of Waste paper', 'Wait Until Dark' and 'Lurking Dangers' has been completed. Three literacy primers focusing on health and sanitation issues have been developed and these have been approved by the National Literacy Mission. Construction of a community toilet complex, with an attached Biogas Plant and Solar Sludge Purifier has been completed.
- Under the project "Coorg- An Alternative Model" a workshop was organized and planning for a resource centre has been initiated. Composting pits constructed as part of the project, have become operational.
- CEE has been given the management of Naroda Lake for a period of 10 years. A conceptual framework and strategy for action has been worked out.
- CEE has been allotted a plot in Manebaug society by the AMC under the Ahmedabad Green Partnerships Programme, for developing an urban forest. Work on the same has been initiated.
- Under the series 'Environment and Sustainable Development', new titles 'Waste Minimization in Industries', "Joint Forest Management - the Haryana Experience' and 'Biomass Model of Sustainable Development" have been brought out and work on 'Marine Bioresources' has been initiated.
- Four issues of Sampark, the Hindi edition of the quarterly UNESCO-UNEP newsletter 'Connect', were published during the year and distributed among NGOs and others.
- Under the EE bank/ENVIS programme six issues of 'News EE' and a Bibliography of Readings on the North East were brought out.
- The SASEANEE Secretariat was closely involved in organizing the Asian Workshop on Communication and Education Strategies for Ministries of Environment and Potential Partners, held in Bangkok, in July 1996. The two-month course conducted by the SASEANEE secretariat, 'Internship in Environmental Education' will now be a three month 'Certificate Course in Environmental Education' (CCEE) to be conducted in collaboration with WWF. Two issues of the SASEANEE newsletter were brought out during the year.

C.P.R. Environmental Education Centre, Chennai

The C.P.R. Environmental Education Centre was established in 1989 to increase consciousness and knowledge about the environment and the major

environmental problems facing India today. The Centre conducts a variety of programmes in the State of Tamil Nadu, AP, Kerala and Karnataka to spread awareness and interest among all sections of the public, including NGOs, educators, farmers, women, youth and children, on all aspects of the environment and ecology, with the purpose of promoting conservation of nature and natural resources. Two field offices of the Centre have been established in the Andamans and the Nilgiri Biosphere Reserve Areas.

The important activities carried out by the Centre during the year are as follows:

- Training programmes were conducted for NGOs, Youth, Farmers and Women in the States of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and the Andaman and Nicobar Islands to raise awareness on a variety of topics dealing with environmental protection and regeneration.
- World Environment Day (June 5, 1966) was observed by organising a Panel Discussion on "Towards a Sustainable Madras".
- The Centre's video van continued to travel around villages and schools in Andhra Pradesh and Tamil Nadu, to create environmental awareness among the general public.
- Seminars on "Environmental Protection: People and the Law" were conducted at several universities and for several NGOs in Andhra Pradesh, Karnataka and Tamil Nadu.
- Training programmes including Workshops were conducted for teachers, students and animal keepers at Chennai, Hyderabad, Trivandrum and Mysore.
- A series of training programmes on Water Quality Monitoring were conducted for teachers and students in Kerala.
- Training programmes for NGOs, teachers, Block Development Officers, as well as students were organised to enable them to take up eco-restoration programmes at the Nilgiri and Andaman Biosphere Reserve Areas.
- Under its "Awareness through Action" Programme, the Centre has taken up 15 sites in Andhra Pradesh and Tamil Nadu, for the restoration of sacred groves.
- At the tribal village of Bokkapuram in the Nilgiris, the Centre has helped the tribes to form a society to take up eco-development activities such as the establishment of kitchen gardens, planting of fruit saplings and other tree species and soil and water conservation programmes. The Centre also facilitated the construction of a check dam and installation of two biogas units at the village.
- A gene pool of medicinal plants has been set up by the Centre at Thambatty in the Nilgiris, in collaboration with the Hill Area Development Project (HADP) and the cooperation of the local villagers. Other NGOs, schools and colleges have also been helped to set up similar herbal gardens.
- Environmental education programmes in schools and workshops for teachers and teacher trainees were continued in the Andaman and Nicobar Islands.
- A major exhibition on "Conserving our Ecological Heritage - the Tamil Tradition" was held in Madras in September 1996, to educate the public about the ecological heritage of the State, during which a seminar on the same subject was also held.
- The Centre's exhibition on "Life Under Water" travelled to several sites along the coast of Tamil Nadu and to the Andaman and Nicobar Islands.
- An exhibition on "Food and the Environment" was displayed at the "Food Security Expo '96", organised by the Rotary Club of Madras East in November 1996. The mobile exhibition on "Sustainable Madras" was taken to several schools in Madras city to educate young people about the city's history and its current environmental problems.
- The following resource materials were produced by the Centre:
  - Seminar papers - "Conserving the Ecological Heritage - the Tamil Tradition"
  - Sthala Vrikshas of Tamil Nadu
  - Teacher's Environmental Education Kit
  - A set of slides on "Women and Environment"
  - Pamphlet on "Women and Environment" (in Tamil & English)
  - Centre's quarterly newsletter "Econews"
- Waste water samples near aquaculture ponds in Kurru village, Nellore District were collected and

analysed by the Centre for a programme of the BBC.

- Several brands of mineral water bottles and sachets were analysed for physical and chemical characteristics.
- The Centre has taken up an experimental study on different soil media with reference to the suitability of Albizzia lebbeck and Pongamia pinnata at Sittannavasal Sacred Grove site.
- A study has been undertaken at different areas of coastal Madras to find out the status of sea water intrusion.
- Air samples were collected from different industrial areas around Madras city for SPM, SO2, NOX and trace metals analysis.
- Water samples from a slaughter house, situated at Madras city were analysed to check the possibility of ground water pollution caused by the slaughter house.
- About 138 sacred groves of Tamil Nadu were documented during the year.
- The following projects were undertaken on behalf of the regional Centre of the National Afforestation and Eco Development Board, at Bangalore:
  - Survey of Sacred Groves in Tamil Nadu
  - Natural Resource Accounting (Study of the non-marketed value of forest produce)
  - Preparation of the Status Report on Control of Pollution in Industries of Tamil Nadu through Afforestation
  - Supply and Demand of Fuel Wood in Tamil Nadu

Centre of Mining Environment (CME), Dhanbad

The CME was established by the Ministry in 1987 at the Indian School of Mines, Dhanbad. Since 1994, the expenditure of the Centre relating to salary etc., of the faculty and staff is being met by the UGC, while the expenditure on Research and Development activities of the Centre is being met by this Ministry. A Monitoring Committee functioning under the chairmanship of Secretary (E&F) oversees and guides the research work of the Centre.

The R & D activities of the Centre during the year focused on the following areas.

- Carrying capacity based development planning of Damodar river basin.
- Study of green belt regarding its noise attenuation and dust arresting capacity in coal mining areas.
- Pilot experimentation for utilisation of fly ash in reclamation and re-vegetation in mining areas.
- Environmental assessment of coal combustion residues from thermal power plants.
- Socio-economic evaluation of coal mining complexes with a view to affecting social development and developing mineral areas societal development index.
- Investigations into groundwater balance in Jharia coalfield.
- Development of noise indices for coal mining complexes.
- Time-scale land-use studies in mining districts of Chotanagpur and Santhal Pargana region of Bihar.
- Air quality impact assessment and development of pollutant dispersion models in mining areas.
- Survey, isolation and inoculation of Ectomycorrhiza and Vesicular Arbuscular Mycorrhizal (EVAM) fungi in coal mine overburden dumps.
- Investigations into environmental and geotechnical parameters for design of compliant tailings impoundment's.
- Environmental pollution potential of the acid waste rocks and tailings in Indian base metal mines and its abatement.
- Development of subsidence predictive models for oil and gas fields of ONGC, India.
- Anaerobic and aerobic treatment of phenolic effluents, laboratory experiments.

Other activities of CME

- A micro biology laboratory has been established at the Centre.
- Four short-term courses on environmental impact assessment, land-use planning etc., were organised for in-service personnel.
- The syllabus of the three semester M. Tech Programme on Environmental Science and Engineering has been re-structured during the year.

- Two faculty members of the Centre were deputed for training to the U.K. under the Colombo Plan.
- Faculty and staff of the Centre participated in several national and international conferences etc., and presented papers.

Centre for Ecological Sciences (CES), Bangalore.

This Centre was established in 1983 at the Indian Institute of Science, Bangalore with the objective of focussing on the ecology and environment at the Western Ghats. During the year, the Centre continued its investigations of pure and applied ecology with special reference to the Western Ghats. The Centre's research work focused on the following topics:-

- Microlichen diversity in the Nanda Devi Biosphere Reserve.
- Ant Sp., diversity in urban habitats of Bangalore.
- Evolution of social life insects.
- Plant reproductive strategies: preliminary spatial analysis.
- Development of Software for training in ecological methods.
- Patterns of Biological Diversity.
- Past climate and vegetation change in Southern India.
- Productivity estimates for tropical plantation forestry.
- Impact of climate change on forests of Western Ghats region.

The faculty members of the Centre contributed to the preparation of the Second Assessment Report on " Impacts, adaptation and mitigation of climate change" being published by the IPCC (Intergovernmental Panel on Climate Change).

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

The Centre was established in 1990 with the major objectives of conducting research and other extension activities relating to all aspects of ornithology and natural history of other forms of life.

To commemorate the birth Centenary of Dr. Salim Ali, SACON, in collaboration with the Birdlife International, organised the First Pan Asian Ornithological Congress at Coimbatore during 9th - 18th November 1996 (Details of the research activities of SACON are given in Chapter 7).

National Museum of Natural History (NMNH), New Delhi

The National Museum of Natural History is a subordinate office of the Ministry of Environment and Forests. Its basic function is to promote non-formal environmental education and create environmental/ conservation awareness among the people through various in-house and out-reach activities. It has various exhibit galleries, a Bio-science Computer Room, an Activity Room and a Mobile Museum which are used for promoting environmental awareness among different target groups.

Exhibit Galleries

The NMNH has four major galleries namely- Introduction to Natural History, Introduction to Ecology-Nature's Network, Conservation and 'Cell - the basic Unit of Life.' During the year a computer based interactive multi-media exhibit has been added to the gallery on 'Cell - the basic Unit of Life' which was inaugurated by the Hon'ble Minister for Environment & Forests.

Temporary Exhibitions

The Museum coordinated and participated in the organisation of the following temporary exhibitions:

- Indian Wildlife' at the NMNH to observe the 'World Environment Day'.
- 'Save the Ozone Layer' at the NMNH to observe the International Ozone Day in collaboration with the Ozone Cell, Ministry of Environment and Forests.
- 'Slow Murder - The deadly story of Vehicular Pollution in India' at the NMNH in collaboration with the Centre for Science & Environment.

Educational Activities

Besides the regular programmes of film shows and activities for the benefit of school children and teachers within the museum premises, the following Special programmes/activities were organised by the Museum during the year.

Fig 97. School children at the Discovery Centre at RMNH, Mysore

- A month-long Summer Programme for teenagers on 'Know Your Environment'.
- Creative activity for children on nature painting and animal/plant modeling.
- Teacher Orientation Workshops.
- Environmental education programmes and activities for different target groups under the National Environment Awareness Programme.
- Audio-visual extension programmes and film shows organised at schools, colleges, resettlement colonies in Delhi and surrounding rural areas.
- Special week-long programmes for handicapped children.
- School Loan Service - Teaching Aids provided on loan to schools.
- LEARN (Lessons on Environmental Awareness and Resources at NMNH) Programme for school children from Classes VI to XII.
- Publication of popular environment education resource materials.
- Workshop for making teaching aids in Biology for teachers of the Visually Handicapped.

Collaboration with Universities

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

The NMNH also extended its cooperation to the National Museum Institute of History of Art, Conservation and Museology (a deemed University), New Delhi in the teaching of Museology and orienting its students on various aspects of Museum Communication, Computerization in Museums and Exhibit Planning and Designing.

Professional Enrichment, Participation in Seminars/ Workshops etc.

The Indo-US Museum Partnership Programme of the Indo-US Sub-Commission on Education and culture under which staff from museums of India visited the museums of USA and vice-versa has come to an end. New avenues for partnerships among Natural History Museums and other allied institutions of the USA are therefore being explored, since such exchange visits have proved beneficial to museum professional of both the countries.

- Director, NMNH participated in the Ist World Science Centre Congress held in Helsinki, Finland.
- The NMNH, New Delhi and its Regional Museum of Natural History, Bhopal collaborated and participated in the Annual Conference of the International Committee of Ethnography Museums of the International Council of Museums organised by the Rashtriya Manav Sangrahalaya in Bhopal. The collaboration was also extended to the Delhi Chapter of the Indian National Committee of the ICOM in organising the Annual Conference of the International Committee of Regional Museums of ICOM in Delhi.
- NMNH participated in the Annual Conference of the Museums Association of India held at Bharat Kala Bhawan, Banaras Hindu University, Varanasi.

Regional Museums of Natural History (RMNH)

RMNH, Mysore

Apart from its permanent galleries and in-house educational activities, the RMNH, Mysore conducted various extension and outreach educational activities like temporary exhibitions, Summer Programmes, NEAC, Programmes for destitute women, programmes for family groups etc.

Fig 98. Summer nature study programme at RMNH, Mysore

Fig 99. Visually handicapped children having hands on experience at NMNH, New Delhi

RMNH, Bhopal

The first phase of construction of the museum building along with its galleries and other infrastructure are ready and the Museum is likely to be opened to the public shortly. This Regional Museum will promote non-formal environmental education and awareness among the masses of the central region of the country.

RMNH, Bhubaneshwar

The RMNH at Bhubaneshwar is at an advanced stage of construction. Besides portraying the natural wealth of the Eastern region of the country, the museum will also promote non-formal environmental education and awareness among the masses of this region

Fellowships and Awards

Indira Gandhi Paryavaran Puraskar (IGPP)

IGPP Award was instituted in 1987 by the Ministry, and is now awarded to an individual and to an organisation every year for their significant contributions in the field of environment. The Puraskar carried Rs. 1.00 lakh in cash, a scroll and a citation.

The Puraskar has been awarded till 1993 and awards for 1994 and 1995 are being finalized. Nominations for 1996 have been received.

Indira Priyadarshini Vrikshamitra Awards (IPVM)

The annual Indira Priyadarshini Vrikshamitra (IPVM) Awards were instituted in 1986 to recognise pioneering and exceptional contribution of individuals/ organisations in the field of afforestation and wastelands development. Since 1993, twelve awards are given under six categories viz. (a) Individuals (b) Panchayat/ Gram Sabha/Village Level Institutions (c) Educational Institutions (d) Voluntary Agencies including Mahila Mandals, Yuvak Mandals etc. (e) Government Agencies (District Level and below) and (f) Corporate Sector. Each award carries a cash component of Rs. 50,000/-, a medallion, a scroll and a citation. The awards for 1994 have been announced.

Mahavriksha Puraskar

The Mahavriksha Puraskar Instituted during 1993-94 recognises individuals/organisations for having trees of the notified species on the basis of girth, height, health & vigour of the trees. A roaster of notified tree species, valid for five years has been prepared. The Award consists of a cash prize of Rs. 25,000/-, a plaque and a citation. Awards for 1994 have been announced.

Pitambar Pant National Environment Fellowship Award

This annual fellowship was instituted in 1978 to recognise, encourage and support excellence in any branch of research related to environmental sciences.

The fellowship for 1996 has been awarded to Dr. L.C. Rai of the Banaras Hindu University (Deptt. of Botany) to study "Production of Nitric Oxide (NO) by Micro-algae.

The award carries a monthly fellowship of Rs. 4000/- for 2 years, a contingent grant of Rs. 18,000/- per annum and other facilities.

B. P. Pal National Environment Fellowship award for Bio-diversity

Instituted in 1995 to commemorate the extraordinary contributions of Late Dr. B.P. Pal to the field of biodiversity, this annual fellowship is awarded to individuals for significantly important research and development contributions in the area of biodiversity.

The award for 1996 has been awarded to Dr. Parthasarathi Roy, Forestry and Ecology Division of the Indian Institute of Remote Sensing, Dehradun for the "Preparation of a Comprehensive Point Data Base in GIS on the Biodiversity of North-Eastern India".

This award also carries a monthly fellowship of Rs. 4,000/- for two years, a contingent grant of Rs. 18,000/- per year and other facilities.

Desert Ecology Fellowship

A Desert Ecology Fellowship has been instituted at the University of Jodhpur in recognition of the Bishnoi community's Contribution to nature conservation and to encourage studies on Desert Ecology. The first Desert Ecology Fellowship was awarded to Dr. (Ms.) Rekha Bhati last year for an initial period of one year. Dr. Bhati has resigned from this fellowship and joined as Lecturer in Deptt. of Botany, Rajasthan University. Efforts are being made to award this fellowship again to Dr. Bhati as an additional work. The award carries a monthly fellowship of Rs. 3500/- and a contingency grant of Rs. 1,000/- p.m.

Paryavaran Aur Van Mantralaya Vishisht Vaigyanik Puraskar

This award was instituted in 1991-92 as an incentive to Group 'A' Scientists of the Ministry and its associated formations. The award consist of a cash prize of Rs. 20,000/- and is awarded to two scientists every year. Selection of awardees for the year have been finalised.

Environmental Information

Environmental Information System (ENVIS)

The ENVIS network with its 21 nodes continued its activities in information collection, collation, storage, retrieval and dissemination to its users during the year. The ENVIS nodes, known as ENVIS centres in 21 subject specific areas and the Focal Point in the Ministry constitute the ENVIS network. A list of such ENVIS centres along with their subject areas is given in Annexure-II. The Focal Point of ENVIS and its network partners laid emphasis on the development of its information-base by creating comprehensive data-bases and strengthening information resource repository in the concerned subject area. Major activities of the ENVIS Focal Point and its various centres during the year are as follows:

Focal Point

– The ENVIS Focal Point continued to publish the quarterly journal namely 'Paryavaran Abstracts'

reporting information on environmental research in Indian context. More than 600 national and international environmental related journals are referred to for compilation of relevant abstracts for inclusion in this publication. The abstracts are arranged under major categories like air pollution, water pollution, noise pollution, environmental management, ecology, health and toxicology, environmental legislation, forestry, wildlife etc.

- The ENVIS network, during the year, responded to a total number of 9779 queries of which 8880 were national and 899 were international. Out of these total queries, ENVIS Focal Point alone responded about 540 queries during the year. The detailed break up of the number of the queries processed by the ENVIS network during the last five year given in Figure-100. Efforts were made by the network to provide substantive information as far as possible to all the queries mentioned above and in some cases where it was not readily available, referral services were provided to the users. The major subject areas on which the queries were responded pertain to-

– Atmosphere	184
– Lithosphere	3
– Terrestrial	225
– Fresh water	267
– Ocean and coastal areas	552
– Environmental development	1186
– Human settlements	1505
– Agriculture	282
– Industry	632
– Transportation	13
– Energy	295
– Chemical and biochemical process	185
– Pollution and wastes	1126
– Human health	76
– Disaster	44
– Monitoring and environmental data	189
– Environmental law and institutions	213
– Environmental awareness	1499
– Others	1303
Total	9779

- The Focal Point also continued its efforts for networking all the ENVIS centres through ERNET programme of the Department of Electronics. Out of these 21 centres, 12 centres have been provided with modem and other software support to install E-Mail facilities in their respective centres. Necessary steps have also been taken to provide these facilities to the remaining Centres for easy and quick dissemination of information as well as for on-line communication to the various centres and to the Focal Point vice-versa.
- During the year steps have been taken to set up two new centres in the fields of "forestry" and "wildlife" at Forest Research Institute, Dehradun and Wildlife Institute of India, Dehradun respectively as recommended by the Scientific Advisory Committee of ENVIS.
- The Library in the Ministry is an integral component of ENVIS and acts as document repository for dissemination of information in the field of environment and its associated areas. During the year, the Library enriched its documentary-base by procuring an additional number of more than 350 books, documents, journals, state of art report etc. so that it could provide the back-up support to ENVIS in disseminating substantive information to its users.
- During the year, more than 300 national and international scientific journals were received in the Library and various other subject related documents have been identified for procurement. Automation of the Library has been made by using suitable software package to expedite the retrieval of the documents provided by the Library. Scholars from various institutions in Delhi made use of the Library in the Ministry during the year. The Library is also equipped to provide reprographic services not only to ENVIS users but also to other Divisions of the Ministry. Apart from the technical books, journals, proceedings etc. Library also procured a wide range of general books, magazines, notable literatures during the year both in Hindi and English for the use of the officials of the Ministry and its associated offices.
- ENVIS also continued to function as a National Focal Point (NFP) and a Regional Service Centre (RSC) for the South Asian Sub Region countries

for INFOTERRA network, a global information network of the United Nations Environment Programme (UNEP). As a RSC of INFOTERRA the ENVIS network provided information to Bangladesh, Sri Lanka, Nepal, Pakistan and Bhutan in response to the queries received from them.

- ENVIS also continued its close liaison with various other national information systems in the country for exchange of environmental information and to avoid duplication of efforts in the fields of environment and its associated areas.
- During the year, the ENVIS Focal Point coordinated the publication of the Annual Report (95-96) of the Ministry.
- Based on the performance of the ENVIS and its network partners, it has been designated as the National Focal Point of the Sustainable Development Network Programming (SDNP) of UNDP. ENVIS has already taken several steps to initiate its activities in this regard.

Activities of the ENVIS Centres

All the ENVIS Centres continued their activities related to collection, storage, retrieval and dissemination of information on the subject areas allotted to them. Besides strengthening the data bases and responding to various national and international queries all the ENVIS Centres carried out a variety of activities aimed at disseminating information to a wide range of users. Highlights of some of the activities of the ENVIS Centres are given below:

- The ENVIS Centre on Control of Pollution at the Central Pollution Control Board (CPCB) continued to publish thematic issues of the Newsletter 'Parivesh' on themes such as air pollution and its

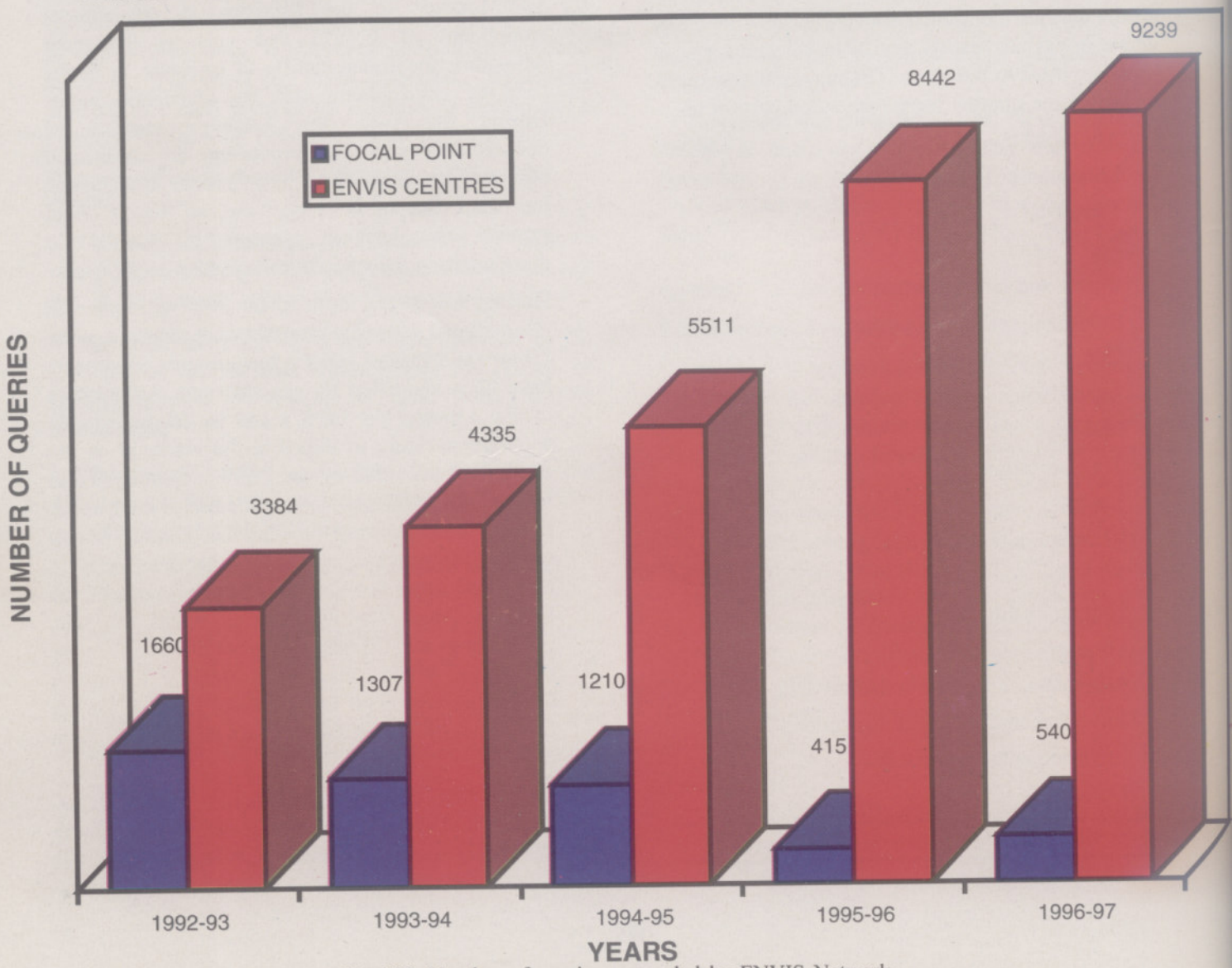


Fig 100. Number of queries responded by ENVIS Network

control, ground water quality, coastal pollution, bio-monitoring etc. The CPCB brought out nearly 20 publications/booklets/reprints under various series and two new series on "Groundwater Quality" and "Information Manual on Pollution Abatement and Cleaner Technology" were added during the year. A total of 185 queries on various aspects of pollution were answered by this Centre.

- Apart from continuing its regular activities, the ENVIS Centre on Toxic Chemicals functioning at ITRC, Lucknow has developed a computerised data base on toxic chemicals including information on 50 chemicals. On the basis of information and literature provided by the ENVIS centre, the U.P. Department of Environment has developed guidelines for assessment and identification of waste disposal sites in Lucknow district. The Centre also helped the U.P. SPCB to identify various categories of hazardous wastes. Publication of ENVIS Newsletters and Abstracts of Current Literature in Toxicology was continued. A total of 42 queries were answered by this centre during the year.
- The DAINET (Development Alternatives Information Network) operated by the ENVIS Centre at the Society for Development Alternatives (SDA), New Delhi continued to collect, store and dissiminate information related to environmentally sound appropriate technology and environmental management. During the year existing database of the ENVIS Centre were parted on to the RDBMS platform. A NGO directory is also being designed and developed on the RDBMS paltform. A web page of the SDA has been set up on the Internet.
- Computerisation of the data base is being continued at the ENVIS Centre on Biodegradation of wastes and Environmental Impact Assessment functioning at the Centre for Environmental Studies, Anna University, Chennai. The database includes a listing of over 5000 papers on the two subjects allocated to the Centre. The ENVIS Library has over 800 books/reports on the subjects. E- mail facility is operational and about 40 research personnel made use of this service during the year. About 324 queries were received and processed by this centre.
- A new journal "TERI information monitor on Environmental Sciences" has been launched by the ENVIS Centre on "Energy and Environment" functioning at the Tata Energy Research Institute (TERI), New Delhi as the ENVIS Newletter. The journal contains review artical, bibleography, abstracts of recent literature, book reviews etc, relating to the subject area allotted to the centre. During the year, the database was updated by adding abuot 1000 bibeography references and about 600 reprints. The ENVIS centre at TERI also contributed to the preparation of the project proposal on "Environmental Management Capacity Building" assigned to TERI by Ministry.
- The "Third Environmental Status Report of Madhya Pradesh" was brought out by the ENVIS Centre at EPCO, Bopal during the year. It also published three issues each of "Madhya Pradesh Paryavaran" and ENLAW and circulated them among NGOs, government departments, educational institutions, etc. Infiormation about 250 NGOs functioning in the state of Madhya Pradesh, has been stored in the computer and is made available to users on request. Several camps and workshops were also organised jointly with EPCO for different target groups.
- The ENVIS Centre on 'Desertification' functioning at the Central Arid Zone Research Institute (CAZRI), Jodhpur has created a database on "Desertification and Soil Science" using CDS/ISIS software package, which is being updated regularly. Searches on the data base can be made through Author(s), Title, subject, keywords and serial numbers. During the year the Centre provided around 625 pages of photocopies of relevant information to various users. A fortnightly 'Current Awareness Bulletin' relating to soil conservation and desertification and newspaper clipping service are being provided. A bibliography on Desertification, Soil Conservation and Environment (upto 1995) has been compiled. The centre continued to provide material for inclusion in the "Paryavaran Abstracts" being brought out by the Focal Point at the Ministry.
- Information continued to be added to the EE bank being maintained by the ENVIS Centre on Environment Education functioning at the Centre for Environment Education, Ahmedabad. Workshops were held at Ahmedabad, Bangalore, Guwahati and Pune to help educators access the

information, adapt it for their use and develop locale-specific EE materials. Six issues of the networking newsletter "News EE", and a bibliography of "Readings on the North East" were brought out during the year. Work on updating the Directory of NGOs in EE in the North East has been completed.

- The subject allotted to the ENVIS Centre at the Zoological Survey of India, has been changed to 'Faunal Bio-diversity" from Animal Ecology to reflect the scope of its subject coverage. Application software for storage, retrieval and dissemination of data has been developed by the staff of the ENVIS Centre. Data of 12 species of vertebrates listed in Schedule I of the Wildlife (Protection) Act 1972 and all the genera of butterflies belonging to the family Lycaenidae occurring in India, Pakistan, Sri Lanka, Nepal, Bhutan, Bangladesh and Myanmar have been entered into the computer. 4000 bibliographic references on bio-diversity and ecology of Indian animals have also been stored electronically. A total of 51 queries were processed by this centre during the year.
- The data base of the ENVIS Centre on Mining at the Centre of Mining Environment, Dhanbad was expanded by adding about 1000 references on the subject during the year. Action has been initiated to have regular interactions with other libraries in Dhanbad to exchange information about the latest publications on the subject. The quarterly Newsletter "MINENVIS" was published regularly and a total of 93 queries were received and answered by this centre during the year.
- The ENVIS Centre on Solid Waste including hazardous waste at NEERI, Nagpur actively disseminates information on the subject by regularly publishing the highlights of the R&D work carried out at NEERI on Solid and Hazardous Waste Management. The Centre has also acquired several national and international data bases on the subject which are searched regularly to service the users.
- The bibliographic data base developed by the ENVIS Centre on Himalayan Ecology at the G.B. Pant Institute of Himalayan Environment and Development has more than 500 abstracts, research papers & technical reports on the subject, collected from the universities/institutions/research stations located in the 12 Himalayan States of the Country. Records of more than 200 scientific and technological personnel working on various aspects of Himalaya have also been collected. Socio-economic data of the region is being collected from the Information Centres of the District Statistical offices of 72 districts spread over 12 states. ENVIS Bulletin was continued to be published.
- The ENVIS Centre on Human Settlements functioning at the Centre for Environmental Studies, School of Planning and Architecture has collected data spanning four decades pertaining to six mega cities of the country with a view to studying the trends of development in these cities. City profiles and trends of demographic growth of cities/Urban Areas of the country in the more than one million population are also being studied. Data has been collected on various parameters to determine the human environment and quality of life in the four metropolitan cities. A seminar on "Environmental Quality of Human Settlements" was organised by this centre and a report of the presentations has been published
- The ENVIS Centre on Biogeochemistry and Environmental Law located in the School of Environmental Sciences, JNU has so far loaded 7942 references on Biogeochemistry and Environmental Law in the computer. An "International Workshop on Environmental Legislation and Management for SAARC Countries" sponsored by the Ministry of External Affairs was organised by the Centre during 23rd-25th October, 1996. CD-ROM's related to Bio-geochemistry and Environmental Law are proposed to be acquired to under the scope of its databases. ENVIS Newsletter continued to be published. A total of 124 queries were answered by this Centre during the year.
- The ENVIS Centre on Floral bio-diversity (previously plant ecology) located at the Botanical Survey of India (BSI), Calcutta is engaged in collecting data on plant diversity, plant ecology and on plants of coastal and marine ecosystems. An appliciation software has been developed for the database on rare and endangered plants. E-mail connection has been set up and publication of the ENVIS Newsletter was continued. About 50 major

queries were received and answered by the centre during the year.

- The database on Eastern Ghats, being developed by the ENVIS Centre at the EPTRI, Hyderabad consists of non- bibliographic and bibliographic components. The non-bibliographic database is being developed using Remote Sensing data and GIS and mapping of the entire Eastern Ghats of Andhra Pradesh in 1:1 million scale has been completed. During the year mapping of a few selected areas in 1:50,000 scale has been undertaken, based on which a model decision support information system will be developed. The bibliographic database has been developed using CDS/ISIS and it consists of records and references of all literature on Eastern Ghats available at EPTRI. The ENVIS Newsletter continued to be published and a total of 375 queries were answered during the year.
- The ENVIS Centre on Avian Ecology and Inland Wetlands at BNHS, formally inaugurated by former Secretary(E&F) in June, 1996 has initiated the creation of a data base on the subjects allotted to it. Bibliographic data is being entered into the computer using both d-base and access software's. The first issue of the ENVIS Newsletter was published in September, 96.
- The ENVIS Centre at Annamalai University in the subject area of mangrove, coral reefs, estuaries and lagoons continued to publish the ENVIS Newsletter in the subject area disseminating information to all concerned. The centre responded to 366 queries and procured 6651 records to provide substantive information to these queries. The draft State of Art Report on estuaries, mangroves, coral reefs and lagoons have been prepared by the centre during the year which will be published soon after the comments from the various experts. Besides the centre continued to strengthen its data-base in these subject areas by procuring the latest ASFA (Aquatic Sciences and Fisheries Abstracts) diskettes and other abstracts of literature in the specified subject areas.
- The ENVIS Centre at the National Institute of Occupational Health, Ahmedabad continued to publish its quarterly publication namely, "Environmental Information" to disseminate the latest information on various aspects of occupational health. Besides, the centre also responded 83 queries and provided substantive information to its users. Monographs on different compounds having health hazardous index were also published by the centre during the year.
- The ENVIS Centre at WWF-India, New Delhi has established an Internet Website for WWF-India on an experimental basis. Data relating to the questions and answers on environment handled in both the houses of Parliament from 1994 is being entered with a view to publishing the same.

9

LEGISLATION AND INSTITUTIONAL SUPPORT

Legislation

The Ministry continued with its activities aimed at creating a comprehensive legal and institutional infrastructure for safeguarding the environment. These include framing of rules, notification of standards, recognition of environmental laboratories, delegation of powers, identification of agencies for management of hazardous chemicals etc. The existing laws, rules etc. are also amended from time to time to make them more effective.

The National Environmental Tribunal Act

This act which was granted Presidential assent on 17th June 1995, provides for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environmental Tribunal for effective and expeditious disposal of cases arising from such accidents, with a view to giving relief and compensation for damages to persons, property and the environment and for matters connected their with or incidental thereto. Enforcement and setting up of tribunal benches at New Delhi, Mumbai, Calcutta and Chennai are under process.

National Environment Appellate Authority Ordinance, 1997

The National Environment Appellate Authority Ordinance was promulgated by the President of India on 30th January, 1997. The Ordinance provides for the establishment of a National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industry, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards under the Environment (Protection) Act, 1986 and for matters connected therewith or incidental thereto. This is to bring in transparency in the process, accountability and to ensure the smooth and expeditious implementations of developmental schemes and projects.

Delegation of Powers under the Environment (Protection) Act, 1986

The Chairman, Central Pollution Control Board was delegated powers of Section 5 under the Environment (Protection) Act vide S.O. No. 157(E) dated 27th February, 1996. Powers of Section 10(i), 11(i) and

19(a) of the Environment (Protection) Act have also been delegated to the Chairman and Member Secretaries of the Committees notified under the Water (Prevention and Control of Pollution) Act 1974 and the Air (Prevention and Control of Pollution) Act 1981 in respect of Union Territories, vide S.O. No. 622-624 (E) dated 3rd September, 1996. Powers of Section 5 have also been delegated to the Chairman of the State Pollution Control Boards and Union Territories vide S.O. No. 23 (E) dated 8th January, 1997. The Hazardous Waste (Management and Handling) Rules, 1989 have been amended on 3.9.96 w.r.t. delegation of powers.

Notification under the Eco-mark Scheme

The scheme of labelling of environment friendly products, provides accreditation and labelling for household and other consumer products which meet certain environmental criteria along with quality requirements of the Indian Standards for that product. The label is known as the "ECOMARK". Any product which is made, used of disposed of in a way that significantly reduces the harm it would otherwise cause the environment could be considered as an environment friendly product. Details of various notification issued under this scheme so far are as follows:

Status Of Notifications for Environment Friendly Products

Sl. No.	Name of product	Notification Number	Date of Notification
Final Notifications issued			
1.	Toilet Soaps	(No. 188)	28/4/92
2.	Detergents	(No. 188)	28/4/92
3.	Paper	(No. 455)	9/11/92
4.	Architectural Paints	(No. 364)	7/9/95
5.	Laundry Soaps	(No. 04)	3/1/94
6.	Food items-I i) Edible Oils, tea & Cofee	(No. 376)	6/9/94
7.	Food Item Part-II ii) Beverages, Infant Food, Processed food and vegetable products	(No. 364)	7/9/95
8.	Lubricating Oils	(No. 364)	7/9/95
9.	Packaging part I (Paper boards & plastics excluding laminates)	(No. 364)	7/9/95
10.	Automotive-lead-Batteries	(No. 364)	7/9/95
11.	Packaging part II (laminates and products thereof)	(No. 364)	7/9/95
12.	Plastics	(No. 170)	18/5/96
13.	Cosmetics	(No. 170)	18/5/96
14.	Aerosols	(No. 170)	18/5/96
15.	Electrical goods/ Electronic goods	(No. 170)	18/5/96
16.	Wood Substitutes	(No. 170)	18/5/96
17.	Preservatives and food additives	(No. 170)	18/5/96
18.	Dry Cell Batteries	(No. 170)	18/5/96
19.	Textiles, Diapers, etc.	(No. 322)	4/10/96
Draft Notifications issued			
1.	Pesticides, insecticides, biocides and weedcides	(No. 225)	3/7/93

Notification relating to Conservation of Forest

A draft notification has been issued by the Ministry under Sections 3(1) and 3(2) (XIV) of the Environment (Protection) Act 1986 and Rules 5 (1) (x) 5 (2) of the Environment (Protection) Rules, 1986 to prohibit and regulate the carrying on of certain processes and operations, in the States of Arunachal Pradesh, Assam and Nagaland and the UT of Andaman and Nicobar Islands except with the prior permission of the Central Government:

(Details of the Notification are given in Chapter - 3)

Other Rules, Amendments and Notifications

- A new set of Rules on "Emergency Planning, Preparedness and Response to Chemical Accidents" has been notified on 2nd August 1996 under the Environment (Protection) Act 1996.
- Rules on Bio-medical waste have been finalised.
- A notification on prohibition on the import of arsenic, cyanide and mercury has been issued after having obtained the views of the public.
- A draft notification on the prohibition on imports of asbestos (dust & fiber), PCB PCT and PBB contaminated wastes, Selenium, Thallium and Berellium containing wastes has been issued.

Workshops on Environmental Legislations

During the year, the following national/international workshops were organised by the Ministry.

At the instance of the Ministry of External Affairs (SAARC Division), The Ministry of Environment and Forests and the School of Environmental Sciences of the Jawaharlal Nehru University, organised a " SAARC Workshop on Environment Legislation" during 23rd to 25th October, 1996. The Workshop was inaugurated by Secretary (E&F), and was attended by participants from SAARC countries including eminent Lawyers, Academicians, Scientists, NGOs and Students. The main recommendation of the Workshop is to set up a Environmental Research Centre in the host country, i.e. India which will strictly be academic in nature and administrated independent of government control, but with active participation of academics and researchers from all SAARC countries.

The Ministry of Environment and Forests and the Indian Law Institute jointly organised a workshop on "Legal Regulation of Hazardous Substances and Processes" during 29th November, to 1st December, 1996. The Workshop was inaugurated by the Hon'ble Chief Justice of India, and the Hon'ble Minister of Environment and Forests was the Chief Guest. Eminent judges of the Supreme Court and High Court, eminent lawyers, scientists, academicians, industrialists and NGOs participated in the workshop and presented theme papers.

Legal Action Against Polluting Industries

The Central and State Pollution Control Boards and the Pollution Control Committees are responsible for taking legal action against polluting units in their respective States under the Water and Air Acts. The State-wise information regarding the number of cases filed by the CPCB, SPCBs and PCCs is complied and analysed on a quarterly basis at the Ministry. As on 31st May, 1996, a total of 6460 cases have been filed by the SPCBs/CPCB under the Water and Air Acts. Out of these 2826 cases have been decided and 3634 cases are pending in various courts.

Institutional Support

Under the scheme Assistance for Abatement of Pollution, the Central Government has been providing financial assistance to the SPCBs and to the State/UT Departments of Environment for additional man power, procurement of scientific equipment's and for specific studies and projects that are required to be completed within a specific time frame to meet the objectives of the Policy Statement for Abatement of Pollution. Funding for man power has been discontinued w.e.f. 1.4.1993 to both the SPCBs and the State Departments of Environment.

An amount of Rs. 130 lakhs has been provided to the SPCBs and the State Departments of Environment under this scheme, during the year.

10

INTERNATIONAL CO-OPERATION

Introduction

The Ministry of Environment and Forests is the nodal agency in the country for United Nations Environment Programme (UNEP), Nairobi, South Asia Cooperative Environment Programme (SACEP), Colombo, International Centre for Integrated Mountain Development (ICIMOD), Kathmandu and the International Union for Conservation of Nature and Natural Resources (IUCN). Annual financial contributions are made to these organisations. The Ministry also functions as the nodal agency for participation in international agreements relating to environment such as the Convention on Wetlands of International importance, especially as waterfowl habitat, Convention on the Conservation of Migratory Species of Wild Animals, Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that Deplete the Ozone Layer, Conventions on Biological Diversity and Climate Change, the Basal Convention on Transboundary Movement of Hazardous Substances etc.

Major activities undertaken during the year are as follows :

World Bank assisted Projects

India: Environment Management Capacity Building Technical Assistance Project

In pursuance of the Environment Action Programme, 1993, a project entitled "India: Environment Management Capacity Building Technical Assistance Project" is proposed to be initiated with assistance from the World Bank. The project will be implemented through the Ministry of Environment and Forests, Department of Ocean Development and the State of Gujarat. The main objective of the project is to enhance environmental management capacity in the country, specifically by strengthening environmental policy planning and administration, decentralisation of environmental management, implementation of environmental laws, monitoring and compliance in specific, high priority environmental problem areas and the Gujarat Ecology Commission and the State Department of Forest and Environment of Gujarat.

The project involves a total outlay of US $61.48 millions comprising of IDA credit of US $ 11.48 million. Special emphasis is being placed on the State of Gujarat as an area specific programme as the State is

not only one of the fastest growing industrial regions of the country, but also since the State is experiencing high levels of pollution.

Delhi-Surat Urban Management Project

One of the Seven areas of critical importance for sustainable environment management identified in the Environment Action Programme, 1993, is urban environmental issues. Discussions had been initiated with the World Bank to formulate a project specifically to address the areas of air and water quality and solid waste management. During these discussions, it was agreed that two cities, Delhi and Surat, may be specifically focused upon under the project. The objective is to prepare an Action Plan for re-engineering the institutional structures governing urban environmental management and identifying cost effective technology-options to improve the delivery of environmental services and also by integration of the existing studies for the two cities. The Japanese Government has undertaken to provide grant of 109,200,00 Yen for this purpose, which works out to approximately Rs. 3.55 crores.

Global Environment Facility (GEF)

Objectives and Scope of GEF

The Global Environmental Facility (GEF) is a financial mechanism that provides grants and low interest loans to developing countries to help them carry out programmes to relieve pressures on global ecosystems. The billion dollar plus fund supports international environment management and the transfer of environmentally benign technologies. The Facility is a cooperative venture among national governments, the World Bank, the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) in the areas of Climate Change, Biodiversity and Pollution of International Water. To qualify for funding from the Facility, a project must relate to at least one of its specific areas of concern. A further qualification is that a project would not be economically viable in the particular country without support form the Facility. The Ministry of Environment and Forests is the nodal point for this Facility in India. So far, seven projects have been approved for GEF funding in the country in the areas of bio-diversity conservation, alternate and renewable energy and energy efficient technologies. For identifying more projects for possible GEF funding, a workshop was convened in New Delhi during April 1996 in which representatives from Central Ministries, State Governments, Heads of National R & D institutions, NGOs and industries participated besides representatives of GEF, World Bank and UNDP. This was further discussed in an inter-ministerial meeting held in Sept. 1996. As a result of these discussions, some new projects have been formulated and are being considered for possible GEF assistance. The project proposals for GEF assistance should be sent to the Director, International Cooperation, Ministry of Environment and Forests, Paryavaran Bhawan, Lodhi Road, New Delhi 110 003.

GEF Council Meeting

India actively participated in the 8th GEF Council Meeting held in Washington D.C. from 8th to 10th October, 1996. The intervention made by the Indian delegation, to highlight the concerns of the developing countries at the Second Conference on Parties meeting in July, in favour of enabling activities to be the focus for non- Annex- I countries and for no additional liabilities to be imposed for GEF funding, were taken cognisance of and adopted by the Council.

Commission on Sustainable Development (CSD)

The Fourth Session of the Commission on Sustainable Development (CSD) was held in New York during 18th April to 3rd May, 1996, during which G-77 countries and China made a statement highlighting the need for transfer of technology and financial resources to developing countries. The Indian delegation made a special intervention on cross sectoral issues with particular reference to the critical elements of sustainability. The Statement, inter alia, underlined the importance of integration of environmental issues with the development process, as the central element of Agenda 21.

Participants at the high level segment stressed the importance of the Special Session to be held in 1997 during which the General Assembly will review the overall progress of the Rio commitments and discuss appropriate strategies for implementation of the same in the coming years. There was a broad consensus that the Special Session should concentrate only on the further implementation of Agenda 21 or other inter-

governmental agreements. Participants at the high level segment reflected on the implementation of Agenda 21 objectives since UNCED 1992 and noted the continuing need to strengthen mechanisms within the UN systems which will help to integrate environmental concerns more fully into regular decision making processes.

United Nations Environment Programme (UNEP)

The 19th Session of the Governing Council of the United Nations Environment Programme (UNEP) is to be held at Nairobi, Kenya from 27th January to 7th February, 1997. The Session of the Governing Council is important as it is being held just before the 5th Session of the Commission on Sustainable Development (CSD) which was set up by UN for review of the follow up action at national and international level, for implementation of Agenda 21 and other decisions of the Rio Conference on Environment and Development. A special review would be taken up in 1997 being the fifth year of the Rio process.

This Session is likely to take up the discussion regarding the question of governing structure of UNEP, funding of the programmes, financial situations of UNEP and its future role especially with regard to its role vis-_-vis CSD. The Indian delegation to this session will be led by the Minister of State for Environment and Forests.

Indo-US Common Agenda for Environment

Subsequent to the signing of a Joint Statement of Intent between India and USA for a common agenda on Environment in April, 1995, three Working Groups had been constituted on the three areas of Co-operation identified, viz. Global Environmental Issues, Trade, Investment & Technology in Environment and Science & Technology Projects with special application to environment.

The first meeting of the Steering Committee under the Indo- US representatives of the Ministry of Industry, Power, External Affairs, Environment and Forests, Urban Affairs and Employment, Central Pollution Control Board, USAID, US Embassy, and representatives of Confederation of Indian Industry (CII), and Federation of Indian Chambers of Commerce and Industry (FICCI). The Steering Committee has restructured the Working Groups on more thematic lines viz, clean cities, clean industry, clean energy and biodiversity.

Indo-Brazil Common Agenda for Environment

A Common Agenda for Environment between the Government of India and Brazil was signed in New Delhi on 27th January, 1996 to promote closer and long-term cooperation in the field of environment.

India - Canada Environment Facility (ICEF)

The India - Canada Environment Facility was created on the basis of a Memorandum of Understanding signed between the Government of India and Canada in 1992, to support related ministries in assuming increased responsibility for the management and implementation of Environmental Projects. Canadian Part will provide 72 million Canadian dollars for this facility, generated through sale of Canadian commodities such as steel, rails etc. in India. Three priority areas have been identified for funding projects:-

- Enhancing the Capacity of Indian private and public sector institutions and organisations to undertake environmentally sustainable development and management of energy, land and water resources.
- Providing support for programmes which specifically address the interrelationship between poverty and environmental de- gradation, especially as it affects women, energy, land water management activities at the community and village level.
- Providing support for public awareness of environmental issues, community participation and community based management of energy, land and water resources. Institutional support may be provided in the priority areas to key institutions and organisations within the Government, NGOs or community sector and the private sector.

The list of projects approved for funding under the ICEF is given at Annexure-VI.

UNDP-GEF Small Grants Programme

The Small Grants Programme (SGP) was conceived as a concession to NGOs who were critical of the overwhelming reliance of GEF on Government sponsored programme. The accent of the SGP is on encouraging the involvement of people and communities in global environment issues by funding small projects which can be replicated. India is one of the 33 countries who are participating in the programme being coordinated by the UNDP. An amount of US $ 400, 000 has been earmarked for Phase I of the SGP in India and

depending on the progress made, additional allotments are likely to be during the 2nd Phase.

The SGP aims to promote innovative local responses while building the capacities of people, particularly women and tribals. It would support projects identified to demonstrate the effectiveness and wide application of small scale decentralised community based initiatives.

The SGP is monitored and guided by a National Steering Committee (NSC) which besides reviewing and approving project proposals, also recommends ways for evaluation and assessment to ensure proper implementation of the programme. Presently the NSC has nine members and is headed by Secretary (E&F) or his representative. The programme is being administered in the country by Development Alternatives, a NGO within the policy framework and guidance laid down by the NSC through a Secretariat under the control of a National Co-ordinator. So far, 22 projects have been approved by the NSC at a total cost of US $ 246,530.

Ozone Layer Protection

Ozone (O_3) is a form of oxygen in the atmosphere about 20 kms. above the earth's surface that efficiently screens out almost all the harmful ultraviolet rays of the sun. This radiation has the potential to cause skin cancer, eye damage, suppress body's immune system, decrease crop yield, cause damage to forests and affect ocean life. Global efforts to protect the ozone layer started in early seventies leading to the adoption of the Vienna Convention in 1985 and the Montreal Protocol in 1987. To strengthen the global efforts, India acceded to the Montreal Protocol along with its London Amendment. Its provisions became effective for India from 17.9.1992. However, recent scientific assessment indicates that ozone levels continue to decrease in all latitudes except over the tropics as Ozone Depleting Substances (ODS) continue to be used in refrigeration and air- conditioning, preparation of foam and spray products, fire extinguishing, fumigation and as solvents in electronics and other industries.

A number of activities were undertaken during 1996 to disseminate information on ODS phase out to industries and others. Three workshops were held for small and medium sized enterprises. One international workshop was held as part of the Eco-frig project of Indian, Swiss and German Governments to improve understanding of hydrocarbons technology in India. International Ozone Day was observed by the Central and State Governments. A delegation of the Executive Committee of the Multilateral Fund, consisting of its Chairman, Vice Chairman and Chief Officer, had visited India in September 1996, which provided an opportunity to the Indian industry to have face to face discussions with senior functionaries of the Executive Committee.

Full exemption from payment of Customs and Excise duties on goods required to implement ODS phase out projects is being provided to enterprises which are eligible for receiving assistance from the Multilateral Fund. Imports and exports of ODS have been brought under compulsory licensing. Export of ODS to developed countries has been banned. Financial institutions have decided not to finance or refinance new investments with ODS technologies. Comprehensive regulation on ODS phase out are being prepared.

Two experts from India have been selected as Co-chair of Refrigeration and Foam Technical Options Committees and one industry representative has been selected as Co-chair of Process Agents Working Group of UNEP on the Montreal Protocol. An industry representative has been included in the Expert Group on Production of Substitutes for ODS set up by the Executive Committee.

India provided leadership to developing countries during the meetings of the Executive Committee and Meeting of the Parties. The budget for the Multilateral Fund for 1997-99 has been negotiated at US $ 540 million, along with the requirement that, as far as possible, the entire budget be committed by 1999. India was re-elected as member of the Executive Committee for 1997.

Multilateral and Bilateral Programme

The Ministry and its agencies receive assistance from various countries like Sweden, Norway, Denmark, Australia, U.K. etc., on bilateral basis and from several UN and other multilateral agencies such as UNDP, World bank, Asian Development Bank, OECF (Japan) and ODA (U.K.) for environmental and forestry projects. Details of Multilateral and bilateral programmes in forestry and environment sectors are given below:-

Forestry Sector

A number of forestry projects have been and are being implemented in various states with assistance from external donor agencies like World Bank, Swedish International Development Authority (SIDA), Overseas Economic Cooperation Fund (OECF) (Japan), European Economic Commission (EEC), Overseas Development Administration (ODA), (U.K) and GTZ Germany. While assistance provided by the World Bank and OECF are in the form of soft loans, SIDA, ODA, EEC and GTZ provide grants.

At present 13 projects are under implementation in various States with external financial assistance and 11 projects are in the pipeline. Three more projects are under preparation. List of these projects are given at Annexures VII, VIII and IX respectively.

Project in North Eastern States

For the first time a forestry project for Nagaland, costing Rs. 41.95 crores has been forwarded to Department of Economic Affairs for posing to EEC.

National Forest Sector Project

Ministry of Environment and Forests is contemplating preparation of a National Forest Sector Project likely to be implemented with assistance from the World Bank. The proposed project envisages overall development of the sector at national and state levels. The main objective of the project would be to prevent continuous degradation of forest lands, improve the production of both timber and non-timber products etc. The process for preparation of National level Sub Project has been started during the year.

Training Abroad

During the year 51 officers from various states, where externally aided projects are under implementation, were deputed for overseas training in various disciplines of forestry development and project management.

Representatives of the Ministry participated in the following international seminars/workshops etc.

- Seminar on Environment and Resource Accounting organised by ESCAP in Seoul from 27-31 May, 1996.
- Workshop on Formulation of Strategy for Updating of State of Environment reporting for South-Asia organised by ESCAP 3-5 July, 1996 at Bangkok.
- The Third Session of the Committee on Environment and Sustainable Development held in Bangkok from 7-11 October, 1996.
- The Regional Consultative Meeting on Environmentally Sound and Sustainable Development (ESSD) Indicators from 26-28 November, 1996 and the Workshop on Field Testing of ESSD Indices on 29.11.96 held at Bangkok.
- The First Meeting of the Regional Intergovernmental Consultation to review the draft of the Global Environmental Outlook (GEO) held during 23-24 July, 1996 at Kathmandu.

The following International Workshops were held in India in which representatives from SAARC countries participated.

- SAARC Workshop on Environmental Legislation and Management held during 23-25 October, 1996 at Jawaharlal Nehru University, New Delhi.
- SAARC Workshop on Wildlife Management held during 18-22 November, 1996 at Dehradun.

Besides these, a large number of officials from the Ministry of Environment & Forests, State Environment and Forests Departments, Central and State Pollution Control Boards, NGOs and autonomous bodies/ institutions of Central and State Governments were nominated for several international Training's/Seminars/ Workshops, etc. in the field of environment.

Environment Sector

World Bank

Under Phase I of the World Bank aided Industrial Pollution Control Project, initiated in 1991, the Ministry is supporting the setting up of Common Effluent Treatment Plants (CETPs) and Demonstration Projects.

Guidelines for assistance to CETPs

Under this Project, technical and financial assistance is given for setting up Common Effluent Treatment Plants (CETPs) in clusters of small scale industrial units. The financing pattern for the CETPs consists of 20 per cent promoters.

Contribution and a grant from the Central Government of 25 per cent of the project cost subject

to a matching contribution from the State Government. The remaining amount is available as a loan from any financial institution such as the Industrial Development Bank of India (IDBI) which channelises the World Bank assistance for this component of the project.

A company or society constituted specifically to own, operate and maintain common facilities for treatment and disposal of solid, liquid and gaseous wastes generated by estates/clusters, will be eligible for assistance under the scheme. State infrastructural/ industrial development agencies promoting CETPs will also be eligible.

Guidelines for Assistance to Demonstration Projects

Any company willing to demonstrate a new/clean technology in the field of production and treatment of effluent/emission will be given financial assistance upto Rs. 1.5 crore. The pattern of funding shall be as per the norm set for common Effluent Treatment Plant.

An agreement has been signed with the World Bank for Phase II of this project with a total outlay of 330 million US$, out of which 16.8 million dollars would be from the World Bank with counterpart funds of 162 million dollars to be contributed by different financial institutions such as the IDBI, ICICI, project sponsors and by the State and Central Governments.

11

ADVISORY INPUTS, ADMINISTRATION, PLAN CO-ORDINATION AND BUDGET

Advisory Inputs

Social Audit Panel

The Ministry had set up a Social Audit Panel (SAP) in November, 1995 for assessing the general public awareness and appreciation of the Ministry's programmes and projects and for suggesting corrective action wherever needed, to model them to suit peoples' requirements and to mobilise peoples' support and participation. The specific responsibilities of the panel, which is advisory in nature, are to critically review the implementation of the programmes of the Ministry and make suggestions on the policy directions as well as on their implementation. The panel is also required to sensitise the public as to their role and responsibilities to watch ecology, environment and habitat. The SAP headed by Shri Justice R.S. Pathak, former Chief Justice of India, has an initial term of two years.

During the year, the panel held extensive consultations with the policy makers, NGOs and other community groups based on which three reports have been submitted on (i) Issures relating to sustainable and equitable management of forests, (ii) Issues relating to environment awareness and education programmes, and (iii) Land, water and Biodiversity (culture and equity). The panel is currently deliberating on issues relating to environmental impact assessment procedures.

Administration

The strength of the Ministry including the National Afforestation and Eco-development Board (NAEB) and the National River Conservation Directorate at the Headquarters is 1106 (Group A: 228, Group B: 318, Group C: 340 and Group D: 220).

Reservation in Service

A special Recruitment Drive initiated earlier to fill up all the backlog vacancies reserved for SCs/STs is being followed up. A statement showing the reservation of posts for SCs/STs in the Ministry is given at Table-16.

Indian Forest Service Cadre Management

The Ministry of Environment and Forests is the "Cadre Controlling Authority" for the Indian Forest Service, an All India Service which consists of 21 State Cadres (including three Joint Cadres namely the Assam-Meghalaya, the Manipur-Tripura and Arunachal

Pradesh-Goa-Mizoram Union Territories (AGMUT). The present authorised strength of the Service is 2699.

The works relating to the direct recruitment of I.F.S. officers, induction through promotion from State Forest Service Cadres, cadre reviews for revising the composition and strength of IFS of various cadres, allocation of I.F.S. probationers to various State cadres, determination of year of allotment of promotee officers, selection/appointment of I.F.S. personnel against central Deputation Reserve forestry posts/central Deputation Secretarial positions under staffing scheme, deputation of personnel to autonomous bodies including ICFRE, IIFM, WII and foreign assignment of IFS personnel within the country and abroad, finalization of service matters, post- retirement, inter-cadre transfers and deputations, management of AGMUT cadre including promotions/transfers and postings and other service matters are dealt with by the IFS Division of the Ministry.

During the year, cadre reviews determining the strength and composition of State cadres of Uttar Pradesh, Rajasthan, Karnataka and Haryana have been carried out and the notification in this regard is to be issued by the Department of Personnel and Training. Forty two direct recruits and 84 State Forest Service Officers have been recruited/inducted into the service during the year under the IFS Promotion Regulations. Twenty one IFS officers from State Cadres have been appointed to man central forestry posts at the Centre, against the Central Deputation Reserve. Forty four IFS personnel have joined their respective State Cadres after completion of the institutional training. The first course for imparting induction training to 26 IFS officers promoted from the State Forest Service under IFS (Appointment by Promotion) Regulation, 1966 has been completed during the year at the Indira Gandhi National Forest Academy, Dehradun.

NGO Cell

Recognising that public participation is pivotal for all environmental programmes and with a view to strengthening the environmental movement at the grass-root level, the Ministry constituted a NGO Cell in 1992. The main responsibility of the NGO Cell is to attend to visitors and correspondence seeking information on the different schemes and programmes of the Ministry involving NGO participation, which are being handled by different divisions of the Ministry. A large number of such references are being received and attended to, every year by the NGO Cell of the Ministry.

A NGO Cell has also been established at the Central Pollution Control Board (Details under Chapter 5).

Environment & Parliament

During the year 709 parliament questions (292 in Rajya Sabha and 417 in Lok Sabha) pertaining to various aspects under the jurisdiction of this Ministry were answered. Vehicular and industrial pollution,

Table-16

Reservation of Posts for SCs and STs in the Ministry

Sl. No.	Name of the post	No. of posts sanctioned	No. in position	No. of SC Employees	% of total No. of employees in position	No. of ST employees	% of Total No. of employees in position
1.	Group 'A'	228	189	16	8.6%	12	6.45%
2.	Group 'B'	318	274	19	7.6%	12	4.4%
3.	Group 'C'	340	300	46	15.4%	12	4.0%
4.	Group 'D' (Excluding Safaiwala)	192	189	61	32.62%	20	10.69%
5.	Group 'D'	28	27	27	100%	—	—
		1106	979	169	17.36%	56	5.72%

deforestation, progress of afforestation, wildlife preservation, and clearance of development projects from environment & forest angles were among the major areas in which the Members of Parliament evinced keen interest.

O & M Inspection, Record Management etc.

The Internal Work Study Unit (IWSU) of the Ministry continued its normal activities viz. O & M Inspections, recording, reviewing/weeding of records and other measures for proper file management. A brochure on the "Channel of submission and final level of disposal of cases" in respect of various Divisions of the Ministry, and a consolidated order indicating the time frames in respect of most of the items of work being handled by various Divisions of the Ministry have been issued by the IWSU. In addition to these, an 'Induction Manual for the Ministry of Environment & Forests has been brought out for the use of new officers joining the Ministry and for facilitating inter-departmental references from other Ministries & Departments.

During the year, the staff requirements of the National Afforestation & Eco-development Board (NAEB), was assessed and the report was finalised and submitted on 24.4.1996. The report in respect of the assessment of FSI and its zonal officers carried out earlier was also finalised and submitted.

Office Council/Departmental Council

The Office Council of the Ministry of Environment and Forests Constituted under the JCM Scheme continued its activities during the year and the last meeting of the Council was held on 9th October, 1996.

Annual Day of the Ministry

The Ministry of Environment and Forests was established on the 4th January, 1985 and the Anniversary of the Day is celebrated every year by organising it officially. Apart from cultural activities, Vishisht Vaigyanik Puraskar awards are also presented on this day to distinguished Scientists who have made outstanding contribution towards achieving the objectives of the Ministry.

Use of Hindi

Hindi is being progressively used as official language in the Ministry of Environment & Forests.

The Hindi Salahkar Samiti of the Ministry held one meeting during the year under the Chairmanship of the Hon'ble Minister for Environment & Forests. To monitor the overall progress of the use of official language in the Ministry, four meetings of the Official Language Implementation Committee have been held during the year.

During the year, the Ministry was awarded the highest award of Indira Gandhi Rajbhasha Shield by Hon'ble President of India for its outstanding performance with regard to implementation of Official Language Policy of the Government.

Inspection of Offices

Eleven offices under the Ministry were inspected during the year to ensure effective implementation of Official Language Policy.

Training in Hindi

Twenty one employees were nominated for Hindi typing, Hindi stenography, Probodh, Praveen and Pragya Courses under the Hindi teaching scheme.

Hindi week

Hindi week was organised during the second quarter of September, 1996 to create awareness regarding the Official Language and to accelerate its use in official work; various competitions were held during the week and prizes were distributed to 29 winners.

Publication of Journal

The quarterly Hindi Journal "Paryavaran' continued to be published during the year with a view to encouraging creative writings in Hindi.

Incentive for original writings on environment in Hindi

The scheme introduced to encourage original and creative writings in Hindi on subjects related to environment and forests etc. was continued. Out of 7 entries received under this scheme, 2 entries have been awarded second and third prize respectively.

Translation

During the year, 12572 pages of important documents including answers to Parliament Questions, Cabinet Notes, Rules, Regulations etc. were translated from English to Hindi and vice-versa and vetted. In

addition, a bilingual computerised Civil List of IFS officers has also been brought out.

Civil Construction Unit

The Civil Construction Unit (CCU) was set up in the Ministry of Environment and Forests in August, 1987 for taking up important works of the Ministry on priority basis, in pursuance of the Government decision that major Scientific Departments with substantial annual civil works budget should have a Civil Engineering Unit. The technical posts are manned by officers drawn from the C.P.W.D. These works relate to various institutions of the Ministry such as Botanical Survey of India, Zoological Survey of India, National Musuem of Natural History, Indira Gandhi National Forest Academy, National Zoological Park, Indian Council of Forestry Research and Education, G.B. Pant Institute of Himalayan Environment and Development and Institute of Forest Management. CCU has completed several projects in Dehradun, Almora, Jabalpur, Jodhpur, Mysore, Bangalore and Coimbatore.

The Civil Construction Unit has taken up 80 major schemes so far with a total estimated cost of Rs. 91.91 crores. The works consist of Office-cum-Labotatory buildings, Herbariums, Musuems of Natural History, Forest Research Institute, National Forest Academy, National Zoological Park and Residential Quarters for staff of these institutes located all over India. Forty three works costing Rs. 62.52 crores are being executed directly by CCU. CCU has three field Divisions with Sub-Divisions at Delhi, Dehradun, Almora, Bangalore, Mysore, Coimbatore, Jodhpur and Jabalpur for execution of various works. Works in Eastern, North-Eastern and Western Zones have been entrusted to C.P.W.D., and their progress is monitored by CCU. However, planning of all the works including those executed by CPWD is undertaken by CCU.

ICFRE has entrusted additional works to the CCU under its World Bank Aided Schemes amounting to Rs. 24 crores.

At present, there are 23 major works amounting to Rs. 30.09 crores already awarded and under execution by CCU. Seventees works amounting to Rs. 21.94 crores are under planning for execution.

In its efforts to avoid use of wood in the buildings being constructed by it, the CCU has adopted the use of a number of alternatives to timber in the buildings. Use of wood in doors, windows, and cupboards has been dispensed with completely. Steel section/pressed steel frames/aluminium sections are being used for door and window frames depending on the importance of the buildings. Agro based MDF Boards/PVC panelled shutters kiln seasoned/chemically treated eucalyptus are being used instead of conventional wooden panel/flush door shutters.

To popularise the use of alternative sources of energy, use of photo voltaic cells are being introduced in selected areas in place of conventional electric lights. Solar water heating system is being introduced for hostel buildings. Compact Flourescent Lamps (CFLs) are being used in place of conventional flourescent lights in houses, guest houses etc. It is proposed to utilise the advantage of solar passive architecture for important projects to be taken up by CCU in future.

During 1996-97 the building of G.B. Pant Institute of Himalayan Environment and Development at Kosi, Almora was inaugurated by the Secretary, Ministry of Environment & Forests. Foundation for office-cum-Residential Complex for Eastern Regional Office of Ministry of Environment and Forests at Bhubaneswar was laid on 24th November, 1996 by the Special Secretary & Inspector General of Forests, Ministry of Environment & Forests.

Details of works completed, works in progress, works for which sanctions have been received and are likely to be started soon and proposals at planning stage are as follows:

(A) Works completed during 1996-97

Sl. No	Name of work
1.	Construction of 24 nos. quarters Ph-III, AFRI at Jodhpur.
2.	Construction of Herbarium-cum-Office buildings & 23 Residential quarters for BSI at Gangtok.
3.	Construction of 46 residential quarters for G.B. Pant Institute at Kosi, Almora.
4.	Faculty building and Guest house for G.B. Pant Institute of Himalayan Environment & Development at Almora.
5.	Experimental Lab building (4 rooms) for AFRI at Jodhpur.

B) Works in Progress

Sl. No	Name of work	Cost (Rs. in Lakhs)
1.	**Botanical Survey of India**	
a.	Harbanium-cum-Office building for BSI, Pune.	119
b.	Office building at AFS, BSI at New Itanagar.	21
c.	Renovation of Roxburgh building at IBG, Howrah.	14
d.	Construction of 18 nos. staff quarters for BSI at Shillong.	42
e.	Construction of Herbanium-cum-Office building at Eastern Circle, Shillong.	55
f.	Construction of 65 nos. staff qtrs. for BSI at Shillong	200
2.	**Zoological Survey of India**	
a.	Construction of staff quarters for ZSI at Port Blair. Type-I-2, Type-II-6, Type-III-4, Type-V-2 nos.	840
b.	Construction of Office bldg. for ZSI at Port Blair	147
c.	Construction of Office-cum-Lab bldg. for APFS of ZSI at Itanagar.	21
d.	Construction of Office-cum-Lab bldg. for ZSI at Pune.	137
e.	Construction of Compund Wall for ZSI quarters at Pali Road, Jodhpur.	17
3.	**National Musuem of Natural History**	
	Regional Musuem of Natural History Ph-I at Bhubaneswar.	100
4.	**G.B. Pant Instt. of Himalayan Environment & Development, Almora**	
a.	Library Building & Hostel	158
b.	Office Building at Kullu	67
c.	Staff Quarters & Hostel at Kullu	105
5.	**Forest Research Institute, Dehradun**	
a.	National Library & Information Centre at Dehradun. (W.B)	354
b.	Addl. Floor over Ground Floor & A/A to G.F. for converting into Hostel & Logging training centre at Dehradun.	51
c.	Office building for ICFRE head quarters (W.B.) at Dehradun.	443
d.	Visiting students Hostel for FRI deemed University at Dehradun.	76
e.	Scientists flats for FRI deemed University at Dehradun.	127
6.	**Arid Forest Research Institute, Jodhpur**	
a.	Office-cum-Lab building Ph-II	203
b.	Gurest house-cum-Scientist Hostel	85
c.	Bank-cum-Post Office	21
d.	40 nos. Residential Qtrs. in Plot No. 729	117
e.	40 nos. Residential Qtrs. in plot No. 729 (W.B.)	121
7.	**Tropical Forest Research Institute, Jabalpur**	
a.	78 nos. staff quarters Ph-II	214
b.	40 nos. staff quarters Ph-III	157
c.	Guest House	80
d.	Library-cum-Information Centre	90
e.	Transit Scholar Hostel	97
f.	Scientist Hostel	107
g.	Extention Institute	112
8.	**Institute of Wood Science & Technology, Bangalore**	
a.	Laboratory & Workshop	425
b.	8 nos. Type IV Quarters	30
c.	Guest House	63
9.	**Instt. of Forest Genetics & Tree Breeding, Coimbatore**	
a.	C/0. 72 nos. Staff Quarters Ph-III	195
b.	Scientist/Scholar Hostel	171

(C) Works for which Sanctions have been received & likely to be started during 96-97.

1.	**Tropical Forest Research Institute, Jabalpur**	
a.	Museum Building	75
b.	Residential quarters 12 nos. (W.B.)	60
c.	Transit Hostel (W.B.)	49
d.	Bio-Technology Laboratory (W.B.)	58
e.	Extention to Office Buildings (W.B)	14
f.	Instrumentation Centre	20
g.	Community Centre-cum Auditorium	102
2.	**Institute of Forest Genetics & Tree Breeding, Coimbatore**	
a.	Library-cum-Information Centre	122
b.	Auditorium	157
c.	Extention of Guest House	16
3.	**Institute of Forestry & Human Research Development, Chhindwara**	
a.	Residential Quarters (W.B.)	77
b.	Admn. Building & Lab Building (W.B.)	132

4. G.B. Pant Institute of Himalayan Environment & Development, Gangtok

a.	Residential Quarters	36
b.	Office Building	35
c.	Site Development	138

5. Indian Institute of Forest Management, Bhopal

a.	Guest House	58
b.	Director's Banglow	18

6. Regional Office, Ministry of Environment & Forests

	Construction of Regional Office & staff quarters, Bhubaneswar	166

7. Institute of Wood Science & Tech. at Bangalore

a.	Construction of Tissue Culture Lab	13
b.	Scientist Hostel (Ph-I), W.B.	50

8. Arid Forest Research Institute, Jodhpur

a.	Bulk services & Development of Plot no. 729	131

9. Indian Botanic Garden, Howrah

a)	Providing fencing at the Howrah Rever infront of IBG, Shibpur.	25

(D) Proposals at Planning Stage

Sl. No. — Name of work

1. Construction of Office-cum-Research Lab & Musuem of Natural History building for ZSI at Solan.
2. Construction of Office-cum-Research Lab & Museum of Natural History building for ZSI at Jodhpur.
3. Construction of Office-cum-Lab building for Marine Estuarine Research Stations at Behrampur.
4. Construction of 20 nos. residential quarter for IIFM at Bhopal.
5. Construction of 40 nos. student hostel block at Bhopal
6. Construction of Regional Museum of Natural History Ph-II at Bhopal
7. Construction of Regional Museum of Natural History Ph-II at Bhubaneswar
8. Construction of Office-cum-Lab building & residential quarters for Social Forestry & Eco-Rehabilitation at Hyderabad
9. Construction of Office-cum-Lab building & residential quarters for Conifer Research Centre at Shimla
10. Residential quarters for ICFRE at Dehradun.

Plan Co-ordination and Budget

The Plan Coordination Division is responsible for the coordination of all plan schemes and programmes of the Ministry with the Planning Commission. This involves preparation, monitoring and review of Five Year Plans, Annual Plans and the Annual Action Plans of the Ministry. The Division also looks after the monitoring of progress reports and reports under the 20-Point Programme (Points 16 and 17).

An amount of Rs. 1200 crores has been allocated to the Ministry for its Eighth Five Year Plan (1992-97). This outlay constitutes about 0.5 per cent of the total Central Sector Plan Outlay of Rs. 2,47,865 crores. The Annual Plans 1992-93, 1993- 94, 1994-95 and

Table-17

Eighth Plan and Annual Plan Outlays - Ministry of Environment & Forests

(Rs. in crores)

Sl. No.	Sector Outlay	VII Plan Outlay	VIII Plan Outlay	Annual Plans 1992-93	1993-94	1994-95	1995-96	1996-97
1.	Environment	110	325	48	70	79	80	125
2.	National River Conservation Dte.	240	350	55	65	78	79	106
3.	Forests & Wildlife	155	250	62	85	100	107.5	148.4
4.	National Afforestation & Eco-Dev. Board	292	275	115*	98	103	104	90
	Total	797	1200	280	318	360	370.5	469.4

* Rs. 26.19 crores transferred to NWDB

1995-96 of the Ministry provided for outlays of Rs. 280 crores, Rs. 318 crores, Rs. 360 and Rs. 370.5 crores respectively. The current year's Annual Plan, has been allocated an outlay of Rs. 469.4 crores. The sector-wise break-up of approved outlays is given in Table-17.

As against the approved outlays, the actual expenditure, year-wise and sector-wise is given in Table-18.

Thus the total expenditure during the Eighth Five Year Plan, is expected to be Rs. 1659.1 crores which is 38.2 per cent higher than the approved outlay. The progress of plan schemes are reviewed regularly in the Ministry and necessary corrective action is taken to ensure proper implementation of these schemes.

The total Public Sector Plan Outlay for the years 1994-95, 1995-96 and 1996-97 are given in Table-19.

The corresponding allocation in the Environment & Forestry sectors, alongwith this Sector's share in total plan outlays, are given in Table-20.

For the Annual Plan 1997 - 98 the Mininstry has been allocated an outlay of Rs. 543.70 crores as per the sectoral break up:

(Rs. in crores)

1.	Environment	198.00
2.	National River Conservation Directorate	109.00
3.	Forests & Wildlife	144.70
4.	National Afforestation and Eco-Development	92.00
	Total	543.70

Table-18

Actual Plan Expenditure

(Rs. in crores)

Sl. No.	Sector Outlay	Annual Plans 1992-93	1993-94	1994-95	1995-96	1996-97*
1.	Environment	45.09	71.15	103.52	62.62	130.75
2.	National River Conservation Dte.	54.19	64.91	31.34	42.09	122.20
3.	Forests & Wildlife	60.92	77.13	90.26	98.37	114.95
4.	National Afforestation & Eco-Dev. Board	114.48	90.33	103.13	93.18	88.50
	Total	274.67	303.52	328.25	296.26	456.40

* Anticipated expenditure

Table-19

Public Sector Plan Outlay

(Rs. in crores)

	Annual Plan 1994-95		Annual Plan 1995-96		Annual Plan 1996-97
	BE	RE	BE	RE	BE
Central Plan	70141	68316	78849	74594	87086
State & UT'sPlan	42056	37888	49741	43973	57550
Total	112197	106204	128590	118567	144636

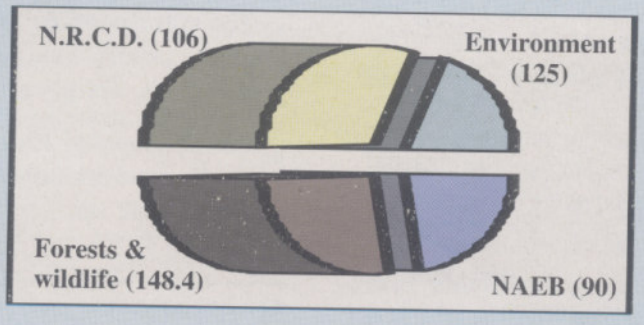


Fig 101. Sectoral distribution of outlays (1996-97)

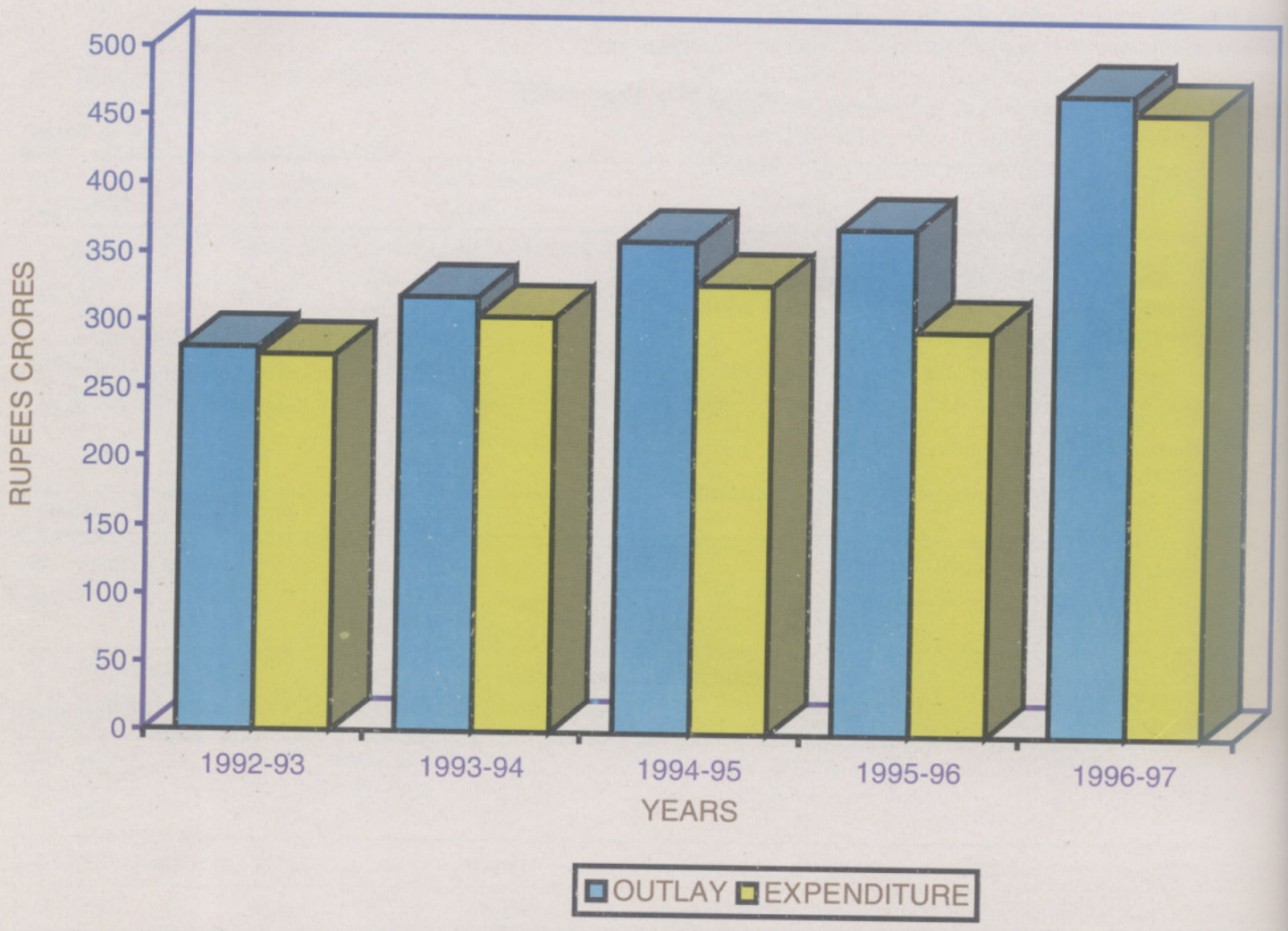


Fig 102. Progress of plan outlay/expenditure 1992-93 to 1996-97

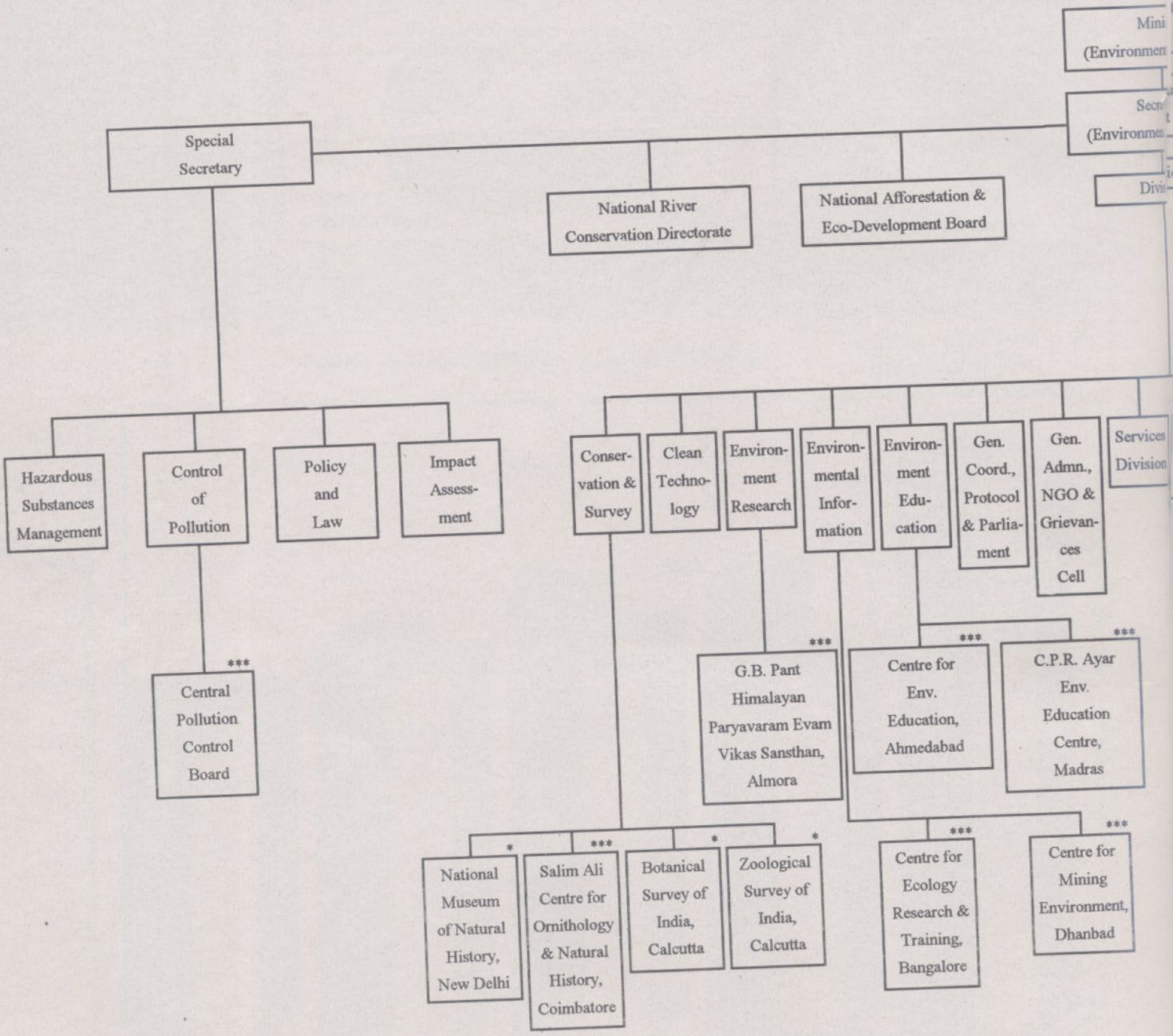
Table-20

Outlay in Environment and Forestry Sector

(Rs. in crores)

Sl. No.	Sector	Annual Plan 1994-95		Annual Plan 1995-96		Annual Plan 1996-97
		BE	RE	BE	RE	BE
1	Central Sector Plan (Ministry of Environment & Forests).	360	328	370.5	335.5	469.4
2.	States and UTs Plan	797	715	968	889.7	—
3.	Total Outlay in Environment & Forestry Sector (Central & State)	1157	1043	1338.5	1225.2	—
4.	Total Outlay in Environment & Forestry Sector as a % of total public sector outlay	1.03	0.98	1.04	1.03	—
5.	Plan Outlay of Ministry of Environment & Forests as a % of total Central Plan Outlay	0.51	0.48	0.48	0.45	0.54
6.	States Plan Outlay under Environment & Forestry as a % of total States Plan Outlay	1.90	1.89	1.95	2.02	—

ORGANISATION CHART OF THE MINIS



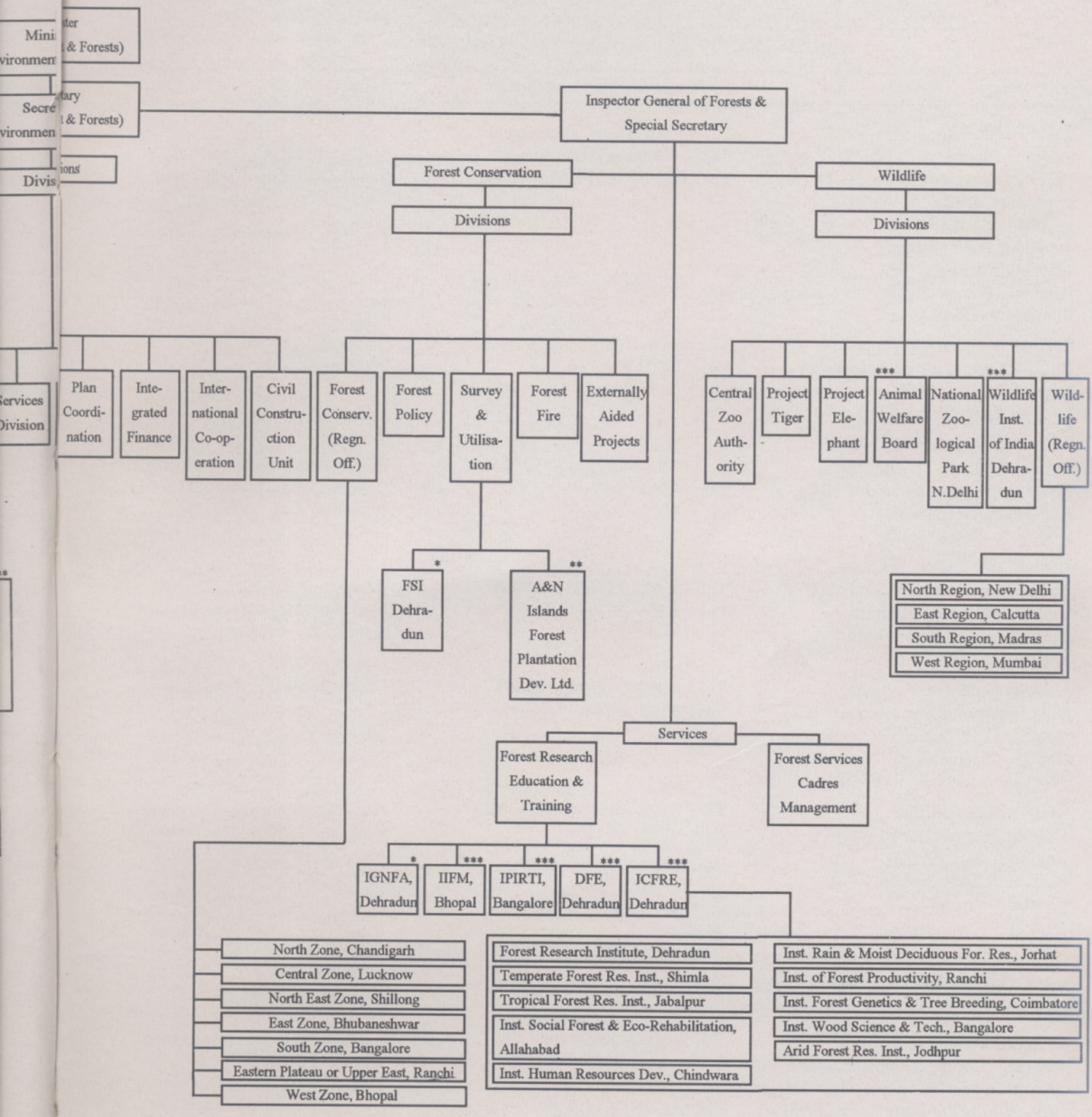
* Subordinate Offices

** Public Sector Undertakings

*** Autonomous Bodies

Annexure - I

TRY OF ENVIRONMENT AND FORESTS



LIST OF REGIONAL CENTRES/ENVIS CENTRES/CENTRES OF EXCELLENCE/AUTONOMOUS/ASSOCIATED AGENCIES ETC. OF THE MINISTRY OF ENVIRONMENT & FORESTS

Regional Offices	Communication Linkages	Area
Regional Offices		
1. Shri V.B. Joshi Chief Conservator of Forests(C) Regional Office, Kendriya Sadan, 4th Floor E&F Wings, 17th Main Road, II Biock, Koramangala, Bangalore-560034.	Fax: : 080-5537184 Tel : 080-5537189,5537190	Andhra Pradesh, Goa, Karnataka, Kerala, Tamil Nadu, Pondicherry, Lakshadeep
2. Shri M. K. Sharma Chief Conservator of Forests(C) Regional Office (EZ) 194, Karvela Nagar, Bhubaneshwar- 751001	Tel: 0674-400097, 403056 Fax: 0674- 418374	Orrisa, Andaman and Nicobar Islands
3. Shri V.P. Singh Chief Conservator of Forests(C) Regional Office (WZ) E -3/240, Arera Colony, Bhopal- 462016	Tel: 0755-566525, 565054 Fax : 0755- 563102	MadhyaPradesh,Maharashtra, Gujrat, Dadar & Nager Haveli, Daman & Diu
4. Chief Conservator of Forests(C) Regional Office (NEZ) Upland Road, Laitumkhrah, Shillong - 793003	Tel : 0364- 227673, 227929 Fax : 0364-227673	Arunachal Pradesh; Assam; Manipur; Meghalaya; Tripura; Nagaland; Mizoram;
5. Shri M.B. Lal, Chief Conservator of Forests (C) Regional Office (CZ) B-1/72, Sector -K Aliganj, Lucknow-226020	Tel: 0522-375984, 375868 Fax: 0522-370107	Uttar Pradesh, Rajasthan
6. Shri Khazan Singh, Conservator of Forests (C) Regional Office (NZ) SCO 132, 133, Sector 34-A Chandigarh-160022	Tel: 0172-604134, 600061 Fax: 0172-604134	Haryana, Punjab, Himachal Pradesh, J&K, Chandigarh
7. Regional Office (Upper East or Eastern Plateau) (Resolution for opening the Office issued on 24.12.96. Yet to be established at Ranchi)		Bihar, West Bengal, Sikkim
Regional Centre for Eco-Development Programme		
1. Dr. A.S. Parashiva Murthy Regional Centre for NAEB University of Agricultural Sciences GKVK Campus (P.B. No. 2477) Bangalore - 560 065	Tel : 080-3334210 3330153 Fax : 080-3330277 GRAM UNIVAGRIS	Andhra Pradesh, Tamil Nadu, Kerala, Pondicherry & Lakhadweep

Regional Offices	Communication Linkages	Area
2. Dr. P. Kaushal, Cordinator Regional Centre for NAEB Dr. Y.S. Pamar University of Horticulture & forestry, College of Forestry, Nauni, Solan - 173 230 (HP)	Tel : 01792-52487 Fax : 01792-52487	J&K, H.P., Punjab & Chandigarh
3. Shri Vijay Kumar Dy. General Manger Regional Centre for NAEB Agricultural Finance Corporation Ltd., B-I/9, Communicy Centre, Janakpuri, New Delhi.	Tel : 011-5550810 Fax : 011-5597437	Rajasthan, U.P., Haryana & Delhi
4. Dr. B.P. Pethiya, Coordinator Regional Centre for NAEBIndian Institute of Forests Management, Nehru Nagar, Post Box No. 357 Bhopal - 462 003	Tel : 0755-65125 575716 Fax : 0755-572878	Madhya Pradesh & Orissa
5. Dr. A.P. Dikshit Agricuultural Finance Corporation Ltd., Dhanraj Mahal, 1st Floor, C.S.M. Marg, Bombay - 400 001	Tel : 022-2028924 Fax : 022-2028966	Gujarat, Maharashtra, Goa, Daman & Diu, Dadar & Nagar Haveli
6. Prof. R.S. Tripathi Coordinator Regional Centre for NAEB North-Eastern Hill University Shillong - 793 014	Tel : 0364-231626	Assam, Arunachal, Pradesh, Meghalaya, Mizoram, Manipur, Nagaland & Tripura
7. Prof. Balaram Bose Coordinator Regional Centre for NAEB Jadavpur University Post Box 17026, Calcutta - 700 032	Tel : 033-4734979 Telex : 214160 VC JUIN Fax : 033-4734266	Bihar, West Bengal, Sikkim, Andman & Nicobar Islands
ENVIS Centres		
1. Dr. S.P. Chakraborty Member Secretary Central Pollution Control Board, Parivesh Bhawan, CBD- Cum Office Complex, East Arjun Nagar, Delhi - 110092	Tel : 011- 2217213, 2217078 Grams : CLEENVIRON Telex : 031- 66440 PCON IN Fax : 011- 2217078, 2204948	Control of Pollution (Water, Air, & Noise)
2. Dr. P.N. Viswanathan Scientist F, Industrial Toxicological Research Centre (ITRC) Mahatma Gandhi Road Lucknow - 226001	Tel: 0522- 240107, 241856, 247586 Grams: INTOXI LUCKNOW Telex: 0535- 2456 Fax: 0522- 248227	Toxic Chemicals

Regional Offices	Communication Linkages	Area
3. Dr. Ashok Khosla, President, Development Alternatives B- 32, Institutional Area, Tara Crescent, New Mehrauli Road, New Delhi- 110016	Tel: 011-665370, 6967938, 6851158 Fax : 011- 6866031 email : Tara @ sd alt. ernet. in tara @ da. Tool. Nl	Environmentally Sound and Appropriate Technologies
4. Dr. K.P. Ranghanathan Director Centre for Environment Studies College of Engineering Anna University, Madras - 600025	Tel: 044 - 2351723 / Extn 3 Gram: ANNATECH MADRAS Fax: 044- 2368403 email: anna lib @ sernetm ernet in	Biodegradation of Wastes and Environmental Impact Assessment
5. Dr. R. K. Pachauri Director Tata Energy Research Institute (TERI) Darbari Seth Block, Habitat Place, Lodi Road, New Delhi - 110003	Tel: 011- 4622246 Grams: TERINST Fax: 11-4621770 email: Mailbox @ teri. ernet. in	Renewable Energy and Environment
6. Prof. Raghavendra Gadagkar Chairman Centre for Ecological Sciences Bangalore- 560012	Tel: 080- 3340985, 3344411 Extn.- 2506 Fax: 080- 3341683 E mail: ragh @ ces. ii. er	Western Ghats and Biological Diversity
7. Dr. A.R.K. Sashtry Project Director Wordl Wide Fund for Nature 172-B, Lodi Estate, Max Mueller Marg New Delhi - 110 003	Tel: 011-462 7586, 4616532, 4693744 Fax: 91-11-4626837 Grams: PANDAFUND, DELHI	NonGovernmen Organisations, Media and Parliament matter related to Enviroment
8. Executive Director Environmental Planning and Coordination Organisation E-5 Sector, Arera Colony, Bhopal-462016	Tel: 0755-565868, 566970, 564318 Fax: 0755- 562136	Environmental Mangement related to the State of Madhya Pradesh
9. Dr. S. K. Bhattacharya Deputy Director National Institute of Occupational Health (NIOH) Meghani Nagar Ahmedabad - 380 016	Tel: 079-867351, 867352, 866842 Grams: NIOHEALTH Fax: 079-866630	Occupational Health
10. Dr. D. C. Ojha Senior Librarian Central Arid Zone Research Institute (CAZRI) Jodhpur - 342002	Grams: SUSHKSHETRA	Desertification

Regional Offices	Communication Linkages	Area
11. Prof. T. Kannupandi Centre Incharge Centre for Advanced Studies in Marine Biology Annamalai University Parangipettai - 608502	Tel: 04144-83223	Mangroves, Estuaries, Lagoons and Coral Reefs
12. Shri Kartikeya V.Sarabhai Director Centre for Environment Education Nehru Foundation for Development Taltej Tekra, Ahmedabad - 380054	Tel: 079-442642, 442651 Fax: 079-6420242, 468201 E-Mail: root @ cee.ernet. in	Environmental Education
13. Director Zoological Survey of India M- Block, New Alipore Calcutta - 700053	Tel: 033-4786893, 4783383 Grams: ZOOLOGY, CALCUTTA Fax: 033-786893	Faunal Biodiversity
14. Prof. N. C. Saxena Prof & Head Centre of Mining and Environment Indian Schools of Mines Dhanbad - 826004	Tel: 0326- 202487, 202578 Fax: 0326- 203042, 202380 E- mail: cme @ ismine ernet in	Environmental problems of mining
15. Dr. T. Chakraborty Head, RIHW Division National Environmental Engineering Research Institute (NEERI) Nehru Marg, Nagpur- 440020	Tel: 0712- 226071, 226072 Grams: NEERI Fax: 0712- 222725	Solids Wastes including Hazardous Waste
16. Director G.B.Pant Institute of Himalayan Environment & Development Kosi - Katarmal - 263643 U.P.	Tel: 05962-81111, 81144 Fax: 05962-22100 Attn. GBPHED email: ghpihed @ shakti. nest. ernet. In	Himalayan Ecology
17. Prof. A.K. Maitra Head, Envis Centre School of Planning and Architecture Indraprastha Estate New Delhi- 110002	Tel: 011- 3318358 Fax: 011- 3319345	Human Settlement
18. Prof. V. Subramanian School of Environmental Sciences Jawaharlal Nehru University New Delhi - 110016	Tel: 011-6106501,6107676 Extn. 429 Fax: 011- 6165886 Grams: JAYENU email: Subra @ Jnuniv. ernet. in	Biogeochemistry and Environmental Law
19. Dr. P. K. Hazra, Director, Botanical Survey of India P-8, Brabourne Road Calcutta - 700 001	Tel : 033-2424922 Fax : 033-2429330 Grams : BOTSURVEY	Floral Biodiversity

Regional Offices	Communication Linkages	Area
20. Shri T. Chatterji, Director Environmental Protection Training and Research Institute 2nd Floor, Maitrivanam, Huda Complex, S. R. Nagar Hyderabad - 500038	Tel: 040- 291366, 290399 Fax: 040- 291366	Eastern Ghats
21. Director Bombay Natural History Society (BNHS) Hornbill House Dr. Salim Ali Chowk Shaheed Bhagat Singh Road Mumbai - 400023	Tel: 022- 2843869, 2843421 Fax: 022- 2837615 Grams: HORNBILL	Avian Ecology including inland Wetlands

Centres of Excellence

1. Centre for Environment Education Nehru Foundation for Development, Thaltej Tekra, Ahmedabad - 380 054
   Tel : 079-442642 442651
   Fax : 91-079-420242
   Gram : PARYAVARAN
2. C.P.R. Environmental Education Centre 1 A, Eldams Road, Madras - 600 018
   Tel : 044-43417778 4346526
   Fax : 91-44-450656
   Gram : PARYAVARAN
3. Ecological Research & Training Centre, Indian Institute of Scienc, Bangalore - 560 012
   Tel : (80) 3340955 3344411
   Fax : (91-80) 3341683
4. Centre for Mining Environment, Indian School of Mines, Dhanbad - 826 004
   Tel : (0326) 202487 202578
   Gram : Scolomin
   Fax : 0326-203042
   email:cme@ismine.ernet.in
5. Salim Ali Centre for Ornithology and Natural History (SACON), Kalayampalayam, Coimbatore-641 010
   Tel : (0422) 807973 807983
   Fax : (0422) 807952
   email : centre @ sacon.ernet.in

Autonomous Agencies

a) Environment Wing

1. Central Pollution Control Board Parivesh Bhawan, CBD-cum-Office Complex East Arjun Nagar, Delhi - 110 032
   Tel : (011) 2217213 2217078
   Gram : CLEENVIRON
   Telex : 031-66440 PCONIN
2. Gobind Ballabh Pant Institute of Himalayan Environment and Development, Kosi, Katarmal, Almora-263 643 (UP)
   Tel : (05962) 81111 81144
   Gram : HIMVIKAS
   Fax : (05962) 22100
   email: ghphied @ shakti.ncst.ernet.in

b) Forest Wing

1. Andaman & Nicobar Islands Forests and Plantation Development Corporation Ltd. Van Vikas Bhawan, Port Blair, Andaman & Nicobar Islands.
   Tel : (03192) 20261 20752
   Fax : (03192) 21254
2. Indian Institute of Forest Management, P.B. No. 3577, Nehru Nagar, Bbopal - 462 003
   Tel : (0755) 65998
3. Indian Plywood Research Institute, P.B. No. 2273 Tumkur Road, Bangalore - 560 022
   Tel : (080) 8394231 8394232
   Fax : 91-80-8396361
4. Indian Council of Forestry Research and Education P.O. New Forests Dehradun - 248 006
   Tel : (0135) 628614
   Fax : (0135) 628571

c) Wildlife Wing

1. Director Wildlife Institute of India Chandrabani Dehradun - 248 006
   Tel : (0135) 640112-115
   Fax : (0135) 640117

2. Animal Welfare Board of India 4th Street, No. 7, 11 Cross Street, Venus Colony, Alwarpet, Madras - 600 018 — Tel : 455619, 453628 Fax : (044) 455973

Associated Units

a) Environment Wing

1. Botanical Survey of India, P-8, Brabourne Road Calcutta - 700 001 — Tel : (033) 2424922 Fax : (033) 2429330
2. Zoological Survey of India M-Block, New Alipur Calcutta - 700 053 — Tel : (033) 4786983 4783383 Gram: ZOOLOGY CALCUTTA Fax : 91-33-786893
3. National Museum of Natural History, FICCI Building, Barakhamba Road New Delhi - 110 001 — Tel : (011) 3314932 Fax : (011) 3314932

b) Forest Wing

1. Director, Forest Survey of India, 21, Subhash Marg Dehradun - 248 006 — Tel : (0135) 625037 626139 Fax : (0135) 629104
2. Director, Indira Gandhi National Forest Academy P.O. New Forests, Dehradun - 248 006 — Tel : (0135)624647
3. Registrar, Forest Research Institute P.O. New Forests Dehradun - 248 006 — Tel : (0135) 626865
4. Director, Institute of Forest Genetics and Tree Breeding, Forest College Campus P.B. No. 1031, R.S. Puram, H.P.O. Coimbatore - 641 002 — Tel : (0422) 441540 442541 Fax : (0422) 430549
5. Director, Institute of Wood Science and Technology, 18th Cross Malleswaram Bangalore - 560 006 — Tel : (080) 3341731 Fax : (080) 3340529
6. Arid Forestry Research Institute 12/10, Chopasani, Housing Scheme Jodhpur Pin - 342 008 — Tel:(0291)26034,28640
7. Tropical Forest Research Institute P.O. RFRC, Mandla Road, Jabalpur - 482 021 — Tel : (0761) 322585
8. Institute of Rain Moist Deciduous Forest Research Jorhat - 785 001 — Tel : (0376) 322052 322054
9. Conifer Research Institute Shimla - 171 001 — Tel : (0177) 6086
10. Directorate of Lac Development Ranchi - 834 001 — Tel : (0651) 304628
11. Advance Research Centre of Forests & Environment Allahabad - 211 001 — Tel : (0532) 609037

c) Wildlife Wing

1. Shri D.M. Singh, Director; National Zoological Park Mathura Road, New Delhi - 110 003 — Tel : (011) 4619825 Fax : (011) 4602408

Regional Offices

1. Wilflife Preservation Western Region 11 Air Cargo Complex, Sahar, Mumbai - 400 099 — Tel : (022) 8328529
2. Wildlife Preservation Eastern Region Nizam Palace, 6th Floor M.S. Building 234/4, A.J.C. Bose Road, Calcutta - 700 020 — Tel : (033) 2478698 Fax : (033) 2473851
3. Wildlife Preservation Northern Region Bikaner House, Shahjahan Road, New Delhi - 110 011 — Tel : (011) 3384456
4. Wildlife Preservation Southern Region C-2/A, Rajaji Bhawan, Basant Nagar, C.G.O. Complex Madras - 600 090 — Tel : (044) 82539777

LIST OF PROJECTS SANCTIONED DURING 1996-97

Title of the Project	Institution
Man and Biosphere Programme	
1. Non timber prodects (minor forest produce) utilisation by different tribals at Mahadevpur in Karimnagar District in the context of ecological change and conservation of biodiversity.	Department of Zoology, University College of Science, Osmania University, Hyderabad, Andhra Pradesh.
2. Cytogenetical and biochemical investigations on some estuarine fishes of the Sunderbuns with particular reference to *Hilsa ilisha* as a means of genotoxicity monitoring.	Department of Zoology, University of Kalyani, Kalyani - 741 235 West Bengal.
3. Environment and Development : The strategy for decentralised forest management system.	Centre for Environmental Planning and Technology, Imoversotu Road, Navrangpura, Ahmedabad- 380009,Gujarat.
4. Production, consumption and marketing of forest products in Himachal Pradesh.	Department of Economics, Himachal Pradesh University, Shimla-171 005, Himachal Pradesh.
Environment Research Programme	
1. Decontamination of riverine system and coal washery training/pithead technique of oil aglomerative and biofilm formation.	Centre for Energy Studies, IIT, New Delhi - 110 016.
2. Environmental management optimisation of energy input and output in some agroecosystems in western India commensurate with local environment.	Raja Balwant Singh College, Agra - 282 002, Uttar Pradesh.
3. Construction of efficient strains of bacteria for cleavage of aromatic pollutants and their applications in industrial effluent treatment.	Director, CAS in Botany, University of Madras, Madras - 600 025, Tamil Nadu.
4. Organic solid waste; recycling and reuse through thermophyllic aerobic methods.	Sulabh International Institute of Technology and Research & Training, Mahavir Enclave, New Delhi - 110 045.
5. Detoxification of toxic metallic wastes.	Centre for Energy Studies, IIT, New Delhi - 110 016.
6. Recovery of chromium value for solid residue chromate plant.	Electrochemical Division, Central Electrochemical Research Institute, Karaikudu - 623 006, Tamil Nadu.
7. Photocatalyst in the treatment of water and wastewater	Department of Chemistry, Anna University, Madras, Tamil Nadu.
8. Studies on eco-friendly termite control management for buildings.	Termite Control Laboratary, Central Building Research Institute, Roorkee, Uttar Pradesh.

Title of the Project	Institution
Eastern and Western Ghats	
1. Prey-predator interaction of three Herpectorine reduviid Predators (Insecta: Heteroptera: Reduviidae) of Western Ghats Peninsular, India.	Entomology Research Institute, St. Xaviors College, Palayamkottai, Tamil Nadu.
2. Biodiversity of the Tingi fauna (Insecta: Heteroptera) of the Eastern and Western Ghats.	Department of Zoology, Madras Christian College, Tambaram, Madras, Tamil Nadu.
3. Biodiversity of Coccoids (Coccoidea: Hemiptera) and their natural enemies in Western Ghats of Tamil Nadu.	Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu.
4. An indepth study of endemic plants of Kerala: - Evaluation of their status and their *ex-situ* conservation.	Tropical Botanic Garden and Research Institute, Pacha - Palode, Thiruvanthapuram - 695562, Kerala
5. Botanical insecticides used by tribal from Palney Hills, Western Ghats.	Entomology Research Institute, Loyola College, Madras - 600 034, Tamil Nadu.
Biosphere Research Programme	
1. Role of the macro fauna in the biolurbalia process around the mangrove zone of the Sunderbans BR and its impact on environmental management.	Dr. A. Bhattacharya, Department of Marine Science, 35, Ballygunj Circular Road, Calcutta University, Calcutta, West Bengal.
2. Studies on the microbial degradation of petroleum hydrocarbon as oil pollutants in the coastal waters of Sunderbans.	Dr. Ranjeet Kumar, National Institute of Cholera Enteric Diseases, Calcutta, West Bengal.
3. Ambient air quality studies in Sunderban area, West Bengal.	Dr. A. K. Saha Centre for Study of Marine Environment, C. K. II Salt Lake City, Calcutta.
4. Impact of oil pollutant air candidate flora and fauna of mangrove ecosystem along Hoogly estuary.	Dr. Ashok G. Dutta, Biotechnology Department, Jadavpur University, Calcutta, West Bengal.
Wetland Programme	
1. Biodiversity and management of ponds of Varanasi City.	Dr. B.P. Tripathy, Department of Botany, Banaras Hindu University, Varanasi, Uttar Pradesh.
2. Food and feeding habits of important aquatic birds of Chilka Lake.	Dr. J.S. Samant, Bombay Natural History Society, Bombay, Mahrashtra.

Title of the Project	Institution
NNRMS Scheme	
1. Delineation of shifting cultivation areas and forest cover maping in the eastern region of Arunachal Pradesh using the remote sensing data.	Department of Geography, Arunachal University, Dolmukh, Arunachal Pradesh.
2. Terrain analysis of coastal Karnataka.	Department of Marine Geology, Mangalore University, Mangalore, Kerala.
3. Serpentines of Andamans: A geobotanical study for resource survey and management.	Department of Botany, Calcutta University, Calcutta, West Bengal.
4. Application of remote sensing techniques to coastal wetland ecology of Tamil Nadu with special reference to mangroves.	CAS in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu.
5. Evaluation of the natural resources and environment of the Kolli Hills, Tamil Nadu using remote sensing and GIS.	St. Joseph's College, Thiruchirapalli, Tamil Nadu.
6. Environmental monitoring of Raniganj coal belt using satellite images and GIS	Department of Geography, University of Burdwan, Burdwan, West Bengal.
7. Monitoring environmental changes due to industrialisation and identification of 'Hotspots' in Vapi, Vadodara belt of the Golden Corridor.	Centre for Environmental Planning and Technology, Ahmedabad, Gujarat.
8. Nation wide forest type mapping for Bio-climatic zoning.	National Remote Sensing Agency, Hyderabad, Andhra Pradesh.
9. Wetland Mapping of Pulicat Lagoon using Remote Sensing techniques towards generation of a total developmental package for the Pulicat Lagoon watershed.	Andhra Pradesh State Remote Sensing Application Centre, Hyderabad, Andhra Pradesh.

LIST OF PROJECTS COMPLETED DURING 1996-97

Title of the Project	Institution
Man and Biosphere Programme	
1. Evaluation of the impact of the use of biocidal plantsap fishing on the ecophysiology and conservation of hill stream fishes of tribal belt of Bihar.	Department of Zoology, Bhagalpur University, Bhagalpur - 812 007, Bihar.
2. Study on human nature interactions in and around National Parks and Sanctuaries.	Indian Institute of Public Administration, IP Estate, Ring Road, New Delhi - 110 002.
3. Environmental impact of increased ultraviolet-B radiation of fresh water algae.	Department of Botany, Banaras Hindu University, Varanasi - 221 005, Uttar Pradesh.
4. Aspects of human infringement in an around National Parks and Wildlife Sanctuaries of Madhya Pradesh.	Department of Tribal Studies, Rani Durgavati Vishwavidyala, Jabalpur, Madhya Pradesh.
5. Genetic studies on the Chowlate Mahseer, *Aerossocheilus hexagono lepes* in relation to its environment.	Department of Zoology, North Eastern Hill University, Shillong - 793014, Meghalaya.
6. South Indian tribal pulses germplasm resource management and biochemical studies.	Department of Botany, Bharathiar University, Coimbatore 641 046, Tamil Nadu.
Environment Research Programme	
1. Impact of heavy metals and toxic wastes on some physiological and Bioenergetics of the prawn, *Macrobrachium malcolmsonii* in the river Cauvery.	Department of Animal Science, School of Life Science, Bharathidasan University, Thiruchirapalli-620 024, Tamil Nadu.
2. Carrier mediated transport throughliquid membranes in pollution abatement.	Department of Chemistry, Banaras Hindu University, Varanasi - 221 005, Uttar Pradesh.
3. Rural sanitation and environment : A study in Uttar Pradesh.	B.L. Centre for Development, Research & Action, 196. Shivani Vihar, Lucknow, Uttar Pradesh.
4. Assessment of pollution due to aluminium industry and its useful abatemen.	Regional Research Laboratory, Bhubaneswar - 751 013, Orissa.
5. Environmental Impact Assessment of transport project. Methodology development for Indian conditions.	Indian Institute of Technology, New Delhi - 110 016.
6. Impact and predictions of heavy metal pollution in and around iron ore mines in Orissa.	Regional Research Laboratory, Bhubaneswar - 751 013, Orissa.
7. Development of environmentally safe and ecologically compatible termite control measures for buildings.	Termite Control Laboratory, Central Building Research Institute, Roorkee - 247 667, Uttar Pradesh.

Title of the Project	Institution
8. Disperson of air pollutants in the atmosphere and its control by green belt.	Department of Mathematics, Indian Institute of Technology, Kanpur- 208 016, Uttar Pradesh.
9. Fabrication of SOx and COx Electro Chemical Gas Sensors.	Department of Physics, Nagpur University, Nagpur, Maharashtra.
10. Dermatophytes and other fungal skin infections prevalent at Rourkela due to pollution and recommendation of measures to control it.	Department of Botany, P.G. Government College, Rourkela - 769 004, Orissa.
11. Optimisation of engineering aspects for spent wash conditioning resources recovery using water hyacinth system.	Shivsadan Renewable Energy Research Institute, Sangli-416 416, Maharashtra.
12. Ecotoxicological studies of dyeing and painting industry effluent on fish with special reference to the muscle growth dynamics.	Department of Bioscience, Saurashtra University, Rajkot - 360 005, Gujarat.
13. Study on the concentration of heavy metals (Pb, Cd, Mg, Se, As) in milk of cow and Buffalo and milk powder.	Department of Chemistry, Anna University, Madras - 600 025. Tamil Nadu.
14. Environmental distribution transport and fate of halogenated hydrocarbons at Portonovo.	Centre for Advanced Study in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu.
15. Removal of heavy metal ions from metallurgical waste water by use of micro-organism.	Regional Research Laboratory, Bhubaneswar 751 013, Orissa.
16. Criteria for recommendation standards for human exposure to environmental heat.	Division of Physiology, National Institute of Occupational Health, Ahmedabad - 380 016, Gujarat.
17. Toxicology of petroleum hydrocarbons in marine eco-system, marine food chain and marine living resources.	National Institute of Oceanography, Goa - 403 001.
18. Estimation of environmental radiation dose on patients and staffs in diagnostic X-ray installations in Udaipur Division.	Department of Radiation, R.S.O. RNT Medical College, Udaipur - 313 001, Rajasthan.
19. Geoenvironmental appraisal of Jhanji river, Assam.	Geoscience Division, Regional Research Laboratory, Jorhat - 785 006, Assam.
20. Health effects of environmental pollution from Rayon factory.	Department of Gastroenterology, Medical College, Trivandrum, Kerala.
21. Study of sediment contamination with heavy metals- its transport, distribution and biological magnification in a select streatch of river, canals and connected lake systems in Telangana region of river Krishna Basin.	Department of Zoology, Osmania University, Hyderabad, Andhra Pradesh.

Title of the Project	Institution
22. The future of endangered human population and environment of Andaman Island : A strategic study on the conservation and development with reference to endangered human population.	Centre for Future Studies, Pondicherry University, Pondicherry.
Eastern and Western Ghats	
1. Studies on biology, parasites and diseases of avian hosts of eastern ghats with special reference to pathology and control measures.	Department of Zoology, Andhra University, Visakhaptnam, Andhra Pradesh.
Biosphere Reserves Programme	
1. Ecological monitoring of structural and functional properties of mangroves forests ecosystem in Gulf of Mannar BR.	Dr. Kailash Paliwal, School of Life Sciences, Madurai Kamaraj University, Madurai, Tamil Nadu.
2. Secondary productivity and larval resources of Gulf of Mannar BR.	Dr. P. Subramanian, Department of Animal Sciences, School of Life Sciences, Bharathidasan University, Thiruchirapalli, Tamil Nadu.
3. Investigations of angiospecies of Nilgiri BR.	Dr. P. Daniel, Botanical Survey of India, Coimbatore, Tamil Nadu.
Wetlands Programme	
1. Ecology and conservation of Kashmir wetlands of Wular Lake.	Dr. M.R.D. Kundangar, S.P. College, Srinagar, Jammu & Kashmir.
2. Conservation and management of wetland - Kabar Lake, Begusarai, North Bihar.	Dr. U.P. Sharma, Bhagalpur University, Bhagalpur, Bihar.
Mangroves Programme	
1. Study on impact of pollution on the mangrove fauna of Thane Creek near Thane City.	Dr. K.S. Gokhale, Department of Zoology, B.N. Bandodkar College, Thane, Mahrashtra.
2. Propagation and re-establishment studies of mangrove in Bhitarkanika and Mahanadi Delta.	Dr. P. Das, Regional Plant Resource Centre, Bhubaneswar, Orissa.
3. Taxonomical and ecological survey of the Lakshadweep for Perumal Marine Park.	Dr. C.L. Rodrigues, Department of Marine Sciences, Goa University, Goa.

Title of the Project		Institution
NNRMS		
1.	Application of Remote Sensing Techniques to coastal wetland ecology of Tamil Nadu with a special reference to mangroves.	CAS in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu.
2.	A rapid assessment of biodiversity in Mehao Sanctuary, Arunachal Pradesh.	SACON, Coimbatore, Tamil Nadu.
3.	Wetland mapping of Pulicat Lagoon using Remote Sensing Techniques.	Andhra Pradesh Remote Sensing Application, Hyderabad, Andhra Pradesh.
4.	Geoenvironmental studies of Manipur river basin.	Manipur University, Manipur.
5.	Landuse mapping of coastal regulation zone.	Space Application Centre, Ahmedabad, Gujarat.
6.	Wetland mapping.	Space Application Centre, Ahmedabad, Gujarat.

LIST OF ON-GOING PROJECTS UNDER THE NNRMS SCHEME

Sl. No.	Name of the Project	Name of the Institution
1.	Monitoring of Forest cover in the Disrtict of Dhanbad,South Bihar through Remote Sensing Images.	Indian School of Mines, Dhanbad.
2.	Ecological evaluation of land and water resources in draught prone PMT district of Tamil Nadu using Remote Sensing and GIS.	Salim Ali School of Ecology, Pondicherry University Pondicherry.
3.	Monitoring of Diara Land of Eastern India with respect to vegetation wasteland, soil erosion through Remote Sensing techniques.	Division of Agriculture Physics, IARI, New Delhi.
4.	Monitoring of Godawari Austere and Mangrove Environment using Remote Sensing and *insitu* measurement methods.	School of Environment, Water Resources & Remote Sensing, Jawahar Lal Nehru Technology University, Hyderabad.
5.	Satellite Data and Geological Information System for investigation and monitoring of Desertification.	Res. Scientist Centre, Bombay, Mahrashtra.
6.	Monitoring and Identification of Shifting cultivation areas of Meghalaya by using Remote Sensing data.	Department of Geography Nehu, Shillong.
7.	Studies of Ecological and Environmental Status of Upper catchment area of Pamba River basin using Satellite.	Centre for Environment, Thiruvananthapuram, Kerala.
8.	Survey and study of Loktak, Pumlen and other connected wetlands in Manipur using Remote Sensing techniques.	Centre of Earth Sciences, Manipur, Imphal.
9.	Study of environmental Impact of Iron Ore Mining in Bailadila, Madhya Pradesh.	Centre of Resources Engineering, IIT, Bombay & MAPCOST, Bhopal.
10.	Environmental Impact Assessment of Jawas Group of Mines using Multi Data Satellite Images.	Institute of Environmental Studies, Jaipur, Rajasthan.
11.	Impact of Urbanisation & industrialisation on Environment - Case of selected Indian cities using remote sensing & GIS.	Faculty of Management Studies, University of Delhi, Delhi.
12.	Integrated study of wetlands of Goalpara District of Assam using Remote Sensing and GIS Techniques.	Assam Remote Sensing Application Centre, Assam.
13.	Environmental Impact Assessment of Lignite Mining in Neyveli, Tamil Nadu using Ground data Remote Sensing Techniques.	Department of Geology Annamalia University, Tamil Nadu.

Sl. No.	Name of the Project	Name of the Institution
14.	Remote Sensing for Keoladeo National Park Wetland.	Maharishi Dayanand Saraswati University, Ajmer, Rajasthan.
15.	Remote Sensing & GIS in the environmental analysis of coastal wetlands - a study on Kolleru and Pulicat lakes.	Department of Geo-Engineering College of Engineering, Andhra University, Visakhapatnam, Andhra Pradesh.

Annexure - VI

PROJECTS APPROVED BY ICEF FOR FUNDING

i) Indian Farm Forestry Development Co-operative Project (IFFCO) to reclaim wasteland by astonishing sustainable profit oriented village based Co-operative structure.

ii) Nagaland Environment Protection & Eco-Development for developing alternative approach to shifting cultivation in the northeast while increasing the income of the people and institution building.

iii) M.S. Swaminathan Research Foundation Project for management of mangroves wetlands along the east coast of India.

iv) Indian Potash Limited Project for environment improvement in rainfed areas of MP and Maharashtra.

v) M/S Aga Khan Foundation (AKF) for Management of Environment Resources by Communities.

vi) M/S BAIF Development Research Foundation for Water Resources Development and Energy Conservation for Sustainable Management of the Environment.

Annexure - VII

PROJECTS UNDER IMPLEMENTATION

Sl. No.	Name of the Project	Implementing Agency	Funding Agency	Nature of Project (theme)	Project Cost (Rs.in Cr.)	Aid in Foreign currency	Date of commence-ment	Date of comple-tion
1	2	3	4	5	6	7	8	9
1.	West Bengal Forestry Project, (2341 - IN)	West Bengal Govt.	World Bank	Forestry Development	114.70	34 M US $	1992-93	1996-97
2.	Maharashtra Forestry Project (2328 - IN)	Maharashtra Govt.	World Bank	Forestry Development	431.51	124 M US $	1992-93	1997-98
3.	Andhra Pradesh Forestry Project (2573 - IN)	A.P. Govt.	World Bank	Forestry Development	353.92	77.4 M US $	1994-95	1999-2000
4.	Dungarpur Integrated Wastelands Develop-ment Project	Rajasthan Govt.	SIDA Development	Forestry	28.21	80 M SEK	1992-93	1996-97
5.	Rehabilitation of Common lands In Aravallis	Haryana Govt.	EEC Development	Forestry	48.15	23.20 M ECU	1990-91	1997-98
6.	Afforestation and Pasture Dev. along Indira Gandhi Canal (ID P - 73)	Rajasthan Govt.	OECF (JAPAN)	Forestry Development	107.50	7869 M YEN	1990-91	1997-98
7.	Afforestation of Aravalli Hills (ID - P -80)	Rajasthan Govt.	OECF JAPAN	Forestry Development	176.69	8095 M YEN	1992-93	1996-97
8.	Western Ghats Forestry Project	Karnataka Govt.	ODA (U.K.)	Forestry Development	84.20	23.19 M UK £	1992-93	1997-98
9.	Forestry and Eco-Development Project for Changer	H.P. Govt.	FRG Development	Forestry	18.70 D.M	5 M	1994-95	1998-99
10.	Forestry Project Kullu-Mandi(H.P.)	H.P. Govt.	ODA U.K.	Forestry Development	13.92	3 M UK £	1994-95	1996-97
11.	Madhya Pradesh Forestry Project (2700 - IN)	M.P. Govt.	World Bank	Forestry Development	245.94	58.50 US $	1995-96	1998-99
12.	Rajasthan Forestry Project, Rajasthan. (ID-P-104)	Rajasthan Govt.	OECF Development	Forestry	139.18	4219 M YEN	1995-96	1999-2000
13.	Integrated Gujarat Forestry Development Project. (ID-P-112)	Gujarat Govt.	OECF Development	Forestry	608.50	15760 M YEN	1995-96	2000-2001

Annexure - VIII

PROJECTS IN THE PIPELINE

S.No.	Name of the Project	Implementing Agency	Funding Agency (Expected)	Project Cost (Rs. in Crores)	Project period No. of years	Current Status exact position
1	2	3	4	5	6	7
1.	Bihar Forestry Project	Bihar Govt.	World Bank	157.00	6 years	Pre-appraised by the World Bank in May-June, 1994. Further action has been delayed due to other Bank aided projects in the State. The matter is being pursued with the State Govt./DEA.
2.	U.P.Forestry Project	U.P. Govt.	World Bank	204.00	4 years	Pre-appraisal completed in January 1996. Pre-project activities have been started. Slotted for appraisal in in early 1997.
3.	Kerala Forestry Project	Kerala Govt.	World Bank	179.68	4 years	Pre-appraisal Scheduled in July, 1996. Pre-project activities have been started. Slotted for appraisal in early, 1997.
4.	Orissa Forestry Project	Orissa Govt.	SIDA	157.57	6 years	Posed to SIDA. Project proposal is under consideration of SIDA.
5.	Shimla Development Project	H.P. Govt.	—	55.63	7 years	The project proposal has been forwarded to DEA for posing to a suitable donor agency.
6.	Forest and Wildlife Project	H.P. Govt.	—	178.94	5 years	- do -
7.	Forestry and Environment Project for Eastern Plains	Karnataka Govt.	OECF	355.54	5 years	Pre-appraised by OECF in July 1996. OECF has agreed to support the project. Loan negotiations has been concluded in December 1996.
8.	Comprehensive Forestry project for Tamil Nadu	Tamil Nadu Govt.	OECF	463.20	5 years	Pre-appraised by OECF in July 1996. OECF has agreed to support the project. Final Loan negotiations to be concluded during December 1997.
9.	Social Forestry, Punjab	Punjab Govt.	OECF	450.00	6 years	Posed to OECF (Japan) seeking assistance during 1997-98 loan package
10.	Bamboo Rehabilitation Project in Chhindwara District.	M.P. Govt.	ICEF	2.39	5 years	Posed to ICEF
11.	Eco-Conservation & Re-afforestation of shifting cultivation	Nagaland Govt.	—	41.25	5 years	Forwarded to DEA for posing to suitable donor agency.

Annexure - IX

PROJECTS UNDER PREPARATION/PROCESSING

S.No.	Name of the Project	Implementing Agency	Project Cost (Rs. in Crs.)	Project Period	Remarks
1	2	3	4	5	6
1.	Meghalaya Eco-Resource Dev. Project.	Meghalaya Govt.	86.46	10 years	Clearance from MHA, MEA & PC awaited. Afterwards it would be forwarded to DEA.
2.	Assam Project	Assam Govt.	271.00	5 years	- do -
3.	Integrated Eco-Development of Shivaliks in the Jammu Region.	J & K Govt.	100.00	5 years	Clearances from MEA, and Planning Commission awaited. Afterwards it Would be forwarded to DEA.

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