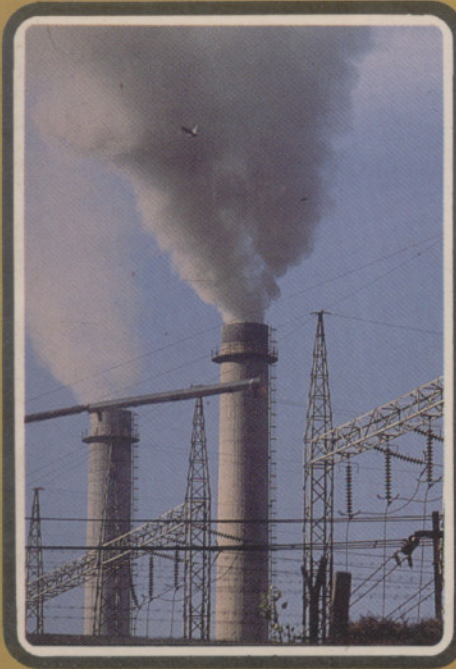


ANNUAL REPORT 1987-88



MINISTRY OF ENVIRONMENT & FORESTS
GOVERNMENT OF INDIA

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1. INTRODUCTION

1.1 ROLE & ORGANISATION

1.1.1 The present integrated Department of Environment, Forests and Wildlife in the Ministry of Environment and Forests was created in September, 1985. The Ministry serves as the focal point in the administrative structure of the Central Government for the planning, promotion and coordination of environmental and forestry programmes. The Ministry's main activities include the survey and conservation of natural resources, the protection of the environment and its regeneration and the development of the degraded parts of the environment. The main tools utilised for this include surveys, impact assessment, control of pollution, regeneration programmes, support to organisations implementing such programmes, research to evolve solutions, extension, education and training to augment the requisite manpower, collection, collation and dissemination of environmental information and creation of environmental awareness.

1.1.2 Allocation of Business

The following are the items of work allocated to the Ministry of Environment and Forests:—

- 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 Environment (Protection) Act, 1986;
- Biosphere Reserve Programme;
- National Forest Policy and forestry development in the country including social forestry;
- Forest Policy and all matters relating to forests and forest administration in so far as the Andaman and Nicobar Islands are concerned;
- Indian Forest Service;
- Wildlife preservation and protection of wildbirds and animals;
- Fundamental research including coordination thereof and higher education in forestry;
- Padmaja Naidu Himalayan Zoological Park;
- National Land Use and Wasteland Development Council;

- National Wastelands Development Board; and
- Central Ganga Authority.

1.1.3 Organisation

The organisational structure of the Department showing various Divisions and Agencies is given in Annexure I.

1.2. AN OVERVIEW OF ACTIVITIES DURING THE YEAR

1.2.1 Survey of Natural Resources

—Flora

—During the year, the first-ever critical review of the activities of the Botanical Survey of India (BSI) was made. Its objectives were redefined and its perspectives delineated in a time frame spanning up to 2000 A.D.

—The BSI continued its activities on the survey, identification, exploration and assessment of the plant resources of the country. A new variety of wild species of rice was discovered in Andaman and Nicobar Islands.

—Under the plant conservation programme, a Red Data Book on Indian Plants covering 235 species has been published. Several publications were brought out, the major ones being the Flora of Tamil Nadu Vol. II and the Flora of Nallamalais (Vol. I).

—Fauna

—The activities of the Zoological Survey of India (ZSI) were also reviewed for the first time and its objectives redefined with a specific programme drawn upto 2000 A.D. The ZSI has so far surveyed the faunal resources of one-third area of the country and is likely to complete survey of 75% of remaining areas by 2000 A.D.

—Faunistic survey of 24 districts was completed during the year. Three volumes of the Fauna of India were published.

—Several research projects in taxonomy, ecology and bio-ecology of the fauna were undertaken.

—Forest Survey

- The Forest Survey of India (FSI) is preparing a detailed forest inventory in the North Eastern region. An area of 21,000 sq. kms. was covered. Data processing covering an area of 33,000 sq. kms. was completed.
- The work related to thematic mapping and vegetation mapping of the entire country has made considerable progress.
- Field work regarding a wood consumption study in Nagaland was completed.
- The FSI undertook a reconciliation exercise jointly with the National Remote Sensing Agency to refine the method of determining the exact forest cover in the country utilising satellite imagery.

—National Natural Resources Management System

- The Department is participating in the multi-departmental National Natural Resources Management System (NNRMS).
- Out of 37 projects identified by the Standing Committee on Bio-resources and Environment, 7 projects have been finalised. These are: impact of coal mines in Jharia—Raniganj Coal Belt; impact of iron ore mining in Goa; impact of mining of bauxite and chromite ores in the East Coast area through remote sensing; impact of industrialisation on land use in Madras Metropolitan area; changes in land use due to urban spread and industrialisation in Ahmedabad—Vapi region; coastal environment; and impact of super thermal power stations and mining activities on the environment.

1.2.2 Conservation of Natural Resources

—Environmental Impact Assessment

- 255 development projects were appraised during the year out of which 89 were cleared and 123 rejected. The major projects which have been approved subject to specific conditions and environmental safeguards include the Sardar Sarovar and Narmada Sagar Projects and the Tehri Dam.
- Reports on studies relating to environmental impact assessment of development projects,

conservation of biological diversity and conservation of genetic resources in the Andaman and Nicobar Islands were completed and presented to the Island Development Authority.

- Human Exposure Assessment Location (HEAL) project aided by the World Health Organisation has been initiated to monitor exposure of human beings to pollutants, through biological monitoring of body fluids and tissues.

—Forest Conservation

- The Regional Offices of the Ministry have started monitoring the observance of the conditions stipulated for compensatory afforestation in cases of approved diversion of the forest areas.
- Efforts were made to reduce the demand on conventional species of wood and to encourage the use of secondary species as a part of conservation strategy.
- Substitution of wood by alternative materials was encouraged in fruit packing and in the Railways.
- In order to reduce the pressure on forests for fuel wood, townships of more than 5,000 population in the vicinity of forests were identified with a view to supply them kerosene and other sources of energy.

—Wildlife Protection

- Captive Breeding and Rehabilitation Programme was continued to cover 9 species including endangered ones like the Manipur Brow Antlered Deer, Musk Deer and Blyth's Tragopan.
- A preliminary survey of the highly endangered Western Tragopan was conducted in the Chamba District, Himachal Pradesh. A wilderness area where the bird was observed was recommended for the establishment of a sanctuary.
- Concerted action has been initiated in the States of Kerala, Karnataka and Tamil Nadu to tackle the problem of illegal killing and trade in wildlife, particularly in relation to elephants.
- The Dudhwa National Park has been included under the "Project Tiger" as the sixteenth sanctuary for tigers. The newly created 'Dudhwa Tiger Reserve' has the Dudhwa National Park

and Kishanpur Wildlife Sanctuary as its core areas. The 16 tiger reserves in the country cover 26,000 sq. kms. in 12 States.

- Guidelines for wildlife tourism in tiger reserves were prepared and action taken to prepare tourism management plans for each of the Tiger Reserves.
- A three tier review of the 'Project Tiger' was undertaken for the first time and completed involving scientific and academic institutions, non-official members of the Steering Committee and experts of the Indian Army.
- Under the 'Snow Leopard Conservation Project', it has been decided to create a network of 12 Snow Leopard Reserves throughout the Himalayas, spanning the States of Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, Sikkim and Arunachal Pradesh.

—Biosphere Reserves

- The State Governments of Tamil Nadu, Karnataka, Kerala have been provided grants for implementing action programmes and management plans of the Nilgiri Biosphere Reserve, which was established in 1986.
- The Nanda Devi Biosphere Reserve has been established during the year in Uttar Pradesh. An action and management plan has been finalised with the State Government and funds released to take up specific activities.
- Project documents on the Biosphere Reserves at Thar Desert, Manas and Sunderbans were finalised. The Government of Meghalaya has agreed to setting up a Biosphere Reserve at Nokrek. Further action is in process.

—Wetlands and Mangroves

- A National Wetland Committee constituted for laying down policy guidelines for implementing programmes of conservation, management and research of wetlands has started functioning. The Committee has identified 10 wetlands as the first batch for preparation of management action plans and the nodal institutions for the preparation of these plans.
- Indicative action plans for wetlands have been

drawn up for Kolleru (Andhra Pradesh), Chilka (Orissa) and Loktak (Manipur).

- A wetland directory was prepared and circulated to the various States for verification.
- The reconstituted National Mangrove Committee has identified 15 mangrove areas for the preparation of management plans in the first batch along with their respective nodal institutions.
- Compilation of status report on Mangroves was completed and the report published.

1.2.3 Control of Pollution

—Control of Water and Air Pollution

- The Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 are being implemented through the Central Board for Prevention and Control of Water Pollution (CBPCWP) and the State Boards. All States except the States of Manipur, Nagaland, Sikkim, Arunachal Pradesh, Goa and Mizoram have constituted State Boards. The Central Board looks after pollution control activities in the Union Territories.
- Following the enactment of the Environment (Protection) Act, 1986, more responsibilities have been placed on the Central and State Boards. The work of the Central Board was comprehensively reviewed for the first time after its creation. Clear priorities were laid down. The staff requirements were reassessed and new groups formed. Regional offices are being opened in six regions.
- Water quality monitoring of rivers continued through 170 monitoring stations. Thirty new monitoring stations were started during the current year.
- The national network of ambient air quality monitoring stations was expanded to include 85 stations covering 24 cities/towns.
- The Central Board, in collaboration with the Department of Ocean Development, established 173 monitoring stations all along the 6,000 kms. of the Indian Coast for purposes of water quality measurement. The programme also involves the State Pollution Control Boards.

- The first round of sampling for assessment of coastal water quality was completed. The sampling will continue till the end of the Seventh Plan period.
- Water quality monitoring and the inventorisation studies were taken up in the Kaveri Basin covering the States of Karnataka, Kerala and Tamil Nadu. Studies on Sabarmati and Krishna river basins were completed.
- A complete inventorisation of air polluting industries has been initiated and the updating of status report on waste water generation, treatment and disposal in class I and class II cities and inventory of water pollution industries was taken up.
- Environmental standards for 24 industries were notified under the Environment (Protection) Act, 1986.
- Comprehensive industry documents were prepared for aluminium, cement and inorganic chemicals and are presently under review before final publication.
- The Ministry has taken up notification of rules for control of emissions by motor vehicles under the Motor Vehicles Act with all the States. So far 10 States and 2 Union Territories have issued the rules.
- Zonal Task Forces were set up to pursue the implementation of standards in fertiliser, iron and steel, cement, pulp and paper and thermal power plants. Violators of standards have been prosecuted under the Pollution Control Acts. 1174 prosecution cases have been launched between February 1987 and February 1988.
- The Ministry revised the procedure for reimbursement of the water cess to the State Pollution Control Boards. This is now done directly instead of through the State Government in order to avoid delays.
- The Air (Prevention & Control of Pollution) Act, 1981 has been amended comprehensively. Proposals for amendment of the Water (Prevention and Control of Pollution) Act 1974 have been finalised in consultation with the States.

- A scheme of assistance to State Pollution Control Boards for strengthening their technical setups and laboratories was initiated. Sixteen State Pollution Control Boards were sanctioned an assistance of Rs. 5.55 crores out of which Rs. 2.62 crores was disbursed.

—Management of Hazardous Substances

- A centrally sponsored scheme has been initiated for extending financial support for strengthening various agencies entrusted with duties in regard to the management of hazardous chemicals.
- A list of hazardous and toxic chemicals has been prepared and circulated to experts, Central and State Government agencies etc., for comments before finalisation and notification.
- Detailed guidelines have been issued to the State Governments to prepare Crisis Management Plans to deal with accidents caused by hazardous chemicals. A Central Crisis Group has been formed. State and District Level Crisis Groups are also being formed.
- Actions taken by the State Governments on various aspects of hazardous chemicals control have been thoroughly reviewed. All States with concentrations of chemical industries have made preliminary identification of hazardous units. Preparation of on-site and off-site plans has made good progress.

1.2.4 Regeneration and Development

—Ganga Action Plan

- Two regional offices of the Ganga Project Directorate were established at Allahabad and Calcutta.
- 194 schemes were sanctioned under the Ganga Action Plan at a cost of Rs. 200.22 crores. These are under execution in the States of Uttar Pradesh, Bihar and West Bengal.
- The renovation of 3 sewage treatment plants at Hardwar-Rishikesh, Varanasi and Patna was completed.
- A scheme of low cost sanitation was taken up in collaboration with the U.P. Government.

—A Research Committee was constituted to aid and advise the Ganga Project Wing for the application of research and technology for conservation of river resources. The integrated research programme involving the universities located along the river is continuing.

—Diverse public participation programmes, especially for the students, youth and pilgrims were organised to generate public awareness and cooperation. Four Ganga Sewa Shivirs were held at Hardwar, Varanasi, Kanpur and Patna. More than 4,000 school children participated in special programmes of public awareness in Allahabad, Farrukhabad, Fatehgarh, Patna and Hardwar.

—A special Ganga Pollution Awareness Programme was launched in 75 Secondary schools of Uttar Pradesh, Bihar and West Bengal in collaboration with the Centre for Environment Education, Ahmedabad.

—Wastelands Development

—During the year, a total of 26.70 crore seedlings are expected to be raised under the decentralised nurseries programmes despite the unparalleled drought.

—Two hundred projects involving voluntary agencies in nursery raising, plantation, silvipasture development etc., were approved. Three crore seedlings are likely to be raised during the year by these voluntary organisations.

—Computer based monitoring cells were set up in 15 States to monitor and evaluate various projects in afforestation, social forestry etc.

—Identification of wastelands was taken up in 147 districts with large areas of wastelands in collaboration with the Department of Space, Survey of India and Ministry of Defence. Maps were printed for each of these districts.

—An interdisciplinary Committee of the representatives of the Land Development Banks has been constituted to make policy recommendations for promoting greater involvement by Land Development Banks in afforestation projects.

—Model bankable afforestation projects have been

prepared for 15 development blocks in 6 States (Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Tamil Nadu and Uttar Pradesh).

—Other Activities for Regeneration

—The eco-task forces of ex-servicemen continued their work of eco-regeneration in the Kiarkuli Catchment area near Mussoorie in Uttar Pradesh and on the left bank of the Indira Gandhi Canal in Rajasthan.

—A new eco-task force of ex-servicemen has been started for working in the degraded parts of the Shiwalik ranges of Jammu & Kashmir.

—Field demonstration projects undertaken in the areas of Pushkar Lake Valley (Rajasthan), Shiwalik Foothills (Punjab), Auroville (Tamil Nadu) and Cherrapunjee (Meghalaya) continued as planned. Two more projects in Alakananda catchment in Uttar Pradesh and in Tumkur in Karnataka were sanctioned.

—Thirty five proposals from various parts of the country have been sanctioned for organising 88 eco-development camps involving 5,000 participants.

1.2.5 Research

—Environmental Research Programme

—Under the Man and Biosphere Programme (MAB), 13 new schemes were sanctioned, while 5 projects sanctioned earlier were completed.

—Thirty schemes were sanctioned in the areas of air monitoring, development and technology, impact assessment, toxicology and health, water quality monitoring etc.

—Research work under the All India Coordinated Research Projects on Ethnobiology, Air Pollution and Plants, Heavy Metals, Conservation of Endangered Plants (Seed Biology and Tissue Culture) and the Beas-Sutlej Link Project continued to be supported.

—Eleven new schemes in the Himalayan region were supported financially under the Integrated Action Oriented Research, Development and Extension Projects.

—Nine new schemes were sanctioned during the year to carry out action-oriented research in the Western Ghats region.

—Nineteen schemes are in operation in the Eastern Ghats region. Three new projects were sanctioned during the year.

—Research on Biosphere Reserves

—Grants have been released to various research institutions for conducting research relating to hydrological studies, human ecology, eco-restoration and long term monitoring of biological processes in the Nilgiri Biosphere Reserve area.

—Research institutions and the priority areas for research in Nanda Devi Biosphere Reserve have been identified.

—Research on Mangroves

—Three research projects on different aspects of conservation of mangroves have been approved.

—Forestry Research

—The entire area of forestry research has been reorganised.

—Thrust areas have been identified and classified into basic research, technology and application.

—The Indian Council of Forestry Research and Education (ICFRE) has been set up to coordinate research activities

—In addition to the Forest Research Institute, Dehradun, 5 more research institutes are being set up at Bangalore, Coimbatore, Jabalpur, Jodhpur and Jorhat. Each Institute will specialise in one or more facets of forestry research and also look after regional research needs.

—Forestry research work during the year focussed on rainfall interception, nutrient cycling, rooting behaviour, biomass, growth and yield studies, anatomical studies of timber, development of kilns and seasoning schedule.

1.2.6 Education and Information

—Formal Education & Training

—The Indian Forest College has been upgraded to the status of a National Forest Academy and named after the late Smt. Indira Gandhi. It trained 154 IFS officers and 10 trainees from foreign countries. 315 IFS probationers and 15 trained 154 IFS officers and 10 trainees from training at present.

—178 officers of State Forest Services passed out of the State Forest Service colleges at Burnihat, Coimbatore and Dehradun. 244 officers are undergoing training.

—Ranger's colleges at Balaghat, Chandrapur, Coimbatore and Kurseong trained 212 Forest Rangers. 258 trainees are undergoing training. The college at Coimbatore was closed down as part of the phased programme of withdrawal of the Central Government from Rangers training.

—Forty six one week courses were arranged to train almost all 1400 IFS Officers in various topics.

—Social forestry training was given to 12 officers from States and Universities.

—Training in logging techniques and use of tools was given to 595 supervisors and 7307 workers.

—Fifty one persons were trained in application of remote sensing techniques, inventory management, electronic data processing and wood consumption and utilisation studies.

—Financial support was provided to the ICAR to continue degree courses in forestry in the Agriculture Universities.

—Non-formal Education, Information and Awareness

—The National Environment Awareness Campaign (NEAC), 1987 had as its main theme the relation between environmental degradation and the recurring droughts and floods in the country. As a part of the NEAC, a National Environment Month (NEM) was organised during November-December, 1987. 207 voluntary and other

agencies from all over the country participated in the Campaign and organised seminars, meetings, camps, rallies, padayatras, exhibitions, plantation drives, essay competitions etc. All possible media were utilised and target groups covered under the Campaign.

- Thirty five educational institutions and registered societies organised technical seminars on environmental topics of current interest with the financial assistance of the Ministry.
- The National Museum of Natural History (NMNH) offered various educational programmes for promotion of environmental awareness among the general public. A new "Activity Room" for children and a 'Conservation Gallery' were set up.
- Preparations have been completed for organising an Exhibition on Environment in Moscow during March, 1988 as part of the Festival of India in USSR.
- As a part of the interpretative programme of the Centre for Environment Education (CEE), Ahmedabad, two visitor's centres explaining importance of wildlife are being installed in the Kanha National Park.
- Teacher training material and water quality monitoring kits were developed for creating awareness and involvement among students regarding pollution of the river Ganga.
- A draft edition of 'A Concept Base for Environment Education', 'An Education Kit' and 11 posters on 'floods and droughts' were published by the CEE.
- A comprehensive review of the activities of all the ENVIS centres has been conducted for the first time. Directions and guidelines were provided to all the ENVIS centres for proper functioning and coordination with the Focal Point in the Ministry.
- Paryavaran Abstracts—the quarterly journal reporting Indian research on environment and related areas—continued to be published.
- As the National Focal Point for the International Referral System for Sources of Information on Environment (INFOTERRA) of the UNEP, the

ENVIS responded to over 300 national/international queries. The ENVIS also acted as the Regional Service Centre for the South Asia Sub-Region under the INFOTERRA Programme.

- The Ministry instituted the Indira Gandhi Paryavaran Puraskar to encourage contribution by individuals and organisations towards environmental protection. The first award for 1987 was given to the Bombay Natural History Society for their significant contribution.

1.2.7 Legislation and Organisation

- The Air (Prevention and Control of Pollution) Act, 1981 was amended to confer more powers on the implementing agencies to control pollution and to impose more stringent penalties for violation of the Acts. Similar amendments to the Water (Prevention and Control of Pollution) Act, 1974 have been finalised.
- Necessary rules were framed and notified under various sections of the Environment (Protection) Act, 1986.
- After careful screening, 50 analytical laboratories spread over the country have been recognised as 'Environmental Laboratories' and the qualified personnel working in these laboratories recognised as Government Analysts under Section 12 and 13 of the Environment (Protection) Act, 1986 respectively.
- The State Departments of Environment have been provided assistance for strengthening their technical manpower.
- On the suggestion of the Government of India, 12 States and 3 Union Territories have set up Environment Protection Councils.

1.2.8 International Cooperation

- A Memorandum of Understanding has been signed between India and Netherlands for co-operation in the field of environment through visits of scientists, exchange of information and execution of projects.
- An integrated long-term programme of co-operation in Science and Technology has been signed between India and USSR. This agreement also covers environment and ecology.

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- Social forestry projects were undertaken in 13 States with the assistance of the World bank for 8 States, Sweden for 3 States and Canada and USA each for one State.
 - The Food & Agricultural Organisation/United Nations Development Programme supported the Wildlife Institute of India, Dehradun; modern forest fire control projects, aerial seeding & training in forest inventory.
 - The Federal Republic of Germany continued to provide assistance to pollution control laboratories.
 - A series of workshops on various aspects of pollution monitoring were held by the Ganga Project Directorate in collaboration with various institutions in India during 1987-88 under Indo-US Co-operation activities.
 - A meeting of the World Commission on Environment and Development was organised in New Delhi during July, 1987. The report "Our Common Future" was presented to 12 South and South East Asian Countries and to Non-Government Organisations of the region.
 - The Prime Minister of India addressed the United Nations on the urgency for co-operative international action to check environmental degradation.
 - An expert Consultation on Forestry and Food Production/Security organised by FAO was hosted by the Ministry at Bangalore.
- ### 1.2.9 Administration & Budget
- The Department implemented a completely new personnel policy in September, 1987 for Group 'A' scientific posts. The recruitment and promotion rules for the Group 'A' Scientific Staff have been revised and notified incorporating departmental recruitment on the basis of merit as judged by group of experts, review for promotion at the end of 5 years of service in each grade and flexible complementing.
 - New purchase procedures have been introduced. A Purchase Wing has been created in the Ministry and its attached organisations.
 - A Civil Engineering Unit has been created for undertaking of civil works of the Ministry.
 - The Departmental Council and Office Council of the Joint Consultative Machinery have been set up in the Ministry in accordance with the scheme of Joint Consultative Machinery and Compulsory Arbitration for the Central Government Employees.
 - The Budget Estimate for the Ministry for the year 1987-88 is Rs. 180.40 crores.

2. SURVEY OF NATURAL RESOURCES

2.1 SURVEY OF FLORA

2.1.1 The Botanical Survey of India (BSI) was established in 1890 with the basic objective of carrying out floristic surveys. The Survey, with its headquarters at Calcutta, has 9 Circles located in different areas of the country. It has 4 specialised research units in the headquarters at Calcutta. It has so far completed survey of plant resources in about three-fifths of the country. It has published a number of floristic/vegetation accounts of different parts of the country. A total of nearly 300 new species have been added to science besides new additions to Indian Flora. During the year, the BSI discovered a new species of rice in Andaman & Nicobar Islands which is stated to grow in dry conditions.

2.1.2 During the year under report, a comprehensive and first-ever review of the activities of BSI was completed. Its objectives have been redefined and its perspectives delineated in a time frame spanning upto 2000 AD.

The objectives of BSI have been classified into primary and secondary objectives, as follows:—

Primary Objectives

- To survey the entire plant resources of the country,
- To undertake and complete the taxonomic studies of all the flora of the country,
- To list all endangered species, to undertake measures for their effective conservation and to collect and maintain germplasm and gene bank of endangered, threatened and vulnerable species,
- To bring out volumes of National Flora and State Flora of States/Union Territories,
- To identify, collect and preserve specimens of plants which are economically and otherwise beneficial to human beings, and
- To prepare national data base on herbarium collection including types, live collections, plant genetic resources, plant distribution and nomenclature.

Secondary Objectives

- To undertake studies on selected critical and fragile ecosystems,

- To undertake assessment of floras relating to environmental impact studies as may be specifically called for,

- To undertake ethnobotanical studies and evaluate plants of economic utility in areas specified by the Ministry, and

- To carry out geobotanical studies in areas specified by the Ministry.

2.1.3 To achieve these objectives, the strategies including approach, coverage, man-power deployment, etc., have been reviewed during the year and appropriate methodologies evolved. As per the targets set, the BSI will complete survey of the remaining two-fifths of the country by 1998. Certain priority areas like North-Eastern India, Andaman & Nicobar Islands, Sikkim, South Western Ghats, Cold Desert areas of Jammu & Kashmir, Himachal Pradesh, etc., have been identified where the taxonomic studies will be completed by 1994. Publication of the National Flora covering the entire country will be brought out in 25 volumes by 2000 AD. The data regarding all endangered species will be inventorised and will be published by 1992. The BSI has been completely restructured to achieve the above objectives.

2.1.4 Survey and Floristic Explorations

2.1.4.1 During the year under report, BSI continued its floristic studies. Botanical explorations were conducted in the following areas of the country to collect, identify and to document the plant resources of the country:

- Andaman & Nicobar Islands* : Exploration of Rutland Island was completed. This resulted in the discovery of a new wild species of rice named *Oryza indandamanica* which can help in evolving a variety suitable for dryland cultivation.

- Arunachal Pradesh* : Exploration of Itanagar and its surrounding areas was completed.

- Jammu & Kashmir* : First exploration tour was undertaken to North and South Lolab Valley, Baramulla, Kupwara, Doda, Kathua and Udhampur districts.

- Kerala* : Work on Kozhikode district was completed.

- Manipur & Meghalaya* : Exploration work in both the States was completed.

—*Nagaland* : Phek and Mokokchung districts were explored for the second time during different seasons.

—*Sikkim* : Second exploration trip was made to Lachen and Lachung valleys in the North district; Sakyong Valley Melli, Jorethang and Rabangla in South district, Gnathang-Phodamdhen Nathula-Jalepla, Singtham Sivoke of East district and Khechepri Lake in West district for seasonal collections.

—*Uttar Pradesh* : Exploration of Pithorgarh district was completed.

2.1.4.2 During these exploration tours, more than 10,000 plant specimens were collected, processed and preserved for further study and future reference. Apart from general collections, specific collection tours were also undertaken to different parts of the



Fig. 1 Jacaranda

country by scientists engaged in revisionary studies.

2.1.4.3 Floristic Assessment for Environmental Clearance

Floristic assessment of the following projects and developmental areas referred by Central/State Governments was completed and reports were submitted.

- Dhaleshwari Hydro-electric Project, Aizwal, Mizoram,
- Teesta Hydro-electric Project Stage-III at Chungtan, North Sikkim,
- Lower-Lagyp Hydro-electric Project near Bushuk, Sikkim,
- Sarju Canal Project—Gonda and Baraich districts, Uttar Pradesh,
- Second Nagur Hydro-electric Project, Bastar district, Madhya Pradesh,
- Bhavani-Kattalai Barrage Hydro-electric Project Stage-II in Salem and Trichy districts, Tamil Nadu,
- Manimuthar Dam Mini Hydro-electric Project, Tirunelveli district, Tamil Nadu,
- Upper Thambaraparani Hydro-electric Project, Tirunelveli, Tamil Nadu,
- Thaliyar Mini Hydro-electric Project, Tamil Nadu,
- Lower Kothagudiyar Mini Hydro-electric Project, Tamil Nadu,
- Perunchani Dam Mini Hydro-electric Project, Tamil Nadu,
- Pechipparai Dam Mini Hydro-electric Project, Tamil Nadu,
- Kallarpallam Mini Hydro-electric Project, Tamil Nadu,
- Yerakadahalla Mini Hydro-electric Project, Tamil Nadu, and
- Gudakkalhalla Mini Hydro-electric Project, Nilgiri district, Tamil Nadu.

2.1.5 Stage of Publications on Flora

The first volume of the 'Flora of India' is in the final stages of publication. The first volume of the 'Enumeration of flowering plants of India' encompassing monocotyledons is in the press. Work on 6 families of plants has been completed during the year.

The checklist of Asteraceae of India has been completed and sent for publication. Preparation of checklist of Indian Ericaceae which includes horticulturally important species of the genus *Rhododendron* is in progress.

—State Flora

State Flora of Tamil Nadu, Vol. 2 was published. Manuscript for Vol. 3 is under preparation. State Flora of Rajasthan, Vol. 1 was published. The manuscript for Vol. 2 of Rajasthan is in progress.

—District Flora

The Flora of Nallamalais (Andhra Pradesh) Vol. 1 and Flora Courtallam (Tamil Nadu) Vol. 1 were published and released under the District Flora Programme. Flora of Akola district (Maharashtra) is in the press. The flora of Sindhudurg (Maharashtra) is in compilation stage.

2.1.6 Manuscripts on the floristic assessment of the following National Parks are being finalised:

- Melghat Tiger Project, Amaravati district, Maharashtra,
- Borivili National Park, Bombay, Maharashtra,
- Jaldapara Rhino Sanctuary, West Bengal,
- Work on Shivpuri National Park and Indravati Tiger Reserve, Madhya Pradesh and Palamau Tiger Reserve, Bihar,
- Survey of Jaldapara Tiger Sanctuary has been completed. Compilation work has been initiated,
- Survey of proposed Namdapha Biosphere Reserve and compilation work of North Andamans.

2.1.7 Conservation Programme of Rare, Endemic and Endangered Species

A Red Data Book of Indian Plants (Vol. 1) covering 235 species was published. Work on the second volume in the series is in progress. Field assessment of two plants, which are exploited for their valuable wood, was taken up in Sikkim. A few isolated habitats of these two species have been located. A rare fern was located in certain localities near Itanagar. The factors affecting the depletion of the above species and possibilities of their multiplication through introduction are being assessed. Under the conservation programme, several rare and endemic species have been introduced into experimental gardens attached to the BSI.

Under the Convention on International Trade in Endangered Species (CITES), three species—A Lady's Slipper Orchid found in Southern-Western Ghats (*Paphiopedilum druryi*), a Pitcher Plant of Khasi Hills (*Nepenthes khasiana*) and a Cycad of Tirumala Hills (*Cycas beddomei*) have been included in the *Appendix-*

1 and intimated to the Ottawa (Canada) CITES Convention held in July 1987.

2.1.8 Funded Research Projects

—All India Co-ordinated Research Projects on Ethnobiology

Ethnobotanical studies are being conducted by the Andaman & Nicobar Circle (Port Blair), Southern Circle (Coimbatore), Eastern Circle (Shillong) and the BSI Headquarters. During the year, field trips were conducted in different parts of Andaman and Nicobar Islands, Andhra Pradesh and Arunachal Pradesh to gather ethnobotanical data. Information about 20 species of potential medicinal and/or of food value were collected and sent to the Chief Co-ordinator of the project at Regional Research Laboratory, Jammu for phytochemical analysis and nutritional investigations.

—Seagrass Ecosystem of Coromandal Coast

This project has been undertaken by the Southern Circle at Coimbatore. Under this project, survey of sea-grasses was conducted in the coastal areas of Tamil Nadu and in offshore islands. 162 field species were collected and about 12 species were identified. Of the 12 species, 3 species were found to be common in specific localities. Detailed taxonomic and biomass studies are in progress.

2.1.9 Other Activities

- Identification services were rendered to various institutions, research organisations, universities, research scholars and individuals dealing with plants. More than 4,000 specimens were identified during the year.
- The Central National Herbarium (CNH), which houses herbarium specimens of plants from different parts of India and other parts of the world, enriched its collections by incorporating specimens received from different Circle Offices, exchange/gifts from other institutions and individuals. The herbarium now holds more than 1.5 million specimens. The CNH received more than 500 unmounted specimens from Australian, Asian and European herbaria in exchange for about 400 specimens sent to different herbaria of the world.
- The Economic Botany Section collected 30 ethnobotanical specimens and 233 field plants

from Malda and West Dinajpur districts of West Bengal. 150 plants having ethnobotanical importance have been identified. Data collected on ethnobotanical importance of plants from Jalpaiguri district, West Bengal were compiled. More than 900 index cards pertaining to ethnobotanical importance of Indian plants have been prepared. The Industrial Section, Indian Museum maintains galleries exhibiting plant products of industrial, medicinal and economic value. Modernisation of the unit was taken up for better display of objects. Renovation of wood gallery has been completed.

—The Indian Botanic Garden completed 200 years of its service. The experimental gardens attached to different regional circles and the National Orchidaria, have introduced, established and multiplied rare, endangered and other wild plant species of economical and horticultural value. The gardens supplied seeds and pickled plant materials to researchers in India and abroad. The gardens also exchange seeds with botanical gardens all over the world. The documentation unit attached to Indian Botanic Garden library prepared

500 literature index cards for the plant families in general and Leguminosae in particular. Xeroxed copies of protologues and other literature pertaining to taxonomy of Indian plants were also supplied by the unit to scientists in the circle offices, other research institutions and universities.

—Scientists of the BSI participated in various National and International Conferences/Symposia and presented research papers.

2.2 SURVEY OF FAUNA

2.2.1 The Zoological Survey of India (ZSI), established in 1916, has the main objective of carrying out faunistic studies. The Survey with its headquarters at Calcutta has 15 Regional/Ecological/Field Stations located in different parts of the country. It has so far surveyed only about one-third of the country. It has brought out 115 volumes of the Fauna of India. A total of nearly 10,000 new species have been discovered. The Survey's collections comprise nearly 1 million specimens.



Fig. 2 Flying Flamingoes

2.2.2 During the year under report, a complete and first-ever review of the activities of ZSI was completed. Its objectives were redefined and its perspectives delineated in a time frame spanning upto 2000 A.D.

The objectives of ZSI have been classified into primary and secondary objectives. These are:—

Primary Objectives

- Exploration and Survey of Faunal Resources,
- Taxonomic Studies,
- Status Survey of Endangered Species,
- Publication of results through Departmental Journals,
- Publication of Fauna of India,
- Maintenance and Development of National Zoological Collections, and
- Central Referral, Information, Advisory and Library Services.

Secondary Objectives

- Maintenance of Museums at headquarters and Regional Stations, and
- Environmental Impact Studies wherever specifically asked for.

2.2.3 As per the targets set, ZSI, which has so far surveyed one-third of the geographical area of the country, will complete survey of 75 per cent of the remaining areas by 2000 A.D. Some areas requiring immediate attention like faunistically rich habitats and fragile ecosystems have been identified. In these areas, faunistic studies will be completed by 1995. The status survey of endangered species will be completed and Red Data Book compiled by 1995. Sixty two volumes of Fauna of India will be brought out by 2000 AD. A detailed restructuring of ZSI has been done in order to achieve the above objectives.

2.2.4 Details of the operations of the ZSI during the year are as follows:—

—Districtwise Survey

To explore the mode of existence of various organisms under different environmental and ecological conditions, 136 faunistic surveys were conducted in Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Lakshadweep, Maharashtra, Manipur, Meghalaya, Rajasthan,

Tamil Nadu, Uttar Pradesh and West Bengal. Twenty four districts in various States have been completely surveyed.

—Survey of Conservation Areas

Surveys in Rajaji National Park, Uttar Pradesh and Buxa, West Bengal have been concluded. The manuscript is being prepared. Surveys in Kalakkad and Mudumalai Sanctuaries, Tamil Nadu are continuing. The manuscript of Sunderbans and Simlipal are ready for press. Studies on Corbett Park and Nanda Devi have been published. Writing up of report on Palamau and Manas has been taken up.

—Survey of the Ecosystems

The fourth and final expedition to Chilka Lagoon was completed. The monthly sampling of Matla estuary was continued.

2.2.5 Results of Scientific Research

2.2.5.1 Taxonomic Studies

—Studies on the Fauna of Lakshadweep Islands

Identification of 143 species of gastropod molluscs and 9 species of crustaceans was completed.

In addition, a taxonomic account, with a list of species and subspecies of butterflies and moths from the Union Territory of Lakshadweep, India was prepared. It includes a discussion on the climatology and biogeography of the area and the fauna in general. Of the 52 species of butterflies and moths, 14 species constitute new records from the archipelago, while 41 species already known from Minicoy are consolidated.

—Studies on the reptiles of Andhra Pradesh

The material collected from Prakasam, Nellore and Guntur districts comprising 116 examples of reptiles belonging to 12 species under 9 genera and 5 families was studied. The salient features and morphological characters of the above specimens were recorded.

—Handbook of Leeches and Lizards

The handbook on spiders, leeches and lizards

was completed and sent to press.

—Fish resources of the river Ganga

406 examples of fishes collected from the river Ganga in between Hardwar and Allahabad were studied. A distributional list of 120 species was tabulated. The work is being continued.

—Revision of the genus *Mus*

Revision of Indian Species of the genus *Mus* Linnaeus was completed and a paper was prepared for publication.

—Amphibia of Western Ghats

For the preparation of a descriptive inventory of Amphibia of the Western Ghats, 71 specimens belonging to 8 species under five genera collected from Kalakkad Wildlife Sanctuary (Tamil Nadu) were identified.

—Fishes of Assam

Studies on the fishes of Dhubri district (Assam) were continued and 60 examples belonging to 13 species under 13 genera were identified.

—Studies on Mollusca

Tricula monatana was rediscovered from Najnital district in Uttar Pradesh. This species was not collected after its discovery in 1843 by Benson. This genus includes the species that transmits schistosome infection in man and other mammals. Anatomical studies were made on the species collected. Phylogenetic relationships and relevance of the genus in transmission of schistosomiasis are discussed.

—Studies on the Suborder Bucephalata: Trematoda:

In connection with the Project 'Fauna of India, Trematoda—Vol. II', 50 species of fish trematodes belonging to Suborder Bucephalata were studied. This study will further help in combating the infection in fishes as well as in formulating control measures.

—Studies on insects

—Cicadellidae is one of the economically important family of jungle insects. Some of its species have vast zoogeographic distribution in South-east

Asia, and is important for the study of the spread of viral diseases to crops. A total of 177 species of this family were recognised. The detailed features of genital armature for each species were studied so that each species can easily be identified.

—Aphids are one of the most economically important groups of insects which act as vector of plant viral diseases. A consolidated account of Aphid fauna of Himachal Pradesh was prepared. It deals with 186 species in 88 genera under 7 subfamilies, of which 12 species and one genus are new to science and 3 species are reported for the first time from India.

—For studies on the scale insects and mealy bugs, 68 lots from Orissa were examined and as a result, 70 species belonging to 10 families were recognised. These insects are pests of fruit plants, while one of them, the lac insect, is beneficial for the production of lac.

—Chemo-taxonomy of some rodents and shrews from Bombay-Pune region

About 200 examples belonging to 13 species of rodents were selected for study from the area.

For certain species the biochemical studies relating to specific proteins such as haemoglobin, eye lens proteins, enzymes, etc., were conducted. These data were used to compile species/genus specific profiles of proteins. Such profiles were then used to establish taxonomic relations based on genetic identities or differences amongst the taxa studied.

2.2.5.2 Ecology

—Biology and ecology of wood boring insects of Andaman and Nicobar Islands

Forty species of the cerambycid beetles of Andamans were studied in detail and a key for their identification was prepared. Surveys were undertaken in islands of Ritchie's Archipelago for the collection of the insect material. Some species were reared in the laboratory.

—Bio-ecological studies of horse-shoe crabs in Indian coastal region

Extensive field studies were conducted



Fig. 3 *Heliaetus leucogaster*—White bellied Sea Eagle

throughout the year along the coastal belt areas of Andhra Pradesh, Orissa and West Bengal, an area to which these animals are restricted in our country. The most exciting discovery was the location of the nesting ground of *Tachypleus gigas* along the Orissa coast and of the round-tailed species, *Carcinoscorpius rotundicauda*, in the Sunderbans. The breeding behaviour of both these species was studied.

The breeding biology of *Tachypleus gigas* is worked out in detail whereas data on other species is being finalised.

2.2.6 Status Survey of Endangered Species

Status survey of Hoolock Gibbons in Garo Hills, Meghalaya and Hispid Hare in U.P. Terai and Assam have been completed.

2.2.7 Impact Assessment of Development Projects

The following projects referred to the Survey for impact assessment on faunal components of the area were completed:

- Kundah Additional Divisions Hydro-electric Project Part. IV, Anna Salai, Madras,
- Thaliyer Hydro-electric Project, Tamil Nadu,
- Gopad Mayor Project, Sidhi district, M.P.
- Kamlang Watershed Management Project, Wakroo, Lohit district, Arunachal Pradesh,
- Sarayu Nahar Pariyojana, U.P.,
- Hydro-electric Project on Indravati river in Bastar district, M.P.,
- Gudakkalhalla Mini Hydro-electric Project,
- Waterfalls Small Hydro-electric Project
- Mayor Valley Hydro-electric Schemes,
- Yarkadahalla Mini Hydro-electric Projects,
- Nellithoral Lower Bhawani Hydro-electric Projects,
- Chinnar Chittar Diversion Hydro-electric Projects,



Fig. 4 White breasted King Fisher

- Polymerisation Initiators, Madras, and
- Power Projects of TIDCO in Madras.

2.2.8 Development of National Zoological Collections

The National Zoological Collections were further enriched by the addition of 26,529 identified specimens pertaining to 3,547 species. These include one species (one specimen) new to the National Zoological Collections and 15 species (49 specimens) new to science.

2.2.9 Identification and Advisory Services

The Zoological Survey of India continued to render identification and advisory services to various research and teaching institutions in the country and abroad, different Central and State Government Departments and individuals. During the year, 1,635 zoological specimens pertaining to 261 species were identified. In addition, 75 other enquiries of scientific and technical nature requiring information and advice on various zoological and allied problems were also responded to.

2.2.10 Publications

- Fauna of India : Volumes on Eimeridae, Dermaptera and Aphidoidea (Part IV) were published. Oligochaeta, Schizothoracinae, Sciamdai and Coleoptera Sylvanidae are in the press.

—Other Publications include:

- Tech. Mono. Zool. Surv. India—No. 16.

- Rec. Zool. Surv. India, Occ. Paper. Nos. 92, 94, 96.
- Rec. Zool. Surv. India, Vols. 83 (3&4) and 84 (1-4).
- Z.S.I. News—1 No.

2.3 SURVEY OF FORESTS

2.3.1 The Forest Survey of India (FSI) is engaged in preparation of State of the Forest Report, including a National Vegetation Map on a two-year cycle; thematic maps on a ten-year cycle; collection, storage and retrieval of forest inventory data; designing of methodology related to forest surveys; forest inventory work in the north-eastern States and training in modern forest survey techniques. The details are given below.

2.3.1.1 Vegetation Mapping

The FSI uses satellite imagery for vegetation mapping. On a biennial cycle, the total number of sheets to be covered is 363 on 1:250,000 scale. The target for 1987-88 is preparation of 182 sheets. The sheets cover the States of J&K, Himachal Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh, Goa, Pondicherry, Lakshadweep, Gujarat, Bihar, U.P., Andaman & Nicobar, Dadra & Nagar Haveli and Daman & Diu. 149 map sheets were prepared upto January 1988.

2.3.1.2 Thematic Mapping

Thematic maps are being prepared using aerial photographs on a 1:50,000 scale. On a ten-year cycle, 2,600 sheets are to be covered. The target for 1987-88 is 260 sheets. The States being covered are Tamil Nadu, West Bengal, Kerala, U.P., Bihar, Andhra Pradesh and Rajasthan. 175 sheets were completed upto January 1988.

2.3.1.3 Digital Cartography

The recommendations of a technical group, constituted to lay down technical specifications for a digital cartography system suitable for the National Forest Data Management, being set up under the Forest Survey of India, for forest mapping using remotely sensed data and for forest data base management were accepted by the Government and are being implemented. Action is being taken on the recommendations of another group constituted to determine the requirement of computer compatible tapes



Fig. 5 Tropical forests in Andamans

2.3.1.4 Forest Inventory in North-Eastern Region

The FSI is making detailed forest inventory in the north-eastern region. Wood consumption and utilisation studies are also being conducted. On the request of the North-Eastern Council, it is targetted to complete the inventory in a period of 7 years. The inventory, which began in 1986-87, has to cover a forest area of 160,000 km². During 1987-88, the inventory is to cover a forest area of 21,000 km², (7,000 km² in Meghalaya and 14,000 km² in Manipur). By January 1988, an area of 16,452 km² has been covered. The target is expected to be achieved.

2.3.1.5 Inventory Data Processing

The target for data processing for 1987-88 is for 36,000 km² of area inventorised. By January 1988,

data processing relating to 33,000 km² of area was completed.

2.3.2 Reconciliation of Data on Forest Cover

The National Remote Sensing Agency (NRSA) did mapping of forest cover of India through visual interpretation of satellite imagery (Landsat MSS) for the period 1972-75 and 1980-82 on 1:1 million scale. The study led to a conclusion that the forest cover in the country had gone down from 16.89% (of the total geographical area) during 1972-75 to 14.10% during 1980-82. The Forest Survey of India (FSI) also carried out a similar study for the period 1982-83 and concluded that the extent of forest cover was 19.7% as against 14.10% worked out by the NRSA. Due to wide discrepancy in the two figures, a joint

reconciliation exercise was undertaken by the two organisations. The results are shown in Table 1.

It will be noticed that the area under closed forest as per the different estimates is almost exactly the same. The reasons for the discrepancy in open forests have been identified.

2.4 NATIONAL NATURAL RESOURCES MANAGEMENT SYSTEM

In order to have an accurate and updated inventory of resources such as land, water, forests, mineral resources, ocean etc., a National Natural Resources Management System (NNRMS) has been established. The Standing Committee on Bio-resources and the Environment, one of the committees established under the system, has formulated a detailed document on the key issues and identified 37 projects for management of resources by integrating conventional surveys and remote sensing techniques. Of these,

seven have been sanctioned at a cost of Rs. 25 lakhs. These are:—

- Environmental impact of coal mines in Jharia-Raniganj Belt;
- Studies related to the impact of iron ore mining in Goa;
- Remote sensing studies of the environmental impact of mining bauxite and chromite mines in East Coast area;
- Impact of industrialisation of land use in Madras metropolitan area;
- Changes in land use because of urban spread and industrialisation in Ahmedabad-Vapi region;
- Coastal environment; and
- Impact of super thermal power stations and mining activities on environment.

Work on these seven projects has made good progress.

Table 1

Category 1	NRSA'S estimate (1980-82)		FSI's estimate (1981-83)		Reconciled (partly corrected upto 1984)	
	Area (Sq.km) 2	Percent@ 3	Area (Sq.km) 4	Percent@ 5	Area (Sq.km) 6	Percent@ 7
1. Closed forest	360229*	10.96	360046	10.9**	357686	10.88**
2. Open forest	100592\$	3.06	282026	8.60\$\$	276583	8.41\$\$
3. Mangrove forest	2649	0.081	4247	0.10	4046	0.12
4. Coffee Plantations	—	—	2376	0.10	3726	0.11
Total£	463470	14.10	648695	19.7	642041	19.52

@ Expressed as percent of the geographical area of the country

* Crown cover 30 percent or more

** Crown cover 40 percent or more

\$ Crown cover 10 to 30 percent

\$\$ Crown cover 10 to 40 percent

£ Scrub areas with less than 10 percent crown cover have not been included.

3. CONSERVATION OF NATURAL RESOURCES

3.1 ENVIRONMENTAL IMPACT ASSESSMENT

3.1.1 Introduction

The objective of Environmental Impact Assessment is to ensure that development is sustained with minimal environmental degradation. Prevention of adverse effects on environment is sought to be achieved by incorporating suitable preventive and control measures in the projects. To achieve this objective, all project proponents are required to incorporate environmental information at the earliest stage of the planning of the project so that the project reports for the developmental projects may include comprehensive proposals for environmental management. Quite often it has been observed that information provided is inadequate for environmental appraisal. To overcome this situation, constant interaction is maintained with the project authorities and the development ministries so that the requisite information is available and that an adequate environment management plan is drawn up and implemented from the outset.

Environmental Impact Statements (EIS) Environmental Management Plans (EMP) are required in case of developmental projects of sizeable capacity. Impact assessment reports have to cover the following aspects:

- Air and water pollution
- Soil degradation
- Noise impact
- Rehabilitation Master Plan
- Impact on flora and fauna

The Environmental Management Plan (EMP) gives the Action Plan to ensure that the environmental impact is kept to the minimum prescribed limits.

Environmental Appraisal Committees have been constituted by the Department to examine projects referred to it in the areas of mining, industries, river valley and thermal power. Wherever required, on-the-site assessment of the related environmental aspects is also made. Representatives of the project authorities, Central and State Pollution Control Boards State Departments of Environment and other concerned State authorities are also associated in the work of the Appraisal Committees. Special Committees/Expert Groups and Task Forces are also constituted for the assessment of major projects referred to the Department.

3.1.2 Impact Assessment of Development Projects

3.1.2.1 Mining Projects

Eight new mining projects were received for environmental appraisal during the current year. Besides these, requisite information in respect of 24 projects pending with the Department was also made available by the project proponents. Of the 59 projects appraised during this period, eight were cleared while additional information has been sought in respect of 21 others. Thirty two projects have been rejected as they were either environmentally incompatible or the requisite information was not available despite constant follow up. In several cases, site visits were made by teams of experts to carry out on-the-spot assessment of environmental implications of specific projects.

The work on a case study regarding environmental management in the Neyveli Lignite Mine initiated during the last year is progressing and requisite data has already been collected.

An agency has been commissioned for preparation of a model Environmental Management Plan in respect of Bailadilla Opencast mining Project.

3.1.2.2 Thermal Power Projects

Twenty-eight new thermal power projects were received for assessment during the year. In addition, the requisite information in respect of several projects received during the previous years, was also received during the current year. Out of 42 projects appraised, 13 were cleared from environmental angle. Two projects were rejected on grounds of environmental incompatibility. One project was withdrawn by the project authorities. Additional information and clarifications have been sought from the project authorities in respect of the remaining projects. While clearing the projects, necessary preventive and control measures were suggested for keeping the adverse impact on the environment to the minimum. In giving clearance, conditions of regular monitoring of efficiency of electrostatic precipitators and other pollution control equipment, stack and ambient air quality monitoring, raising of green belts around the power plants etc., have also been incorporated. In addition, project authorities were advised to place emphasis on conservation of water through recycling/reuse, energy conservation, utilisation of fly ash for constructive purposes such as in cement,

building materials, bricks, blocks etc. A document on environmental guidelines for thermal power plants has been brought out by the Department to help the project authorities to select proper site, prepare EIS and EMP and to adopt necessary preventive and pollution control measures. Environmental guidelines have been sent to the concerned departments and to the State Electricity Boards.

The project for the preparation of a "Manual for Thermal Power Plants" with special reference to impacts on ambient air quality, commissioned by the Department last year, has continued during the year and the document is likely to be ready shortly. This manual will be useful to project authorities in preparation of EIS and EMP.

3.1.2.3 Industrial Projects

Thirty-one industrial projects were referred by the concerned administrative Ministries for clearance from environmental angle during the year. Detailed information sought for 11 old projects was also received. Out of 35 projects appraised from environmental angle, 24 projects were accorded clearance and 3 were rejected. Details have been sought for other cases. While according environmental clearance to the projects, conditions for necessary environmental safeguards and preventive and control measures have been imposed.

The questionnaire for environmental appraisal of industrial projects has been revised and updated.

3.1.2.4 River Valley Projects

During the year, 87 projects were appraised from environmental angle. While 17 projects were approved from environmental angle, 70 projects were rejected, in many cases due to failure to provide requisite information despite months of waiting. Necessary mitigative and environmental safeguards for avoiding adverse effects on environment have been incorporated as conditions covering the following fields:

- Submergence of valuable agricultural and forest areas;
- Siltation of reservoirs due to the degraded catchment conditions;
- Satisfactory rehabilitation of oustees;
- Loss of flora and fauna;

- Reservoir induced seismicity; and
- Water borne diseases.

The following approach has been adopted by the Department:

- Adoption of a river basin as a whole for planning purposes; and
- Integrated development of water resources projects covering catchment area treatment, command area development and the engineering works.

This approach has also been incorporated in the National Water Policy.

3.1.3 Status of Development Projects

The status of various Development Projects referred to the Ministry for approval from environmental angle during the year is given in the Table-2

3.1.4 Major Development Projects

3.1.4.1 Sardar Sarovar and Narmada Sagar Multipurpose Projects

The Sardar Sarovar and Narmada Sagar Projects have been proposed across the river Narmada. The construction of a 137.16 m high Sardar Sarovar dam and a 91.4 m high Narmada Sagar dam would provide irrigation to an area of 22.6 lakh ha. The installed capacity for power generation is 2450 MW.

These projects were approved from the environmental angle with detailed conditions including the proviso that the Environmental Action Plans must be drafted and implemented pari-passu with the engineering works under the overall guidance of the Narmada Control Authority which has been suitably enlarged. Environment has been given the right to veto action on 'works' if such progress is not satisfactory.

3.1.4.2 Tehri Dam, U.P.

This major reservoir project is proposed to be constructed in the Himalayan region. It envisages construction of 260.5 m high dam across the river Bhagirathi downstream of Tehri Town in U.P. This project was given environmental clearance during the year. It is proposed to set up a Tehri Control Authority to prepare necessary Environmental Action Plans and oversee their implementation.

Table 2

Category of Projects	Projects pending at the beginning of the year	Projects received	Total	No. of projects earlier referred for which detailed particulars received	Projects appraised	Projects cleared	Projects rejected
River Valley & Hydel Power	68	36	104	12	87	17	70
Thermal	15	32	47	10	42	14	9
Industries	29	31	60	11	35	24	4
Mining	92	8	100	24	59	8	37
Others	5	30	35	5	32	26	3
Total	209	137	346	62	255	89	123

3.1.4.3 Talcher Super Thermal Power Project (2 × 500 MW)

The proposal is for setting up a super thermal power project at Talcher for generation of 2 × 500 MW of electricity. The project was approved on the condition that necessary preventive and control measures for mitigating environmental effects are effectively implemented.

3.1.5 Other Projects

3.1.5.1 Nhava Sheva Port

The Working Group set up by the Ministry of Environment and Forests has submitted its report. The suggestions made by the Working Group for decongestion of Island city of Bombay and release of land from Bombay port for creation of parks etc. have been taken up with the Ministry of Surface Transport for necessary action.

3.1.5.2 Bombay Port

Proposals from the Bombay Port Trust for the augmentation of container handling facilities and reclamation of timber pond have been recommended to be dropped on environmental grounds.

3.1.5.3 Bombay Trans-harbour Link

The State Government have been advised to give higher priority to East-West Rail-cum-Road links across the Thane Creek. The Trans-harbour link would be needed only at a later date. Necessary follow-up actions have also been suggested for the decongestion of Bombay.

3.1.5.4 Floor Space Index in Bombay City

The relaxation of Floor Space Index for the

reconstruction of dilapidated buildings and luxury hotels was taken up with the State Government who have reported that preparation of urban renewal plans for Bombay City is under progress and that relaxation of FSI will be in very selected cases only.

3.1.5.5 Defence Constructions in Coloba, Bombay

A Working Group set up by the Ministry of Environment and Forests is examining the proposal in consultation with the Ministry of Defence so that the environmental degradation of this area could be avoided.

3.1.5.6 Pune Cantonment Byelaws

The Ministry of Defence have been requested to restrict the permissible Floor Space Index to what has already been notified under Draft Byelaws.

3.1.5.7 Review of Policy for Industrialisation of Backward Areas

Lists of totally protected and non-polluting industry districts and industries that can be considered in such areas have been drawn up. The matter is under consideration of the Government.

3.1.6 Water and Energy Needs of Palghat Region, Kerala

A Centre-State team was constituted by the Ministry in February, 1987 to study the water and energy needs of Palghat region to ensure integrated development of the region. The Working Group has held detailed discussions with the State authorities and the report will be ready by March, 1988.

3.1.7 Integrated Development of Andaman and Nicobar and Lakshadweep Islands

The Ministry of Environment and Forests has been

assigned the task of conducting studies relating to Environmental Impact Assessment of Development Projects, conservation of biological diversity, review of the red-oil palm plantation programme, conservation of genetic resources, etc in these two island territories. These reports were completed and were presented to the Island Development Authority in its 3rd meeting in December, 1987. Long term studies would now follow.

3.1.8 Doon Valley Board

The Doon Valley Board, constituted in 1981 for ensuring integrated development of the ecologically fragile Doon Valley had made a number of far reaching recommendations in its last meeting based on which the following studies and reports have been prepared:

- A report on the shifting of lime kilns from Dehradun so as to reduce the air pollution in the urban area;
- A review of the Environmental Management Plans prepared by the 23 lessees in the Dehradun-Mussoorie area as per the directions of the Supreme Court.

The ARC Cement Plant in Dehradun which was a serious source of air pollution, has been asked not to function without installing adequate pollution control measures.

The draft Dehradun-Mussoorie Master Plan has been reviewed.

3.1.9 Human Exposure Assessment Location (HEAL)

A new programme of World Health Organisation known as 'Human Exposure Assessment Location' (HEAL) project has been initiated. The objectives of the HEAL Project are given below:

- Exposure monitoring of human beings through biological monitoring of body fluids and tissues for the selected contaminants (pesticides and heavy metals).
- Monitoring of ambient air quality and food samples for selected pollutants such as sulphur dioxide, oxides of nitrogen, particulates, lead, cadmium, DDT, BHC, etc.
- Evaluation of potential health risks or exposure related morbidity in the selected population through epidemiological surveys.
- Observation of trends in regard to human exposure to the selected pollutants.
- Evaluation of an appropriate approach for preventive and control of human exposure and health risks attributable to environmental

pollutants.

Spade work pertaining to identification of areas/locations to be monitored in Bombay, parameters to be covered, number of samples to be analysed, etc, have been made. The National Institute of Occupational Health, Ahmedabad, Bombay Municipal Corporation and the Maharashtra Pollution Control Board have been identified as participating institutions. Modalities for the HEAL Project, time schedule, distribution of work among the participating institutions, etc, have been finalised. Project proposal indicating the technical details of the programme along with the financial implications has been worked out. With a view to have scientific data, emphasis has been given to quality control programme. Standard samples have been received from Sweden through World Health Organization. These are being analysed by the participating institutions for cross checking of the results.

3.1.10 Training in Impact Assessment

3.1.10.1 A Workshop on 'Environmental Impact Assessment and Evaluation' was held in Lucknow during January, 1988 under the joint sponsorship of the Asian Development Bank, Manila, Union Ministry of Environment and Forests and the U.P. State Planning Institute, Lucknow.

The objective of the Workshop was to expose the decision makers to:

- Use of Environmental Impact Assessment concepts and techniques in decision making;
- Analysis and choice of methodologies;
- Simulation exercises; and
- Analysis of case studies in water resources development (irrigation and power projects), mining projects, thermal power projects and industrial projects.

Case studies were prepared and presented by the resource persons—national as well as international. The Workshop was attended by the upper and middle level executives from the States and the Union Territories who are involved in the planning and execution of various development projects.

3.1.10.2 A two-week training programme was organised at Central Mine Planning and Design Institute, Ranchi for personnel working in the coal mining industry on the formulation and implementation of environmental management programmes.

3.1.10.3 A training course on Environmental Impact Assessment of thermal power plants was organised in July-Aug. 1987 in collaboration with the School of Environmental Sciences, Jawaharlal Nehru University

at New Delhi. The participants were drawn from the various State Electricity Boards. The main emphasis of the course was the need for and techniques adopted in the preparation of EIS Report. The participants were also acquainted with the environmental issues related to the thermal power plants *vis-a-vis* the preventive and control measures to be adopted.

3.2 FOREST CONSERVATION

3.2.1 Implementation of Forest (Conservation) Act, 1980.

3.2.1.1 The National Forest Policy 1952 enunciated that one-third of the geographical area of the country should be under forests. However, there had been continuous deforestation in the country for various reasons. It is estimated that 4.238 million ha. of forest land was officially diverted to non-forest purposes between 1951-52 and 1979-80.

3.2.1.2 The Forest (conservation) Act 1980 has been enacted with a view to check indiscriminate de-reservation and diversion of forest land to non-forest purposes. Under this Act, prior approval of the Central Government is required before any reserved forest is declared as de-reserved or forest land is diverted to non-forest purposes. Detailed guidelines and procedures have been laid down for submission of proposals under the Act. Proposals are processed expeditiously as soon as all essential information is received. Where diversion is unavoidably permitted, compensatory afforestation is insisted upon and other suitable conditions imposed.

3.2.1.3 The present status of the 2729 proposals received under the Forest (Conservation) Act, 1980 till the end of January 1988, is given below:

--Approved	1284
--Not approved	465
--Closed	797
--Withdrawn by State Govts	86
--Pending	97
--Total	2729

Out of 97 pending cases, only one is pending over 6 months, 9 are pending between 1-2 months and 87 are pending for less than one month. The total forest area permitted for diversion during the year is 1,14,000 hectares. Closed cases are so closed because of the failure of State Governments to furnish the requisite information despite repeated requests.

They are reopened and disposed of immediately on receipt of the wanting information.

3.2.2 Regional Offices for Monitoring of Conditions and Safeguards

Five Regional Offices have been established at Bangalore, Bhopal, Bhubaneswar, Lucknow and Shillong to monitor and evaluate ongoing forestry development projects and schemes with special emphasis on conservation of forest land and to advise the State/Union Territories Governments in preparation of proposals involving diversion of forest land to non-forestry purposes under the provisions of the Forest (Conservation) Act, 1980.

These offices also undertake physical inspections of sites in cases of diversion of forest land and monitor the implementation of conditions and safeguards stipulated by the Central Government in proposals already approved under the Forest (Conservation) Act, 1980.

3.2.3 Protection of forests from Biotic Interference

One of the major causes for the decline and degradation of forests in the country is the tremendous biotic interference. The Government of India have sponsored a scheme entitled "Development of Infrastructure for Protection of Forests from Biotic Interference" with an outlay of Rs. 300 lakhs during the Seventh Five Year Plan. Under the scheme provision is made for mobility for forest protection personnel, facility of communication through wireless equipment, arming forest protection personnel to prevent illicit cutting of trees, control of grazing, fire control, raising of fodder grasses and acquisition of private forests constituting enclaves in forest areas.

A very large percentage of the over 400 million cattle population of the country constitute a major pressure on forests by free grazing. The scheme inter alia envisages that 5% of the forest area important from ecological and biotic view point will be permanently closed from grazing, an additional 5% will be put to rotational grazing and 10% of the forest area will be protected from fire. Against the plan provision of Rs. 300 lakhs, the total expenditure incurred under the scheme so far is Rs. 126 lakhs.

3.2.4 Regional Advisory Groups

The Government of India constituted 6 Regional

Advisory Groups consisting of Members of Parliament, eminent public men and experts to advise the Government on the status and conservation of the forests in the region. Their recommendations have been received and are under detailed study for action.

3.2.5 Other Forest Conservation Measures

3.2.5.1 As part of the overall conservation strategy, efforts are being made to reduce the demand on conventional species like teak and deodar and to encourage the use of so called secondary species which did not find favour primarily due to their short life. Increased use of timber preservatives is therefore emphasised. The State Governments have been requested to ensure that thatching material with bamboos and timber from non-durable species may be treated with preservatives while these are sold/purchased by the Government Departments and public sector undertakings. The Central Ministries who deal with timber in bulk have also been requested to apply preservative treatment to timber.

3.2.5.2 Wood Substitution

An action plan for promoting substitution of wood by alternatives, wherever possible, has been formulated. To reduce the quantity of 5.75 lakh cubic metres of wood per annum used for packing cases for apples, cartons made of corrugated fibre board (CFB) are being promoted as an alternative to wooden boxes and the State of Himachal Pradesh is being supported in subsidising the use of CFB cartons. Kraft paper intended for use in manufacture of packing cartons has been exempted from excise duty by the Central Government as an incentive.

3.2.5.3 The Railway Board, has undertaken to substitute wooden track sleepers with RCC sleepers to the maximum extent possible to conserve wood. 19 lakh RCC sleepers were produced during 1986-87 as against 14.52 lakhs during 1985-86. The production is expected to go upto 21 lakhs during 1987-88 and the demand for wooden sleepers is expected to be reduced considerably by the end of Seventh Five Year Plan.

3.2.5.4 Use of Alternative Source of Fuel

In order to reduce the pressure on the forests for fuelwood, townships of more than 5000 population which are in the vicinity of forest have been identified with a view to supply them LPG. The list of such townships from the States of Bihar, Maharashtra,

Rajasthan, Arunachal Pradesh, Haryana, Tamil Nadu, Sikkim, Dadra & Nagar Haveli, Goa, Daman & Diu, Tripura, Gujarat, Kerala, Nagaland and Himachal Pradesh have been forwarded to the Ministry of Petroleum and Natural Gas for taking further necessary action. The State Governments have been advised to ensure adequate supply of kerosene oil in these towns and to take preventive action to check unauthorised felling of trees and smuggling of timber from the forest area.

3.2.6 Modern Forest Fire Control Project

A Central sector project 'Modern Forest Fire Control' has the objective of promoting prevention, detection and suppression of forest fires. The project covers forest areas of Uttar Pradesh and Maharashtra. Use of ground fire suppression system including the handtools, mechanised equipment and water handling equipment has been demonstrated in the project area of both the States. Initially, handtools were received from abroad under UNDP assistance. During the year 1987-88, these handtools were manufactured within the country. Use of helicopter in fire suppression has been demonstrated in the project area of Uttar Pradesh. A 'Fire Danger Rating System' to forecast the ignition index and spread index of fire has been implemented. A scientifically designed 'Fire Statistical Reporting System' has also been introduced in the project area of both the States to assess the fire damage.

3.2.7 Amendment of the Forest (Conservation) Act, 1980

To check the violation of the provisions of the Forest (Conservation) Act, 1980, a bill has been introduced in the Rajya Sabha to amend the Act by incorporating penal provisions against violators.

3.3 WILDLIFE PROTECTION

3.3.1 One of the most effective way of conserving forests and natural habitats is to establish national parks and sanctuaries. Enhanced support to these protected areas, which increased very significantly in extent and number during the year, action to reduce diverse impacts upon them, counteracting poaching of wild animals, especially of elephants and rhinos, major strides in the establishment of a premier national institute for professional training and research in wildlife, enhancement of support to nature interpretation and education and programmes for rehabilitation of a number of endangered species were



Fig. 6 Indian Lion

the main thrusts of the current year's activities of the Wildlife Directorate of the Ministry.

3.3.2 The States and Union Territories are responsible for protection of wildlife and enforcement of the Wildlife (Protection) Act, 1972. To assist the Director, Wildlife Preservation, Government of India, in implementing the Act there are four Regional Deputy Directors, one each at New Delhi, Bombay, Calcutta and Madras. They are responsible for implementation of the Convention on International Trade in Endangered Species (CITES) and also actively assist the local officers in wildlife protection and enforcement of regulations in trade and commerce in wildlife, including their import and export. Besides inspecting about 6000 wildlife related consignments for import and export, they have been instrumental in detecting some major cases of illegal trade in wildlife products.

3.3.3 Indian Board for Wildlife

The Indian Board for Wildlife, the apex statutory

advisory body for formulating policy on wildlife has the Prime Minister as its Chairman. A Standing Committee of the Board met in 1987 to consider various proposals for amending the Wildlife (Protection) Act, 1972. Major policy papers have been finalised on various issues including wildlife tourism and zoo management.

3.3.4 National Wildlife Action Plan

3.3.4.1 The National Wildlife Action Plan, which was formulated in 1982 under the aegis of the Indian Board for Wildlife, continues to provide the blueprint of wildlife management in the country. The allocation of Central funding and designing of schemes to assist the States and Union Territories in the protection and management of wildlife in their custody are guided by the priorities enunciated in the Action Plan.

3.3.4.2 Implementation of Action Plan

The following activities for the current year have been performed as per the priorities enunciated in the

Action Plan:

- Prohibition of trade in endangered species of wildlife and their products introduced late last year consequent to the amendment of the Wildlife (Protection) Act, 1972 has been enforced and systematised.
- Central assistance was made available to 8 states under the Central Scheme—Control of poaching and illegal trade in wildlife—to assist them in tackling the problem of illegal killing and trade in wildlife, particularly for curbing elephant poaching in the southern States.
- Encouraged by the success of the last year's rhino introduction programme and the white winged wood duck breeding scheme, the Captive Breeding and Rehabilitation Programme was continued to cover 9 species, including such highly endangered ones like the Manipur Brow Antlered Deer, Musk Deer and Blyth's Tragopan. Under this scheme which involves sharing of expenditure with the States and Union Territories on 50 percent basis, the Central Government released Rs. 8 lakhs during the current year to 7 States.
- A scheme, introduced last year, to familiarise the growing number of visitors to wildlife reserves with the educational aspects of nature and eco-conservation, has been continued this year with number of beneficiary States having increased from 11 to 13. Under this Scheme, the Centre has provided 50 percent funding for activities like setting up of nature interpretation centres.
- A preliminary survey of the highly endangered Western Tragopan was conducted in the Chamba district, Himachal Pradesh, jointly by the State Forest Department and the Zoological Survey of India. The bird was observed in a wilderness area which has been recommended to the Himachal Pradesh Government for the establishment of a sanctuary.

3.3.5 Project Tiger

3.3.5.1 The Centrally Sponsored Plan Scheme 'Project Tiger' was initiated on 1 April 1973 and is continuing in the Seventh Five-Year Plan. Its objectives are:

- to ensure the maintenance of a viable population of the tigers in India for scientific, economic, aesthetic,

cultural and ecological values; and

- to preserve for all times, areas of such biological importance as a national heritage for the benefit, education and enjoyment of the people.

3.3.5.2 To achieve these objectives, 16 Tiger Reserves have so far been established in 12 States covering over 26,000 sq.km of forest area. The latest addition is the Dudhwa Tiger Reserve in U.P. which has been brought under 'Project Tiger' in 1987-88 with Dudhwa National Park and Kishanpur Wildlife Sanctuary as its core areas. The total area of this Tiger Reserve is 811 sq.kms. (643 sq.km as core and 168 as buffer area). This Tiger Reserve will also be responsible for the future progress of the Rhino Reintroduction Programme which is being implemented there. It will also take care of the problem of man-eating tigers prevalent in that area. Plans have been finalised to set up another Tiger Reserve at Mundanthurai in Tamilnadu.

3.3.5.3 Central assistance is being provided to the State Governments at 50 percent of the recurring expenditure and 100 percent of the non-recurring expenditure on approved items of works in the Tiger Reserves.

3.3.5.4 The main works to be carried out under the scheme during the current year include construction of Field Research Laboratories, Interpretation Centres; development of service roads for effective control over poaching and accidental forest fires; improvement of wireless communication, purchase of scientific equipment including arms and ammunition, development of water facilities, translocation of villages and cattle camps from the core area to buffer area, eradication of weeds like lantana and eupatorium, improvement of pasture land, fire protection, compensation to the owners of cattle killed by tiger/leopard; monitoring of flora and fauna and other research activities, training of staff and publicity and extension activities. Special attention is being given to the improvement of veterinary services in and around the Tiger Reserves.

3.3.5.5 Tourism has a very intricate relationship with wildlife areas. With the ever mounting pressure of tourism in the Tiger Reserves, it has become necessary to take steps to regulate the number of visitors. Guidelines for Wildlife Tourism in Tiger Reserves have been formulated in 1987 and action is being taken to prepare Tourism Management Plans for each Tiger Reserve.



Fig. 7 A Red Panda

3.3.5.6 A three-tier review of Project Tiger was undertaken for the first time involving scientific and academic institutions, non-official members of the Steering Committee and experts of the Indian Army. Institutions like the Bombay Natural History Society, Indian Institute of Science, Bangalore, Wildlife Protection Society, Dehra Dun and the Indian Society for Wildlife Research, Calcutta, undertook the review of the management of the Tiger Reserves. The National Institute of Rural Development, Hyderabad was requested to assess the awareness and acceptability of the general public of the Nagarjunsagar, Manas, and Ranthambore Tiger Reserves. The review of organisational and operational aspects as well as the pattern of financial support of various Tiger Reserves was entrusted to the non-official members of the Steering Committee, while Army Experts reviewed protection and communication in the Tiger Reserves. The reports received from the various reviewing agencies were discussed in the 28th meeting of the Steering Committee held in New Delhi in June 1987 and a final Review Report has been prepared. The recommendations are now being implemented.

3.3.5.7 Other important activities during the year

are as under.

- The Management Plans of Periyar, Simlipal, Sunderbans and Corbett Tiger Reserves have been revised.
- A field research centre has been established in the Simlipal Tiger Reserve. Three villages have been translocated from the core area of the Kanha Tiger Reserve to the adjoining forest areas with 100 percent central assistance.
- The legal status of the core area of the Manas Tiger Reserve has been upgraded from a Sanctuary to a National Park this year.
- A Nature Interpretation Centre has been established in the Nagarjunsagar Tiger Reserve with 100 percent Central assistance.
- A three-day workshop on Animal Census Techniques was organized in November 1987 at the Sariska Tiger Reserve for the training of the Field Directors of all the Tiger Reserves. The Tiger population in the 15 on-going Reserves showed an increase from 1121 in 1984 to 1141 in 1987. Similarly, the number of animals of the endangered species such as the wild buffalo, swamp deer and the elephant have also shown an increase.

3.3.6. Conservation Programmes

3.3.6.1 National Parks and Sanctuaries

- The network of national parks and sanctuaries represents a very major element of the nation's conservation movement. At present there are 63 national parks and 358 sanctuaries with a total area of about 1,33,300 sq.km representing roughly 4 percent of the nation's geographic area. The area of one national park—the high altitude Hemis National Park—has been increased from 600 sq.km to 3350 sq.km. There has been an increase of 4 national parks and 104 sanctuaries during the year.
- Under the Centrally Sponsored Scheme of assistance to national parks and sanctuaries Rs. 270 lakhs have been allotted this year to different States and UTs for the development of 25 national parks and 67 sanctuaries. The grants are being utilized for a wide range of developmental activities like fire protection, water resource improvement, habitat conservation, establishment of wireless

system, provision of vehicles and staff accommodation.

3.3.6.2 Zoological Parks

—National Zoological Park

The National Zoological Park, New Delhi, at present houses 1647 birds and animals belonging to 170 species from all over the world, although mostly of Indian origin. Some of the notable development activities during the year have been the completion of the Nocturnal Animal House and the redesigning of some enclosures and cases. An Information Centre as well as an Education Wing has been started. New signages highlighting important features of plants and animals have been erected. The long standing problem of removing the unauthorised settlements or jhuggies from within the zoo premises has been amicably solved. A draft master plan for the zoo including projections for future management has been prepared. Training courses for zoo-keepers have been started.

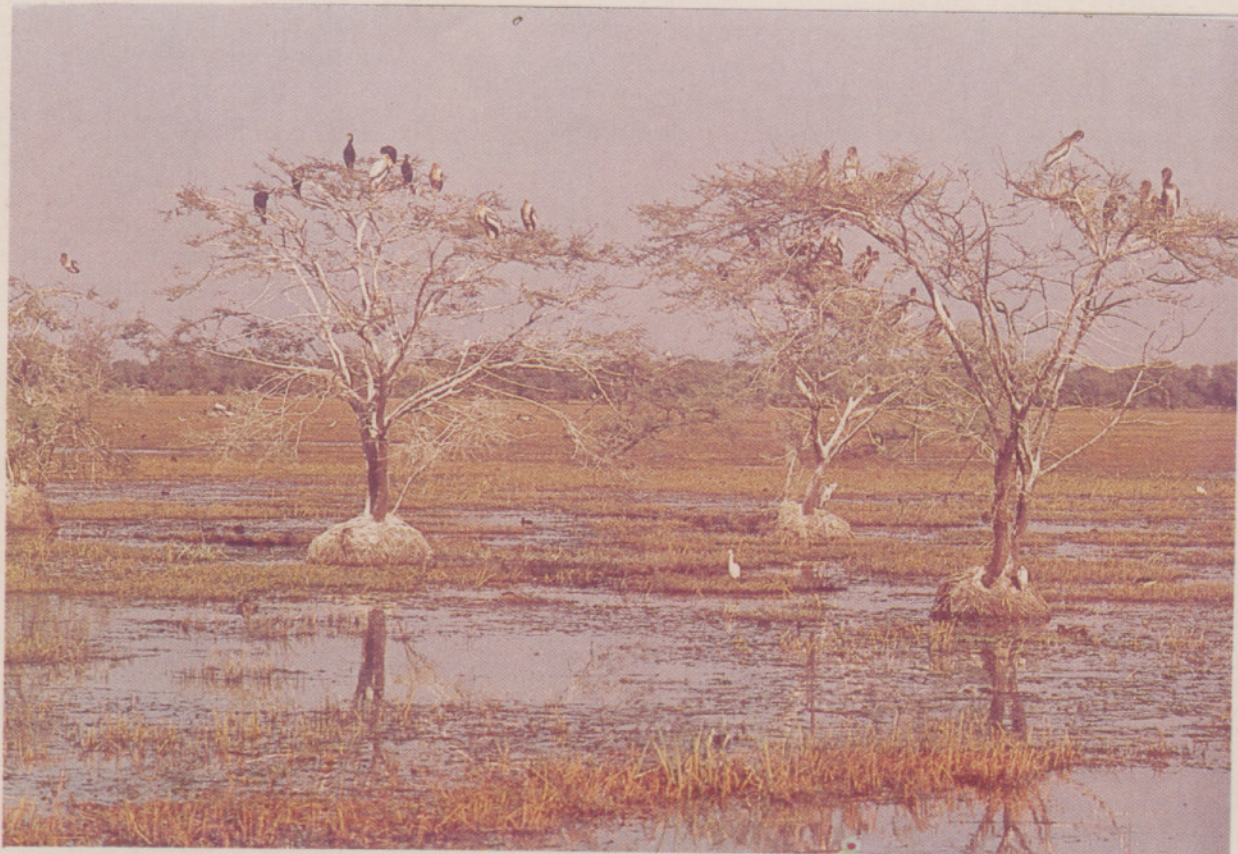


Fig. 8 Bharatpur Bird Sanctuary

—Padmaja Naidu Himalayan Zoological Park

This Zoological Park at Darjeeling, West, Bengal, administered by the State Government, houses and breeds a number of endangered and rare species of wildlife.

3.3.6.3 Conservation of Rhinos

The Centrally Sponsored Scheme 'Conservation of Rhinos in Assam' which was introduced last year with an outlay of Rs. 40 lakhs, was continued this year with the outlay enhanced to Rs. 66 lakhs. Under this Scheme, Government of India provided funds for staff, buildings, communication equipment and vehicles for more effective and intensive management of rhino habitats in Assam.

3.3.6.4 The Snow-Leopard Conservation Project

The snow leopard in India confined to the Himalayas, from Kashmir to its Eastern Ranges is found to be an endangered species. It is proposed to create a network

of 12 Snow Leopard Reserves throughout the Himalayas.

3.4 BIOSPHERE RESERVES

3.4.1 The biosphere reserves are intended to preserve genetic diversity in representative ecosystems and to carry out in-situ conservation of plants, animals and micro-organisms.

3.4.2 The Nanda Devi Biosphere Reserve has been formally designated with effect from 18 January 1988. With this, there are now two biosphere reserves in the country. The first, viz. Nilgiri Biosphere Reserve came into being in 1986.

3.4.3 Action and management plan for 1987-88 in respect of Nanda Devi Biosphere Reserve has been finalised with the State Government and grants were released for taking up works under the following heads:

—Survey and demarcation;



Fig. 9 Nilgiri biosphere Reserve

- Eco-restoration;
- Protection; and
- Environmental education.

3.4.4 Grants totalling to Rs. 46.60 lakhs were released to the State Governments of Karnataka, Kerala and Tamil Nadu for taking up schemes for protection, conservation, eco-restoration and educational activities in Nilgiri Biosphere Reserve in accordance with long term action and management plan. In addition, an amount of Rs. 3.42 lakhs was released to research institutions for carrying out research work directly related to the objectives of the Nilgiri Biosphere Reserve.

3.4.5 The project documents on setting up of Biosphere Reserves at Thar Desert, Manas and Sunderbans were finalised during the year.

3.4.6 The State Governments of Arunachal Pradesh, Assam, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal have been requested to convey their concurrence to the setting up of biosphere reserves at Namdapha, Manas, Thar Desert, Gulf of Mannar, Uttarkhand and Sunderbans respectively.

3.4.7 The State Government of Meghalaya have agreed to the setting up of the Biosphere Reserve at Nokrek as soon as the area is notified by the State Government under the Wildlife (Protection) Act, 1972.

3.4.8 Project documents on North Andamans and Little Rann of Kutch are being finalised. Preparation of project documents on Kanha and Kaziranga has made considerable progress.

3.5 WETLANDS AND MANGROVES

3.5.1 Wetlands

3.5.1.1 Wetlands may be defined as submerged or water saturated lands, both natural and artificial, permanent or temporary, with water, i.e., static or flowing, fresh, brackish or saltish, including areas of marine water, the depth of which at low tide does not exceed six metres, for the major portion of the year. Such areas include swamps, marshes, fens, peatlands, lagoons, lakes, etc. Wetlands serve as suitable niche for fish and other aquatic animals as breeding and nursery ground for waterfowls and as filters for sediments and pollutants. The country is losing its wetlands rapidly due to biotic interference and anthropogenic pressure.

3.5.1.2 Considering the importance of wetlands, measures have been initiated for their conservation and management to educate the public on the need for their conservation as well as their economic utility and to commence scientific and application-oriented research studies on their productivity. A National Wetland Committee has been constituted comprising of experts in various wetland disciplines. The terms of reference of the Committee include:

- Laying down broad policy guidelines for implementing programmes of conservation, management and research of wetlands;
- Deciding priority of wetlands to be taken up for intensive conservation measures;
- Monitoring the implementation of the programme of conservation, management and research in wetlands; and
- Advising on the preparation of an inventory on Indian Wetlands.

3.5.1.3 The Committee has identified the first ten wetlands for preparation of Management Action Plan. The nodal academic/research institutions for each of the area have also been identified as under:

Table 3

Wetland	State	Nodal Academic Institution
Kolleru	Andhra Pradesh	Osmania University & Nagarjuna University
Wullar	Jammu and Kashmir	Jammu and Kashmir University
Chilka	Orissa	Utkal University
Loktak	Manipur	Manipur University
Bhoj	Madhya Pradesh	Bhopal University
(Lower and upper lakes)		
Sambhar	Rajasthan	Jodhpur University and Central Arid Zone Research Institute
Pichola	Rajasthan	Udaipur University
Ashtamudi	Kerala	Kerala University
Harike	Punjab	Punjab Agricultural University, Ludhiana
Ujani	Maharashtra	Pune University.

3.5.1.4 The Action Plan will be formulated by the Steering Committees set up in the States concerned.

3.5.1.5 Eight out of nine concerned State Government viz. Andhra Pradesh, Jammu & Kashmir, Manipur, Madhya Pradesh, Rajasthan, Orissa, Punjab and Kerala have already set up the Steering Committees. The Governments of Andhra Pradesh, Jammu & Kashmir, Manipur, Rajasthan, Orissa and

Punjab have also held the first meeting of the Steering Committee.

3.5.1.6 Indicative action plans were prepared by the Department in selected cases viz. Kolleru, Chilka and Loktak and circulated to the State Governments concerned. This was followed up by discussion with individual states. Management action plans have been received in respect of Pichola, Sambhar, and Harike. Broadly, the action envisaged is survey and demarcation of area; protective measures like notification of the area as a wetland ecosystem selected for conservation; restorative measures like dewatering, desilting etc; studies on various aspects like pollution, biotic status etc. to be followed by suitable remedial measures; and promotion of environmental awareness through publication of literature, films, organisation of environmental camps etc.

3.5.1.7 A complete wetland directory for the country has been compiled and is under printing.

3.5.2. Mangroves

3.5.2.1 Mangroves are the salt-tolerant forest ecosystems found mainly in tropical and sub-tropical inter-tidal regions. They consist of swamps, forest land within and its water spread areas. This ecosystem is a reservoir of a host of plant and animal species. Mangroves in India have been subjected to reckless exploitation due to biotic interference and other factors.

3.5.2.2 Considering the importance of mangroves, steps have been initiated to conserve the mangroves, to educate the public on the need for their conservation as well as their economic utility and to commence scientific and application oriented research on their productivity, flora, fauna, etc. The National Mangrove Committee was constituted to recommend policies and actions.

3.5.2.3 The Committee has identified the following first batch of 15 areas for preparation of Management



Fig. 10 Mangroves (Rhizophora)

Action Plan. The nodal academic/research institutions for each of the area have also been identified as under:

Table 4

Name of the area	State/U.T.	Nodal Academic Institution
Northern Andaman	Andaman and Nicobar	Pondicherry University BSI/ZSI and Central Agricultural Research Institute, Port Blair.
Nicobar	—do—	—do—
Sunderbans	West Bengal	Calcutta University
Bhitarkanika	Orissa	Utkal University, and Central Soil Salinity Research Institute, Port Canning.
Coringa	Andhra Pradesh	Andhra University, Waltair
Mahanadi Delta	Orissa	Utkal University and Regional Plant Resource Centre, Bhubaneswar.
Pichavaram	Tamil Nadu	Annamalai University
Goa	Goa	National Institute of Oceanography, Goa.
Godavari Delta	Andhra Pradesh	Andhra University, Waltair
Gulf of Kutch	Gujarat	Gujarat University, Ahmedabad and Saurashtra University, Rajkot
Coondapur	Karnataka	Shivaji University, Kolhapur
Achra Ratnagiri	Maharashtra	National Institute of Oceanography, Goa
Vembanad	Kerala	Kerala Agricultural University, Trivandrum
Point Calimere	Tamil Nadu	Trichy University.
Krishna Estuary	Andhra Pradesh	Andhra University, Waltair and Institute of Brackish Water and Aquaculture (ICAR) Madras.

3.5.2.4 The Action Plan will be formulated by the Steering Committees set up in the States concerned with the Chief Secretary as the Chairman and consisting of representatives from various subject matter departments, universities, non-official organizations, etc.

3.5.2.5 Four States/Union Territory of West Bengal, Orissa, Goa and Andaman and Nicobar Islands have set up the Steering Committee. Individual discussions were held with West Bengal, Orissa and Andaman and Nicobar Islands. Action plans are awaited. Broadly the contents of the action plan will be survey and demarcation of the area; protective measures like notification of the area as mangrove ecosystem selected for conservation; study of aqua-culture, pollution, biotic status, etc. to be followed by suitable remedial measures; and promotion of environmental awareness through publication of literature, films, organisation of environmental camps, etc.

3.5.2.6 A status report on mangroves has been compiled and has been printed.

4. CONTROL OF POLLUTION

4.1 CONTROL OF WATER & AIR POLLUTION

4.1.1. The main instruments for control of pollution of water and air are the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, and the Environment (Protection) Act, 1986. The Water (Prevention and Control of Pollution) Cess Act, 1977 provides for the levy of cess on water consuming industries. This cess is distributed to the States.

4.1.2. The Water and Air Acts are implemented through the Central Board for Prevention and Control of Water Pollution and the State Boards. All States, excepting the States of Manipur, Nagaland, Sikkim, Arunachal Pradesh, Goa and Mizoram, have constituted their State Boards. The Central Board look after pollution control activities in the Union Territories.

4.1.3. Consequent on the enactment of the Environment (Protection) Act, 1986 major additional responsibilities have been devolved on the Central and State Boards. The Government, during the year, conducted a comprehensive review of the organisation and programmes of the Central Board with a view to equipping it for achievement of its short term and long term goals. Specific targets regarding assessment and control of pollution have been set. The staff structure has been reorganised to subserve these objectives and new groups formed to perform the relevant tasks. Regional offices of the Central Pollution Control Board are being set up in the six regions.

4.1.4. Assessment of Water Quality

The water quality monitoring of rivers is being continued in 170 monitoring stations (which includes 11 stations on selected wells in river basins). Out of the 170 stations, 27 stations on the Ganga are being monitored under the Ganga Action Plan. Thirty new monitoring stations will be incorporated in the current year so as to expand the network to consist of 200 monitoring stations. The stations monitor the quality of water in respect of 19 parameters such as total dissolved solids, biological oxygen demand, metals and nitrates.

4.1.5. National Ambient Air Quality Monitoring Network

The National network of ambient air quality monitoring stations initiated during the year 1984, has

been progressively expanded to comprise 85 stations covering 24 cities/towns. These stations monitor the air quality with respect to suspended particulate matter, sulphur dioxide and oxides of nitrogen.

4.1.6. Assessment of Coastal Water Quality

The Central Board, in collaboration with the Department of Ocean Development has identified 173 monitoring stations all along Indian Coast for purposes of water quality measurement. Four State Pollution Control Boards have been involved in the programme. The first round of sampling was done in October 1987. The sampling will continue upto the end of the Seventh Plan period. The monitoring stations have been classified into four groups e.g. (i) Inland (estuarine), (ii) Coastal, (iii) Off-shore (5 km from coast) and (iv) High Seas (15 km from coast).

4.1.7. River Basin Studies

4.1.7.1 Water quality monitoring studies and the inventorisation studies in the Kaveri Basin covering the States of Karnataka, Kerala and Tamilnadu were taken up during the year. Similar studies on Mahi, Mahanadi and Godavari were initiated. Studies on Sabarmati and Krishna river basin were completed and final reports are under preparation.

During the year, work has been initiated on the following:

- Preparation of an inventory of industries/local bodies contributing to pollution;
- Updating of Status Report on waste water generation, treatment and disposal in Class I and Class II cities,
- Updating of the inventory prepared in 1984 on water polluting industries; and
- Preparation of an inventory of air polluting industries.

4.1.8. Preparation of Standards

4.1.8.1 Based on the standards prepared by the Central Board and the Bureau of Indian Standards, environmental standards for 24 industries have been notified under the Environment (Protection) Act, 1986. The details are given in the Table 5. Experts have been appointed for preparation of standards for 6 more industries, i.e. bullion refining, foundry, pesticides, drugs and pharmaceuticals, petrochemicals and plastics and stone crushers.

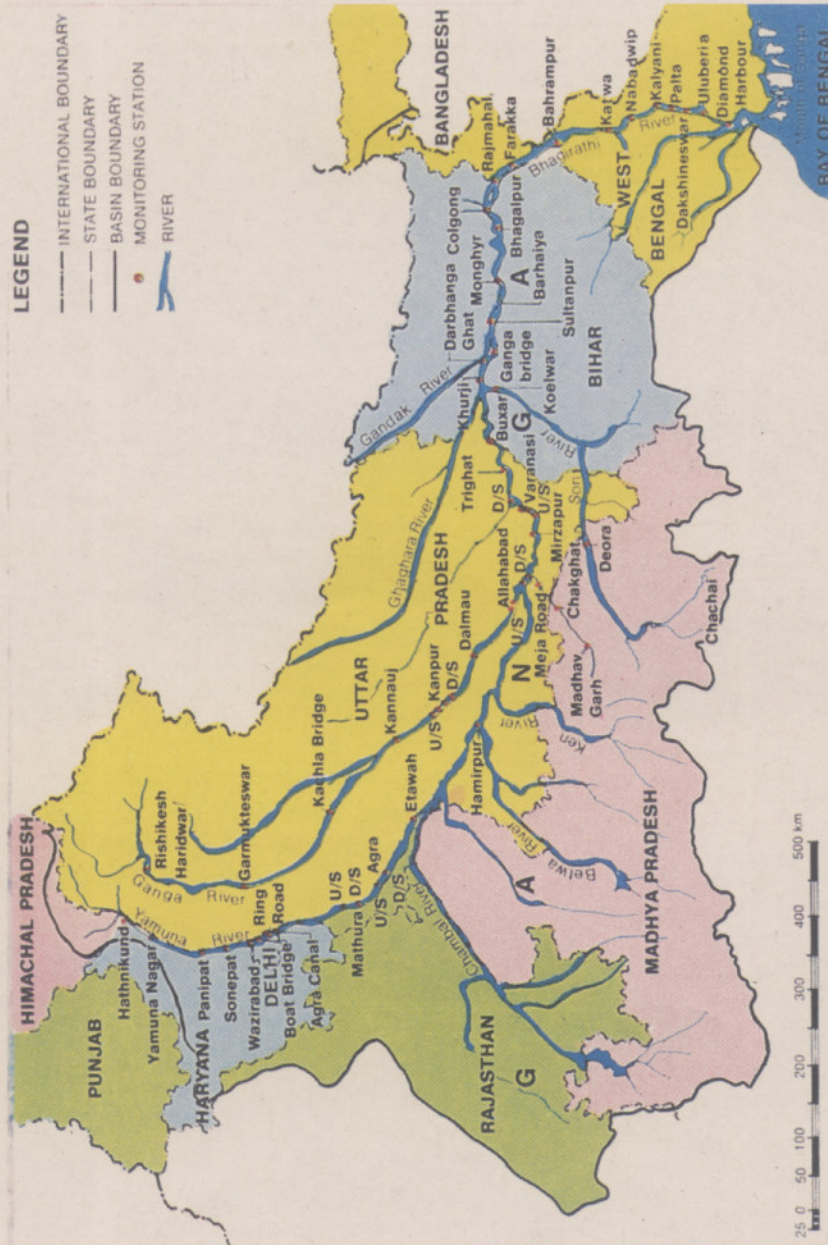


Fig. 11 Water Quality Monitoring Stations on Ganga and its Tributaries

Table 5
Industries for which Standards are Notified

—Cooustic Soda	—Synthetic rubber
—Manmade fibres	—Small pulp and paper
—Oil refinery	—Fermentation
—Sugar	—Leather tanneries
—Thermal Power Plants	—Fertilizers
—Cotton textiles	—Aluminium
—Composite woollen mills	—Copper, lead and smelting
—Dye and Dye intermediates	—Calcium carbide
—Electroplating	—Carbon black
—Cement Plants	—Nitric acid
—Stone crushing	—Sulphuric acid
—Coke ovens	—Iron and Steel

4.1.8.2 Comprehensive industry documents have been prepared for aluminium, cement and inorganic chemicals and are under review before final publication. Such documents are being prepared in respect of 7 more industries.

4.1.8.3 The control of vehicular pollution is sought to be achieved through prescription of standards for emission from vehicles and enforcement of these standards through issue of rules under the Motor Vehicle Act issued by various states. The Ministry has taken up the issue of rules with all the states. So far 10 States and 2 Union Territories have issued the rules. During this year, four states and one union territory have made such rules.

4.1.9. Enforcement of Standards

The Central Board has set up Zonal Task Forces to pursue implementation of standards in fertilizer, iron and steel, cement, pulp and paper and thermal power plants. The results of these studies are given below:

4.1.9.1 Twenty three phosphatic, fertilizer units and 13 nitrogenous and complex fertilizer units have complied with the standards as given in Table 6.

4.1.9.2 Pulp and Paper Industry (Small)

Out of 258 small pulp and paper units, the pollution control status is as given in Table 7.

Forty six mills out of 258 were prosecuted in various states by the concerned State Pollution Control Boards for violation of the provisions of the Water (Prevention and Control of Pollution) Act, 1974.

Table 6

	Phosphatic	Nitrogenous and complex
Number of units complied with standards fully	13	07
Number of units complied with SO ₂ standards	05	03
Number of units complied with SPM emission	05	02
Number of units complied with NO _x standards	—	01
Total	23	13

Table 7

Number of units complying with standards	24
Number of units complying with Phase I of the standards, i.e. reduction of 90 percent of the initial load of BOD and suspended solids	54
Number of units complying with Phase I of the standards partially	63
Number of units executing ETP Schemes	25
Number of units with no ETPs	92
Total	258

4.1.9.3 Integrated Iron and Steel Industries

The task force for steel industries continued its efforts along with State Pollution Control Boards for effective implementation of the standards and emission standards through Steel Authority of India Ltd (SAIL).

4.1.9.4 Man-made Fibre Industries

Efforts for implementation of standards in man-made fibre units, both in synthetic and semi-synthetic categories were continued. Out of 20 synthetic and 14 semi-synthetic units, information is available for 26 industries and its pollution control status is as under:

Table 8

	Synthetic	Semi-synthetic
Number of units complying with standards	06	02
Number of units complying with standards partially	04	05
Number of units not complying with standards	06	03
Total	16	10

4.1.9.5 Cement Plants

Out of the 93 large cement plants, the pollution control status is as below:

Table 9

Number of units complying with the emission regulations	32
Number of units not complying with the emission regulations	57
Number of units not in production	04
Total	93

4.1.9.6 The enforcement of the standards on various defaulting units is sought to be done through prosecution in courts of law under the pollution control acts. So far 2072 prosecutions have been launched under these acts by the Central and State Boards. Of these, 469 cases have been decided so far and the remaining cases are pending in courts of law. This process of enforcement has been intensified considerably during the year. Of the total 2072 cases launched since the enactment of the pollution control acts in 1974 and 1981 respectively, 1174 cases were launched between February 1987 and February 1988.

4.1.10 Awareness

The theme of pollution control occurs predominantly in the various programmes launched under the National Environmental Awareness Campaign by the Ministry. In addition, the Central Board has launched such a programme in the Union Territories on its own.

4.1.11 Training

The Central Board has organised training courses on various aspects of pollution control during the year. One workshop has been held in Calcutta University on Bio-monitoring of Water and Wastewater. The Ministry has sponsored 10 candidates for training abroad under the bilateral cooperation agreements with UK, Netherlands, Norway and Federal Republic of Germany.

4.1.12 Research

The research programmes undertaken by the Board are detailed below:

—The Central Board in collaboration with IIT, Delhi has evolved an improved design of Reverberatory furnaces used in Steel Re-rolling Mills. A demonstration was held at the IIT, Delhi, to the representatives of Steel Chamber of India.

—Studies were initiated by the Central Board in collaboration with NEERI, Nagpur on colour removal from effluents of Pulp and Paper industry;

—Performance evaluation studies have been conducted on effluent treatment plants of 11 major industrial units in Union Territories;

—A project for indepth study to evaluate the performance of effluent treatment plants of 6 tanneries in Tamil Nadu has been taken up in collaboration with the Tamilnadu State Pollution Control Board;

—Studies have been completed to determine optimal conditions for finding Biochemical Oxygen Demand (BOD) of water and waste water. Keeping in view the temperatures of water obtaining in the country, BOD at 27°C, 3 days has been determined as an alternative to the presently adopted BOD at 20°C, 5 days;

4.1.13. The Air (Prevention and Control of Pollution) Act, 1981 has been amended. The important amendments are the following:

—The amendment to the definition of air pollutants includes 'noise';

—The Central Board is empowered to take over the powers and functions of State Board for a limited period when circumstances so warrant;

—It will be obligatory on the part of the persons to obtain the consent even at the time of establishing the industrial plant;

—the penalties for violation of the Act are made stiffer;

—The Schedule-I enumerating 20 industries is deleted. This will require all the industries emitting air pollutants to obtain consent from the Board.

—The Boards are empowered to give directions, including directions for closure/stoppage or regulation of electricity or supply of water and other services to the establishments in public interest; and

—All citizens are enabled to complain to courts regarding violations of the law, after a notice of 60 days to the designated authorities. This notice is intended to prevent vexatious litigation.

It is proposed to amend the Water (Prevention and Control of Pollution) Act, 1974 on similar lines.

4.1.14. Water Cess

The Water Cess under the Water (Prevention and Control of Pollution) Cess Act, 1977 is collected by the State Governments and credited to the Consolidated Fund of India. A proportionate amount is reimbursed to the State Governments for making it available to the State Pollution Control Boards. During the year, an amount of Rs. 6.58 crores was collected under this account and the due amounts have been reimbursed to the States. During the year, the Ministry has made an arrangement to directly reimburse the cess to the State Pollution Control Boards instead of routing it through the State Governments.

4.1.15 Assistance to State Pollution Control Boards

Assistance is provided to the State Pollution Control Boards for strengthening their technical set up and laboratories. 16 State Pollution Control Boards were sanctioned Rs. 156.65 lakhs for purchase of equipment and Rs. 49.48 lakhs was disbursed. 14 State Pollution Control Boards were sanctioned funds totalling Rs. 180.80 lakhs for augmenting their technical staff by 196 technical personnel and a sum of Rs. 45.20 lakhs was disbursed. Besides, a sum of Rs. 167 lakhs was disbursed to the state Pollution Control Boards under the scheme of strengthening of environmental laboratories.

4.2 MANAGEMENT OF HAZARDOUS SUBSTANCES

4.2.1. The Environment (Protection) Act, 1986 places on the Central Government the responsibility for laying down procedures and safeguards for handling of hazardous substances and for prevention of accidents. The substances which need attention in this regard are:

- Hazardous chemicals
- Radioactive substances;
- Micro-organisms.

4.2.2 The details of action taken are enumerated below:

- In order to introduce and implement a system for the regulation of all hazardous chemicals at all stages of manufacture, import, storage, transport, use and disposal, the gaps in the existing systems were identified and agencies identified to perform the following tasks:

- Notification of hazardous chemicals and issue of regulations for manufacture, import, storage, transport, use and disposal;
 - Identification of hazardous installations, hazard and risk assessment and implementation of regulations; and
 - Preparation of on-site and off-site emergency plans and implementation.
- A list of hazardous and toxic chemicals has been prepared based on surveys conducted in various States by technical experts and on similar lists prepared by other countries. The list has been circulated to experts, Central and State Government agencies and the Chemical Industry Associations for eliciting their comments. The public have also been requested, through an advertisement, to offer their comments on the list. Based on the comments received, the list will be finalised and notified.
- Based on the notified list, the various agencies of the State and Central Governments will identify the hazardous installations and operations which deal with these chemicals by way of manufacture, storage, transport, use or disposal. The Ministry will issue statutory regulations to control the installations and the identified agencies will implement the regulations and procedures and safeguards prescribed.

4.2.3 In spite of the best safety practices, accidents cannot be fully averted. Every hazardous installation must prepare a plan for meeting the consequences of accidents and also inform the local authorities in advance regarding the area likely to be affected, type of damage to environment and the remedial measures needed in case of an accident. Based on such information from all the hazardous installations in a particular area, the local authorities have to prepare off-site emergency plans to deal with the effects of an accident. Detailed guidelines have been issued to the State governments to prepare such Crisis Management Plans. A central Crisis Group has been formed and the State Governments have been requested to form similar groups at the State and district levels.

4.2.4. During the year, the actions taken by the State Governments on various aspects of hazardous chemical control have been closely reviewed. Fourteen States have formed Coordination Committees at the State level and have designated the nodal department in the state to deal with hazardous chemicals. The norms for manpower requirements for management of hazardous chemicals were discussed

and finalised with the States. All the states with concentrations of chemical industries have made preliminary identification of hazardous units and significant progress has been achieved in preparation of on-site plans in these units. The preparation of off-site plans in concerned districts has been initiated.

4.2.5 A beginning has been made to train the personnel of the existing agencies such as Factory Inspectorates and Pollution Control Boards in risk assessment of chemicals and hazardous assessment of installations. A beginning has been made in this respect and a five day workshop for 25 field level officers has been completed in collaboration with the Indian Institute of Technology, New Delhi. A comprehensive plan for training will be prepared in consultation with the States.

4.2.6 A Central grant scheme of Rs. 2.48 crores was sanctioned to assist the agencies entrusted with various responsibilities for strengthening their technical man-power and equipment. This scheme will continue to be implemented in the remaining three years of the Seventh Plan.

4.2.7 Radioactive Substances

The responsibility for prescribing procedures and safeguards for nuclear installations is discharged by the Department of Atomic Energy and monitored by the Atomic Energy Regulatory Board. The Ministry of Environment and Forests is also monitoring the action taken. The Ministry participates in the National Emergency Response Committee of the Department of Atomic Energy.

4.2.8 Micro-organisms

The Ministry is examining the regulations needed for regulating research involving the manipulation of genetic material.

4.2.9 Waste Utilisation

The Ministry has commissioned two studies on waste utilisation to form the basis for the policy initiatives needed.

5. REGENERATION AND DEVELOPMENT

5.1 GANGA ACTION PLAN

5.1.1 The Central Ganga Authority was constituted in February 1985 to guide and oversee the implementation of a programme for restoring the quality of the river Ganga. The Authority, under the Chairmanship of the Prime Minister held its third meeting in August 1987 to review the overall progress of Ganga Action Plan. The Steering Committee met several times during the year to review the progress of sanction and execution of various schemes and utilization of funds under the Ganga Action Plan.

5.1.2 During the year, the Ganga Project Directorate was strengthened with the induction of technical officers as well as the establishment of Regional Offices at Allahabad and Calcutta. The 3 State Governments of UP, Bihar and West Bengal have designated an officer in the nodal department to coordinate the Action Plan work. In addition, committees comprising implementing agencies and non-officials have been set up for each of the major towns.

5.1.3 The total estimated cost of various schemes under the Ganga Action Plan as approved by the Central Ganga Authority is about Rs. 292 crores. As many as 260 different schemes are envisaged. The position regarding number of schemes sanctioned till end of January 1988 is as follows:

Table 10

State	Schemes No.	Sanctioned Cost
Uttar Pradesh	69	86.55
Bihar	30	18.37
West Bengal	95	95.30
	194	200.22

5.1.4 Work has commenced and is in progress in 25 out of a total of 27 towns under the Ganga Action Plan.

5.1.5 Schemes sanctioned under the Ganga Action Plan can be broadly divided into 5 categories as follows:

5.1.6 At present, about 900 mld of domestic waste water is finding its way into the river through various outfall drains in different locations. Emphasis is on interception and diversion of this quantity of waste water away to the treatment plants. The plans envisaged are estimated to intercept and divert about 800 mld for waste water in different locations. In some locations, however, interception of the total quantity of waste water is not possible at present since it is carried to tributaries such as Pandu in Kanpur or Punpun in Patna which reach the river only after some distance.

5.1.7 Treatment of Waste Water

5.1.7.1 Under the Ganga Action Plan, a total of 10 sewage treatment plants are to be renovated and another 25 new plants are to be constructed in different locations. The renovation of 3 treatment plants at Hardwar-Rishikesh, Varanasi and Patna at an estimated cost of Rs. 1.52 crores have been completed. Another 5 plants in Varanasi, Titagarh and Bhatpara are expected to be completed by mid 1988. Two new plants are under execution in Varanasi and Chandan Nagar.

5.1.7.2 Resource recovery is an important component of the treatment process which are being taken up in different locations as under:

- Utilisation of treated effluent of the oxidation pond at Lakkarghat in Hardwar-Rishikesh for irrigation.
- Recovery of bio-energy and conversion of the same into electricity in major high capacity treatment plants at Hardwar-Rishikesh, Allahabad, Kanpur, Varanasi, Patna and some units in Calcutta Metropolitan District.

Table 11

(Rs. lakhs)

	UP		Bihar		West Bengal		Total	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Interception and diversion	29	1783.27	15	1209.90	26	5692.05	70	8685.22
Treatment of Waste Water	6	5455.83	4	98.60	5	1866.41	15	7420.84
Low Cost Sanitation	8	429.83	4	364.94	22	881.61	34	1676.38
River Front Development	6	438.90	1	2.50	29	722.20	36	1163.60
Other Schemes Like Crematoria, etc.	20	547.55	6	161.54	13	367.71	39	1076.80
	69	8655.38	30	1837.48	95	9530.03	194	20022.85

—Pisciculture schemes for Behrampore, Nabadwip, Panihati and Serempore in West Bengal.

5.1.7.3 Since in many towns the sewerage network is not extensive, Ganga Action Plan has provided considerable assistance for low cost sanitation. With an outlay of Rs. 16.76 crores, schemes sanctioned so far will enable construction of about 50,000 pour flush latrines and nearly 3,000 seats in about 200 public toilet complexes.

5.1.7.4 Though the bulk of the schemes under the Ganga Action Plan relate to sewerage and sanitation some additional schemes to supplement these efforts have been taken up as follows:

—Schemes for plantation in the denuded stretches of Mansa Devi hills, soil conservation and construction of check dams to reduce silt intrusion into the drains and sewers of Hardwar.

—Biological conservation of fresh water turtles in

Varanasi. These turtles are now endangered and represent a major biological fauna of the river.

—A scheme for improving safety for river-using public at Varanasi through increased patrolling to prevent dumping of solid wastes; removing of floating animal carcasses and dead bodies; and by control of mooring of vessels.

—Construction of 30 electric crematoria in 19 towns at a cost of about Rs. 9.25 crores which will reduce the demand for fire wood by about 2700 quintals per year equivalent to the produce of 900 hectares of forest.

5.1.7.5 During 1987-88, 42 schemes at a cost of Rs. 19.39 crores in 8 locations are expected to be completed. The work to be completed would include construction and commissioning of intermediate pumping stations, interception of drains, renovation of sewage farms, low cost sanitation facilities, etc. The expenditure during 1987-88 is estimated to be about

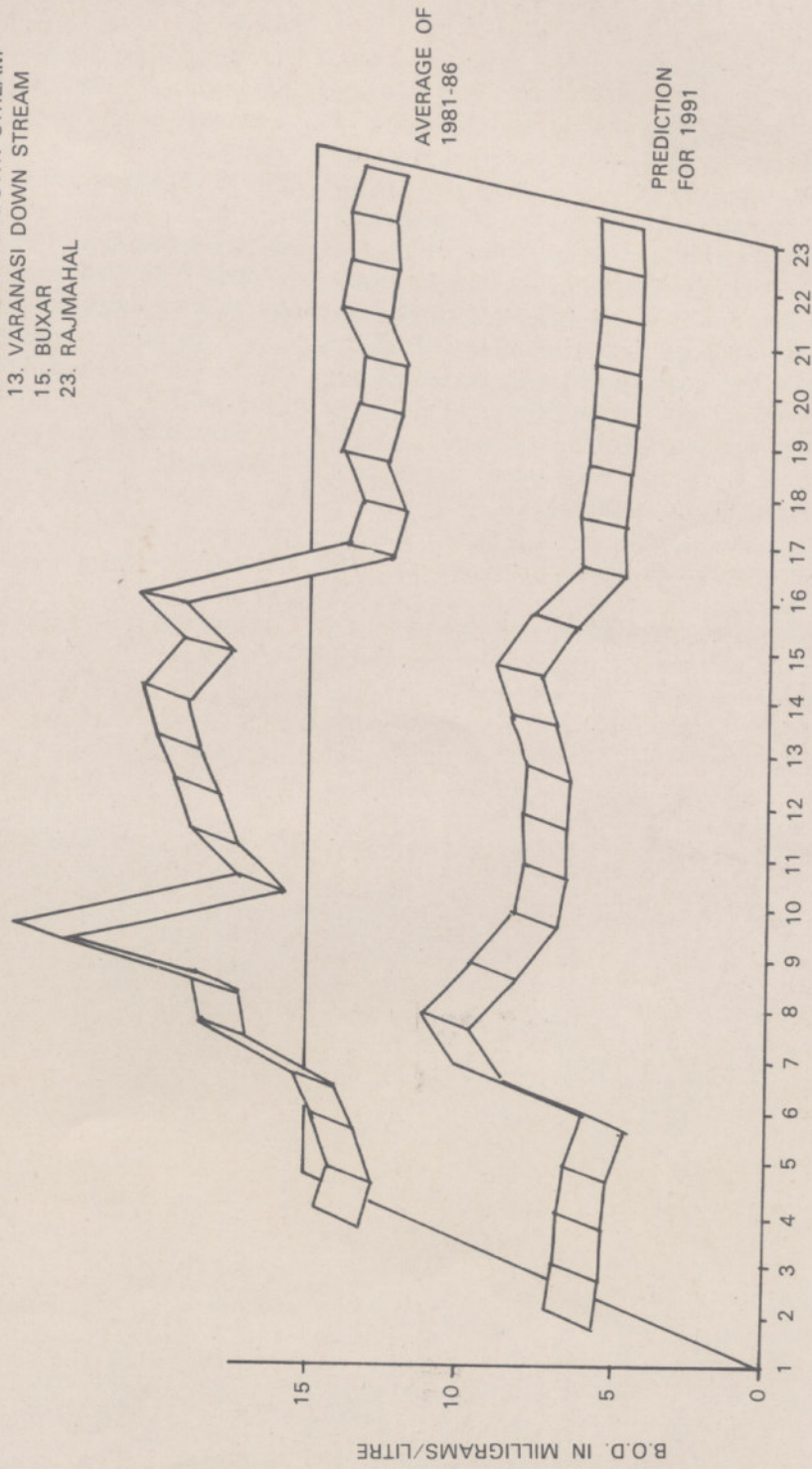


Fig. 12 Sulabh Complex, Allahabad—One of the 200 Sulabh Sauchalayas being constructed in different cities under the Ganga Action Plan

LIKELY IMPACT OF GANGA ACTION PLAN
SCHEMES ON RIVER QUALITY

[RIVER BIOLOGICAL OXYGEN DEMAND (B.O.D.) IN APRIL]

- 1. RISHIKESH
- 7. KANPUR DOWN STREAM
- 10. ALLAHABAD DOWN STREAM
- 13. VARANASI DOWN STREAM
- 15. BUXAR
- 23. RAJMAHAL



MONITORING STATIONS 1 TO 23 — RISHIKESH TO RAJMAHAL

Fig. 13

Rs. 45.50 crores. Upon completion of these schemes, substantial quantity of waste water will be diverted in locations such as Hardwar-Rishikesh, Kanpur, Allahabad, Patna, Bhatpara, Titagarh, etc.

5.1.7.6 Schemes under Ganga Action Plan will also be supplemented by ongoing schemes for improving the urban infrastructure such as in Kanpur, Allahabad and Varanasi where an outlay of Rs. 85 crores has been programmed till 1991-92 under Urban Development schemes. In Calcutta Metropolitan District, an Urban Development programme of Rs. 110 crores is being implemented which will supplement the schemes under the Ganga Action Plan. Special mention may be made of the scheme for rendering Allahabad scavenger free by pooling together the allocations from Ganga Action Plan, Ministry of Welfare, HUDCO and the State Government.

5.1.8 Monitoring Methodologies

5.1.8.1 Monitoring of Physical Progress

A detailed format for monitoring the progress has

been evolved in consultation with the implementing agencies. Each scheme is monitored with respect to its monthly target of physical and financial progress so that bottlenecks are identified and remedial measures taken. For major locations such as Hardwar-Rishikesh, Kanpur, Allahabad, Varanasi, Patna, Howrah and Calcutta Municipal Corporation, citywise consolidated progress charts and schedules have been prepared.

5.1.8.2 Monitoring of Water Quality in the River

The Central Board for the Prevention and Control of Water Pollution is engaged in monitoring river water quality through 27 sampling stations all along the river. In addition, river water quality is monitored in more intensive frequency in selected locations such as Hardwar-Rishikesh, Allahabad, Kanpur and Varanasi. Monitoring is undertaken according to 42 parameters which will help assess the physical, chemical and biological characteristics of the river water.

5.1.8.3 Water Quality Modelling

Water quality modelling to enable prediction of the



Fig. 14 Construction of steps under the integrated river front development programme in progress at Rajghat, Varanasi

quality of the river water under different scenarios is being done in collaboration with the Central Water Commission, Central Board for the Prevention and Control of Water Pollution and the Indian Institute of Technology, Bombay with advisory services from Thames Water Authority, U.K. The model is capable of predicting the river quality status in respect of Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and ammoniacal nitrogen. The model has been calibrated and verified. Anticipated river quality in respect of the three parameters consequent to the pollution prevention schemes taken up under the Ganga Action Plan are being projected with the help of the model. Further, a comparison of projections with the river water quality objectives will help in the identification of additional schemes, if required, to be taken up to meet the objective.

5.1.8.4 Several steps have been taken to ensure participation of Indian scientists and institutions in the preparation, execution and monitoring of schemes under construction plan. The focus of the scientific content of Ganga Action Plan is on the following:

- Better knowledge of the river through extensive monitoring of physico-chemical and biological parameters;
- Technology development and application in the conveyance and treatment of waste water;
- Identification and promotion of research in resource recovery and resource conserving mechanisms relevant to Ganga Action Plan; and
- Providing a structure to secure the interaction of technologies and scientists in the formulation of various schemes under the Ganga Action Plan.

5.1.8.5 The Planning Commission, in the year 1981, initiated a significant programme to study the various aspects of the river involving the leading universities along its course. This programme is presently being coordinated by the Ganga Project Directorate and involves 16 universities and colleges. During the year the following were taken up:

- Characterisation of the river water in terms of chemical and physical parameters;
- Inventory of macro and micro flora and fauna of the river;
- Identification of the bio-indicators of pollution; and
- Investigation of the presence of heavy metals and pesticides in the river.

The results of the studies are expected to provide the biological profile of the river by end of 1988. A Committee of Scientists has been constituted for overall coordination and supervision of the work being done.

5.1.9 Technology Development and Application

The participation of National laboratories and scientific organisations like National Environmental Engineering Research Institute, Nagpur; Central Leather Research Institute, Madras; Indian Agricultural Research Institute, Delhi; Central Soil Conservation Institute, Dehradun; Indian Toxicology Research Centre, Lucknow; etc. has been enlisted for devising low cost options in conveyance and treatment of waste water, better utilisation of treated effluents for resource recovery, optimisation of the capacity of treatment plants, training of personnel for monitoring heavy metals and pesticides, etc.

5.1.10 Promotion of Research in Relevant Areas

A Research Committee for the Ganga Action Plan has been constituted to aid and advise the Ganga Project Wing in the matter of promotion of research and technology application to further development of holistic policies and practices for conservation of the resources of the river. The State Government have constituted State level committees of scientists to secure interaction of scientists in the formulation of schemes under the Ganga Action Plan.

5.1.11 Public Involvement in the Ganga Action Plan

5.1.11.1 Since June, 1986 when Prime Minister launched the Ganga Action Plan formally as a Peoples Project from Varanasi, the efforts to secure public involvement in the implementation of the Ganga Action Plan have been stepped up considerably. The main objectives in this regard are the following:—

- Promote awareness of the problems of pollution of rivers in general and Ganga in particular;
- Disseminate the importance of the initiative taken by the Prime Minister towards a cleaner Ganga;
- Promotion of right attitudes towards use of rivers;
- Improve motivation and performance on the part of those engaged in the Ganga Action Plan;
- Promote awareness of related issues such as the siltation of rivers, soil erosion, afforestation, industrial pollution, conservation of water resources, etc.; and

—Secure public cooperation and participation in the implementation of the Action Plan.

Many of the programmes are addressed to specific target groups as follows.

5.1.11.2 Youth and Ganga

The Nehru Yuva Kendra, National Service Scheme, Yuva Mandal and other youth organisations have participated in 8 Ganga Sewa shivirs held at Hardwar, Varanasi, Patna, Bhagalpur, Sonapur and other places. As part of these camps cleaning of Ghats, Prabhat Pheris, Padyatras and awareness campaigns were organised in which over 2500 volunteers participated. Aquatic sports such as swimming and boating to enable the youth to cultivate an active interest in maintaining the cleanliness of the river have been organised in Allahabad and Varanasi.

5.1.11.3 School Children and Ganga

About 4000 school children participated in special programmes of public awareness in Allahabad, Farrukhabad, Fatehgarh, Patna and Hardwar. A special programme involving secondary school children in 75 schools along the Ganga has been developed through the Centre for Environment Education, Ahmedabad under which specially prepared kits for simple water quality monitoring have been distributed. Through the scheme, school children will test water quality in the river stretches near their schools and compare results. In addition, song and dance, debate and painting competitions have been organised for school children by various social clubs in Varanasi.

5.1.11.4 Pilgrims and Ganga

In Hardwar, Allahabad, Sonapur, Sultanganj, Naihati and Ganga Sagar special exhibitions were organised to coincide with congregation of pilgrims. In July-August, 1987 a special effort was mounted to involve the several lakhs of pilgrims who undertook the annual yatra from Sultanganj in Bihar on the banks of Ganga to Baidya Nath Dham in Deoghar. All along the route, volunteers carried messages about pollution problems and the need to keep the Ganga free of it. Special cultural programmes in the folk media were also organised at Allahabad, Varanasi and Sonapur.

5.1.11.5 Media and Ganga

Press teams from various National and Language

Press visited Varanasi, Kanpur, Hardwar and Allahabad during the year. Seven Television news films have been produced covering the progress of work in Hardwar, Kanpur, Allahabad, Varanasi, Patna and parts of Calcutta. Information folders have been produced on the progress of work in Hardwar, Kanpur Allahabad, Varanasi and Calcutta. In addition public awareness kits which can be used by various Non Government Organisations have been made available. The overall progress of the Ganga Action Plan is covered in quarterly progress reports which are brought out regularly.

5.2 WASTELANDS DEVELOPMENT

5.2.1 The National Wastelands Development Board (NWDB) was set up in May 1985, with the following principal objectives:



Fig. 15 Plantation on salt affected land

- To achieve a quantum leap in afforestation activities;
- To take the programme of afforestation to the people, especially farmers and the landless and also to increase the involvement of women;
- To secure widespread involvement of other governmental and non-governmental agencies;
- To place greater emphasis on the development of fuelwood and fodder; and
- To evolve ways and means of securing institutional support.

5.2.2 Targets and Policies

Afforestation target for 1987-88 was fixed at 1.90 million hectares (corresponding to 380 crore seedlings). The achievement during the current year till the end of December 1987 was 1.5 million hectares (corresponding to about 300 crore seedlings). Although failure of monsoon in many States after the initial plantation activities caused a setback, it is expected that the target will be achieved.

5.2.3 Review of the Existing and New Schemes

5.2.3.1 Decentralised Nurseries Programme

This scheme was introduced in 1986-87 for setting up decentralised people's nurseries, each producing 25,000-50,000 seedlings, through the instrumentality of small farmers, schools, women's groups, voluntary agencies and cooperatives to ensure need-based afforestation, appropriate choice of species and valuable extension support for afforestation programmes. In 1987-88, 26.70 crore seedlings are expected to be raised. School nurseries programme has also been taken up under decentralised nurseries programme, in order to inculcate awareness of tree plantation among children. A total of 70,000 nurseries are proposed to be set up in 1987-88 with the objective of raising 28.70 lakh seedlings. Five percent of funds under NREP/RLEGP are earmarked for raising of nurseries but the same could not be utilised in full during the current year because of the drought conditions.



Fig. 16 Raising of seedlings in decentralised nurseries

5.2.3.2 Grant-in-Aid to Voluntary Agencies

This scheme for Grant-in-Aid to Voluntary Agencies has been in operation for the last two years. This scheme has received good response by way of involving voluntary agencies for nursery raising, plantation, awareness creation, training of the rural public and for slivipasture development etc. About 200 projects have been approved and 150 agencies from all over the country are likely to be financed by the end of 1987-88, with a financial commitment of Rs. 15 crores. The expected achievement during 1987-88 is the raising of 300 lakhs seedlings.

5.2.3.3 Monitoring and Evaluation

To strengthen the data base in the field and State levels and to ensure systematic and reliable reporting of the afforestation work of social forestry, NWDB has started project Monitoring and Evaluation for which computer based Monitoring Cells have been set up in 15 States. The NWDB has selected suitable hardware

and helped in installation and preparation of software and training of operating staff. Under this project, all States/Union Territories are expected to be covered under a centralised monitoring network. The Central Unit will take up specific evaluation studies and concurrent and post-evaluation of on-going schemes.

5.2.3.4 National Identification of Wasteland Projects

Under this project, 147 districts have been identified in the first phase which have a high propensity of wasteland. The identification is being done with the collaboration of Department of Space, Survey of India and Ministry of Defence. Printing of maps for Phase I has been completed.

5.2.3.5 Rural Fuelwood Plantation

This is a continuing scheme of the Sixth Plan. The scheme was started in 157 selected districts which were considered chronically deficient in fuelwood. The



Fig. 17 tribal nursery

plantation activities for raising fast growing fuelwood species, fodder and small timber are undertaken with central assistance to the tune of 50% of the expenditure. It has both block plantation and farm forestry elements. During 1987-88, 0.8 lakh hectare will be planted under this scheme with an outlay of Rs. 21 crores. An area of 0.66 lakh hectares has been planted up to December 1987. Independent evaluation of the scheme has been taken up with the help of the National Council of Applied Economic Research, New Delhi.

5.2.3.6 Operation Soilwatch

This scheme is a continuing scheme of the 6th Plan. The scheme was introduced during 1977-78 for treatment of identified catchments of micro-watershed basins in the fragile Himalayan eco-system and is being implemented in 14 Himalayan States with 100% Central assistance, comprising 50% grant and 50% loan. During 1987-88, 0.32 lakh hectares are targetted to be treated with an outlay of Rs. 14 crores.

5.2.3.7 Silvi-pasture

This scheme was drawn up in 1986-87 as a Centrally sponsored scheme in the Seventh Plan to augment fodder production and development of seed farms. The State Governments and other agencies which implement this scheme receive Central assistance to the extent of 50% of the cost. The balance is to be provided by the State Government, other agencies, or farmers as the case may be. The scheme is presently undertaken by the States of Karnataka and Orissa and the physical target of 1480 hectares is likely to be achieved. The National Dairy Development Board (NDDB) has taken up development of Kisan Vans in 3000 hectares and Gram Vans in 6000 hectares. An amount of Rs. 1.185 crores has been released to NDDB for this work.

5.2.3.8 Margin Money Assistance to Autonomous Bodies/Corporations

A scheme for provision of equity assistance prepared earlier has been reformulated and objectives and contents of the scheme have been clarified. Under this scheme, Central assistance would be provided to autonomous bodies and government corporations for plantation of fuelwood, fodder, small and commercial timber species with appropriate soil and water management techniques. Central assistance in the form of margin money upto 25% of the project cost could be given as grant from NWDB for bankable



Fig. 18 Silvi-pasture development

projects where at least 50% of the investment is met through loans from financial institutions. the objective of the scheme is to assist and promote projects being taken up with the help of institutional finance.

5.2.3.9 Area-oriented Fuelwood/Fodder Projects

This is a new Centrally sponsored scheme introduced with 50% Central assistance to promote fuelwood and fodder cultivation with appropriate soil/moisture conservation measures, on area basis, to ensure optimum development of wastelands. The scheme has been formulated with a view to extend the existing scheme for rural fuelwood plantation and operation soilwatch to other districts not covered so far. The project will be formulated by the States for each district according to the important components/activities listed out.

5.2.3.10 Tree Growers Cooperatives

In collaboration with the National Dairy Development Board, a pilot project has been implemented to promote 64 tree growers cooperatives in 256 villages in 8 districts of 5 States (Rajasthan, Gujarat, Andhra Pradesh, Orissa and Karnataka). Thirteen cooperatives societies have so far been set up.

5.2.4 Institutional Finance

5.2.4.1 In order to encourage people to take up plantation as a mass movement, NABARD have agreed to extend refinancing of the credit by banking institutions. Upto June 1987, the total amount refinanced under NABARD afforestation schemes is in the order of Rs. 173 crores.

5.2.4.2 The National Federation of Land Development Banks organised a workshop at Mysore in April, 1987 and on the recommendations of the workshop, an interdisciplinary Committee of the representatives of the LDBs was constituted in August 1987 to examine in detail the methods by which Land Development Banks can increase their involvement in afforestation projects. This Committee has held discussions with various State governments and State Land Development Banks and it is expected to submit its report by the end of the financial year.

5.2.4.3 Under the NWDB and AFC Project, model Bankable Afforestation Projects have been prepared for 15 Development blocks in 6 States, viz. Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Tamil Nadu and Uttar Pradesh. Thirteen of these projects have been taken for implementation with the concerned State Government. Action has been initiated to implement the remaining two projects also.

5.2.5 Studies Undertaken by NWDB

During the year under review, the following studies were commissioned by the Board:

- Surveys of wood requirements and difficulties in burning dead bodies in rural areas;
- Evaluation of the Centrally sponsored Scheme-Rural Fuel Wood Plantation by NCAER;
- Survival rate of tree plantation by IIPO;
- Integration of Wastelands Development by Centre for Study of Administration of Relief;
- Study of Lands and Forests by Indian Law Institute; and
- Lovraj Kumar Committee on Involvement of Industry

in Afforestation.

5.2.6 Indira Priyadarshini Vrikshamitra Award, 1987.

The Indira Priyadarshini Vrikshamitra Award, was institute in 1986. The second set of awards for 1987 were given to 18 awardees in recognition for the outstanding work at grass root level by individuals and organisations.

5.2.7 Seminars and Workshops

NWDB sponsored the following workshops/seminars during 1987-88:

- National Seminar on Agro-Forestry;
- Workshop on Legal Policy for Wastelands Development;
- Workshop on role of Panchayats in Forestry and Wastelands Development; and
- Three Regional Workshops on Tree Patta Schemes.

5.3 OTHER ACTIVITIES FOR REGENERATION

5.3.1. The programme of eco-regeneration aims at restoration of degraded eco-system and to demonstrate the techniques for regeneration.

5.3.2 Eco-Task Forces

5.3.2.1 The programme is operated in collaboration with the Ministry of Defence and the concerned State Governments. The programme utilises the services of ex-servicemen for eco-regeneration of selected regions. The activities include afforestation, soil and water conservation and other restorative works.

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

The Task Force is deployed in the Kiarkuli micro-catchment in the Himalayas near Mussoorie. The main achievements of the Task Force in Kiarkuli so far are given below:

(a) Afforestation

—Pits dug	: 10,00,000 Nos.
—Plantation of saplings	: 9,29,107 Nos.
—Plantation of shrubs	: 9,100 Nos.
—Pasture development	: 86 Ha
—Fencing of Kiarkuli Project area	: 858 Ha



Fig. 19 Task-Force in Kiarkuli, UP, digging tube—holes on vertical mined area for planting

(b) Soil Conservation

—Construction/repair of check dams	:	497 Nos.
—Construction/repair of retaining walls	:	310 Nos.
—Preparation of GI wire mesh nets	:	475 Nos.
—Construction of Ballie crats	:	613 Nos.
—Collection of boulders/stones for soil conservation	:	7,251 M. tons.

5.3.2.3 Eco-Task Force (TA-128), Rajasthan

This Task Force continues to work on the left bank of the Indira Gandhi Canal, Rajasthan. During the year extensive works relating to afforestation and pasture

development were undertaken besides maintenance work. The achievements of Task Force are presented below:

—Plantation (in Nos.)	:	37,20,993
—Fencing length (in Metres)	:	1,73,280
—Pasture development (in Ha)	:	3,436
—Construction of tree protection units (Nos.)	:	2,133

5.3.2.4 Eco-Task Force, Jammu & Kashmir

Taking note of the environmental degradation in the Shiwalik ranges of Jammu and Kashmir, the Government have sanctioned raising of an Eco-Task Force to undertake restoration of these mountain



Fig. 20 Landslide in Himalayan region

ranges. The main tasks include field works relating to afforestation, soil conservation and water harvesting. The Task Force will become operational during 1988-89.

5.3.3 Field Action Programme

This programme is intended to demonstrate regeneration techniques in different ecological zones of our country. The projects taken up and the results during the year are described below.

5.3.3.1 Eco-regeneration of Pushkar Lake Valley, Ajmer

The project is implemented by the District Development Society, Ajmer. 160 hectares of plantation and pasture land have been protected through fencing. Another 5,000 plants were protected with conventional stick and grass enclosures and 30,000 plants were protected in the critical sandy areas. Nurseries having 1,00,000 plants are being maintained. 29 abandoned wells were improved for supplementing water supply. Environmental education activities were promoted through ten eco development camps. Five puppet shows, 3 dramas, 2 video-tapes and 6 games on environmental themes were developed to create awareness and involvement of children and local people.

5.3.3.2 Ecological Restoration of Cherrapunjee, Meghalaya

This project was started in 1984 for ecological improvement in this high rainfall desert area of the east Khasi Hill District. A programme for planting 98 hectares of highly refractory area has been taken up. Techniques have been standardised by planting one and half year old saplings in polythene bags. The project is implemented by the Government of Maghalaya.

5.3.3.3 Environmental Regeneration in Auroville, Tamil Nadu

The main achievements during the year were the establishment of wind breaks and raising of plantation for fuel, fodder and timber in 80 blocks, improvement in soil and water conservation measures, afforestation and soil conservation activities in the farmer's fields and social forestry plantation (17 acres) in Pattanaur village (Aurobrindaban). Training workshops for 25

groups were organised for mobilising public participation in ecological restoration. The project is implemented by Auromitra Foundation.

5.3.3.4 Eco-development in Shivalik Foothills, Hoshiarpur, Punjab

The activities include planting trees which yield fodder, fuel and timber on the vacant land stretches between the field terraces on the slopes, construction of water storage tanks and check dams, installation of fuel-efficient chullahas and involvement of Harijan women in tree and nursery raising. So far about 65 hectares of area and 19 landless families have been benefited. The project is implemented by the Society for Promotion of Wasteland Development.

5.3.3.5 Ecological Improvement at Gopeshwar, Chamoli (UP)

The project was sanctioned in 1987 for rehabilitating 30 sq.kms. area (in 30 patches) in Alakananda Catchment of the Himalayas. The activities include nursery raising, afforestation, soil conservation and fencing with stone wall with active participation of local people. The project is implemented by Dasholi Gram Swaraj Mandal.

5.3.3.6 Ecological Improvement at Tumkur (Karnataka)

The project, sanctioned in 1987, is designed to undertake training in nursery work, dibbling of seeds, plantation, propagation, budding, grafting, and plant protection through field demonstrations. This project is implemented by G. G. Ben Soans Memorial Association, Tumkur.

5.3.4 Eco-development Camps

The aim of this programme is to create awareness in the youth through practical activities. Non-governmental organisations are provided financial support for mobilising youth to undertake various activities like survey of environmental problems, tree plantation, soil conservation, water resources management, health care, promotion of energy alternatives, environmental education and awareness creation. During the year, 35 proposals from different parts of the country have been sanctioned for organising 88 camps involving 5000 participants in various eco-development activities.

6. RESEARCH

6.1 ENVIRONMENTAL RESEARCH

6.1.1 Development of strategies to harmonise environment and economic development and to mitigate the problems arising from degradation of environment need research and development in the areas of environmental sciences and technology. The Department operates a programme aimed at providing support to several institutions and universities in the country in the relevant areas.

6.1.2 In order to optimise the use of the limited funds available for research, it is necessary to fix priorities for funding so that the research findings will be useful in tackling the environmental problems of the country. The Ministry has developed such priorities for research, after extensive consultations with experts. The subject areas have been comprehensively listed in the "Matrix of research priorities" (annexed in the pouch).

6.1.3 The progress in respect of various research programmes of the Department is given below.

6.1.3.1 Man and Biosphere Programme

The Man and Biosphere Programme encompasses studies on various ecosystems to develop scientific basis for resource management. During the year, 13 schemes were sanctioned with respect to forests, wetlands, aquatic ecosystems, biological diversity and impact of pollution. Four schemes have been completed during the year. In order to monitor the progress of the ongoing projects, 2 Workshops were organised at the University of Jodhpur and Gurukul Kangri Visva Vidyalyaya, Hardwar. Thirty nine schemes falling under major theme areas of research in arid zones, ecological effects of pollution and environmental impact of major engineering works were reviewed.

6.1.3.2 Environmental Research Programme

This programme covers technological aspects of monitoring, management and control of pollution. Thirty one schemes were sanctioned in the areas of air and water quality monitoring, development of technology, impact assessment, toxicology and human health. Twenty schemes were completed during the year.

6.1.3.3 Coordinated Research Projects

Following multidisciplinary research projects were

continued:

—Ethnobiology

The aim of the project is to understand the inter-rérelationships/associations of tribal communities with their surrounding environment. Seventeen Centres for the project have identified important plant species used by the tribals. Phyto-chemical and pharmacological screening of 700 wild plants has led to isolation of an active ingredient used for various ailments.

—Air Pollution and Plants

The study is in progress at 8 Centres. Preliminary studies have revealed both morphological aberrations and biochemical changes indicating varying tolerance of plants.

—Beas Sutlej Link Project

Studies to evaluate the ecological impact of the project comprise of 10 sub-projects on various aspects by the Himachal Pradesh Agricultural University, Palampur, Indian Council of Agricultural Research (Central Inland Fisheries Research Institute, Barrackpore), Botanical Survey of India and Zoological Survey of India. The studies are continuing.

—Heavy Metals

A survey was conducted under this project on the levels of eight heavy metals in air, water and food samples collected from six regions of the country. Chemical investigations are in progress.

—Conservation of Endangered Plant Species—Seed Biology and Tissue Culture Programme

The project envisages investigations on plant species of high herbal/medicinal and ornamental importance. Investigations on 40 plant species have been initiated at nine Centres in the country. Information has been collected on 16 plant species with respect to breeding systems, pollination mechanisms, seed dispersal, seed germination, seedling establishment and their maintenance in natural populations. Suitable agricultural/domestication methods for the cultivation of 6 plant species at lower altitudes were developed.

6.1.3.4 Integrated Action-oriented Research, Development and Extension Projects for Mountains

The programme envisages generation of scientific data for development of action plans for management of natural resources on a sustainable basis. The details are given in the following sections:

—Himalayan Region

Eighty nine schemes were sponsored out of which work on 18 projects has been completed. The highlights include—

- Socio-economic survey of 400 sq.km. of catchment of Alakananda;
- Establishment of plantation and forage nursery in Himachal Pradesh;
- Development of a new technique of vegetative propagation of Assam bamboo; and
- A detailed study of Gaula catchment (Kumaon Himalayas).

Eleven new schemes were sanctioned during the year in the areas of conservation of edible fungi of Western Himalayas, culturability of fish in North-east, germplasm in bank of grasses of Himachal Pradesh, watershed protection, and wasteland management in different parts of Himalayas.

—Western Ghats

The programme has been operational since 1983. Eighty two schemes have so far been funded.

During the year, 9 schemes were sanctioned and 20 were completed.

The highlights of the completed projects are given below:

- A detailed study of Panshet Catchment area has resulted in the identification of promising plant species which are ecologically viable for the terrain. A list of plant and animal species, including rare and endangered has been prepared;
- A detailed survey of forage grasses in the Palani Hills has resulted in the identification of six grasses, 60 forage legumes and 42 tree legumes which are highly promising in regard to fodder value; and
- One hundred seventy seven sacred groves had been identified within the Western Ghats region of Maharashtra which harbour 792 plant species belonging to 352 genera. A list of rare and

endangered species growing within these groves has been prepared.

—Eastern Ghats

The programme has been in operation since 1984-85 and so far 19 schemes have been funded. During the year 3 new schemes were sanctioned in the areas of wild rodent distribution, ecology of selected birds and environmental awareness.

6.1.4 Centres of Excellence

In order to strengthen research and training in priority areas of environmental science and management, the Department has set up the following three Centres of Excellence in the areas of environmental education, ecology and mining:—

- Centre for Environment Education, Ahmedabad;
- Ecological Research and Training Centre at the Indian Institute of Science, Bangalore; and
- Centre of Mining Environment, Indian School of Mines, Dhanbad.

6.1.4.1 Centre for Environment Education, Ahmedabad

The Centre for Environment Education, Ahmedabad was established in 1984 to meet the country's need for creating high quality education material and for propagating awareness among children and urban/rural communities. During the year, the Centre continued to develop educational material such as guide books and illustrative documents on the natural resources. The Centre organised 7 zonal and nearly 100 location specific teaching workshops all over the country. Over 7000 middle school teachers were trained during the year.

6.1.4.2 Ecological Research and Training Centre, Indian Institute of Science, Bangalore

During the year, the Centre interacted with the State Government of Karnataka to take up the action plan emanating from the work conducted by the Centre. The document on Uttara Kannada District was discussed and specific action programme has been drawn up. The Centre has also concluded field surveys of two micro-catchments and has prepared an action plan. One of the important programmes undertaken by the Centre is the development of fodder resources. The Centre has established six small nature reserves.

6.1.4.3 Centre of Mining Environment, Indian School of Mines, Dhanbad

This Centre was set up in March 1987 at the Indian School of Mines, Dhanbad. The Centre has initiated studies on the following:—

- Land reclamation with pre-determined land use patterns;
- Problems of air and water pollution in mining areas
- Safe disposal of tailings; and
- Impact of mining on flora/fauna habitats.

6.1.5 Govind Ballabh Pant Himalaya Paryavaran Evam Vikas Sansthan (Govind Ballabh Pant Institute of Himalayan Environment and Development)

This institute is being set up in Almora district, U.P. as an autonomous organisation for evolving integrated development strategies compatible with ecological principles for the Himalayan region. The Institute will be the focal point for integrated policy planning in the area of research and development, training and education, public awareness, conservation and protection of natural resources and regeneration of degraded ecosystems.

6.2 RESEARCH ON BIOSPHERE RESERVES

6.2.1 Grants have been released to various institutions for conducting research in Nilgiri Biosphere Reserve area in the following fields:

- Hydrological studies;
- Human ecology and eco-restoration; and
- Long-term monitoring of biological processes.

The following institutions were identified for conducting research in the Nilgiri Biosphere Reserve areas:

- Anthropological Survey of India, Mysore office;
- Zoological Survey of India, Calcutta;
- Forest Research Centre, Coimbatore;
- Kerala Forest Research Institute, Peechi;
- Botanical Survey of India, Calcutta;
- National Remote Sensing Agency, Hyderabad;
- Centre for Water Resources Development and Management, Kozhikode;
- Tamil Nadu Agricultural University, Coimbatore; and
- Indian Institute of Tropical Meteorology, Poona.

6.2.2 A committee for identifying priority areas for research in the Nanda Devi Biosphere Reserve and the

institutions suitable for carrying out research had been set up. The following research institutions have been identified to undertake research projects in the Nanda Devi Biosphere Reserve area:

Table 12

<i>Institution</i>	<i>Area of research</i>
—Anthropological Survey of India	Socio-economic studies of the 17 villages falling in the Nanda Devi Biosphere Reserve.
—Garhwal University Srinagar, U.P.	Soil Survey and Hydrological studies.
—Kumaon University Nainital	Soil Survey and Hydrological studies.
—BSI/ZSI Dehra Dun	Floral and Faunal Survey.

6.2.3 Research on Mangroves

During the year, three research schemes on different aspects of conservation of mangroves have been approved as given below:

Table 13

—Shivaji University Kolhapur	Human Impact on Primary productivity and Regeneration of Mangroves of Maharashtra.
—Centre for Marine Biology, Annamalai University	Ecological Energetics of the Mangrove Ecosystems.
—National Institute of Oceanography, Panaji	Environmental Impact Assessment on the Mangrove Ecosystems along the West Coast of India

6.3 FORESTRY RESEARCH

6.3.1 Forestry research in the country has been totally reorganised after an indepth review. The philosophy behind the reorganisation is the achievement of the twin national goals of conservation of the natural forests remaining in the country and the stepping up of the pace of afforestation and wastelands development.

6.3.2 Thrust areas have been identified for basic research, technology development and application. Biotechnology, energy dynamics of forest ecosystems, watershed management, inventory of forest resoruces, optimum utilisation of scarce wood

resources and its substitution by alternative materials, social aspects of forestry and establishment of a network for dissemination of research results are some of the key areas given priority.

6.3.3 A comprehensive system of formulation of research schemes, monitoring of their progress and periodic evaluation has been worked out.

6.3.4 An Indian Council of Forestry Research and Education (ICFRE) has been set up to ensure the best method of application of all sources of scientific knowledge to the solution of technical and practical problems of forestry. In addition to the existing institute at Dehra Dun, the Council will set up five institutes located in different regions of the country. These are—

- Institute of Genetics and Tree Breeding, Coimbatore
- Institute of Wood Science and Technology, Bangalore
- Institute of Arid Zone Forestry, Jodhpur
- Institute of Northern Peninsular Deciduous Forests, Jabalpur, and
- Institute of Rain and Moist Deciduous Forests, Jorhat

6.3.5 Each institute will carry out national level research on one or more particular facets of forestry and will also take care of regional research needs.

6.3.6 Detailed proposals identifying research areas of each institute and their infrastructural needs have been worked out and placed before the Council for their consideration in a meeting called specially for this purpose.

6.3.7 Focus of research during the year was on the following:

- Rainfall interception and nutrient cycling;
- Seed germination behaviour;
- Rooting of nodal cuttings;
- Biomass studies;
- Growth and yield studies from 120 permanent and 33 temporary sample plots;
- Preparation of monographs on 60 species of bamboos;
- Anatomical studies of timber species from Andamans;
- Development of solar-cum-wood waste fed furnace kiln for seasoning of timber;
- Kiln drying schedule for timber;

- Natural durability of timber;
- Permeability penetration absorption correlation for preservative treatment of timber; and
- Stress strain hysteresis and stiffness strength relationship of timber species.

6.4 WILDLIFE RESEARCH

6.4.1 The Wildlife Institute of India, an autonomous institution funded by the Government, currently has 15 ongoing research projects on endangered ecosystems and species and management techniques. These projects cover the southern evergreens, western arids, trans-Himalayan cold deserts, sub-Himalayan tarais and river ecosystems involving Nilgiri langurs, giant squirrels, lions, snow-leopards, elephants, rhinos and fruit-bats. The studies also cover rare and endemic flora and human aspects of local communities vis-a-vis wildlife management. Valuable information for wildlife management, besides developing wildlife biologists for research and monitoring work in protected areas, is being generated through these studies.

6.4.2 A consultancy for designing a network of biogeographically representative network of protected areas, which was entrusted to this Institute by the Government of India, is in the final stages of completion. The report would be useful in upgrading the network on a planned basis.

6.4.3 The following projects have been completed during the year:

- Ecology of the Keoladeo National Park: The project has provided information about the hydro-biological cycle of the park and the interrelationship of plants and animals.
- A study on the population trends, migration habits and breeding biology of the elephant and the great Indian bustard.
- A survey of rare species of birds like the floricans, Jerdon's courser and the mountain quail.

6.4.4 The following research schemes were continued during the year.

- Continuation of the ongoing study on the Indian elephant in their main Southern habitats and newly occupied areas in Andhra Pradesh, Bihar and Meghalaya.
- Continuation of the study of the ecology of the Keoladeo National Park.

-
- Study of the migration pattern of Indian birds and establishment of an avifauna migration data bank.
 - Study of the ecology of Pt. Calimere Sanctuary, with the objective of preparing a management plan for the Sanctuary.

- Study of the ecology and management of large predators and their prey in Nagarhole National Park.
- Establishment of model education and interpretation centres in selected zoos and National Parks.

7. EDUCATION & INFORMATION

7.1 FORMAL EDUCATION & TRAINING

7.1.1 Forestry Education & Training

7.1.1.1 Inservice Courses:

- The Indian Forest College at Dehra Dun has been upgraded as the National Forest Academy and named after late Smt. Indira Gandhi. It will train Indian Forest Service (IFS) officers. The faculty of the academy was strengthened by creating several permanent faculty posts. 154 IFS probationers and 10 trainees from foreign countries passed out during the year. 315 IFS officers and 15 trainees from foreign countries are undergoing training at present.
- Officers of the State Forest Service were trained at the State Forest Service Colleges at Burnihat, Coimbatore and Dehra Dun. 178 trainees passed out during the year and 244 are undergoing training in the three colleges.
- Training of Forest Rangers deputed by the States was continued at the four Forest Ranger Colleges at Balaghat, Chandrapur, Coimbatore and Kurseong. 212 trainees passed out of these colleges and 258 trainees are undergoing training. The Rangers College at Coimbatore was closed down as part of the decision under which the Central Government will withdraw from rangers training.

7.1.1.2 Retraining:

- A regular programme of refresher training of IFS officers in various aspects of management was introduced during 1985-86. The programme was continued during the current year. During the period August 1987 to March 1988, 46 one-week training courses covering about 1400 officers were organised in various Central and State training institutions on various topics such as general management, concepts, financial management, computer appreciation, project formulations, wildlife management, forest protection, role of forest in rural and tribal development etc.
- Twelve officers from State Forest Departments and Universities were given special training in social forestry.
- Twenty six IFS officers were given special training to enable them to take up higher responsibility at the level of Conservator of Forests.

—Training in the field of logging techniques and use of forestry tools was given to 595 forest supervisors and 7307 forest workers.

—The Forest Survey of India imparted training in application of remote sensing techniques in forestry, forest inventory management, electronic data processing and wood consumption and utilisation studies to 51 persons belonging to Forest Survey of India, State Forest Departments and Forest Development Corporations.

7.1.1.3 Forestry Education

Financial support was provided to the Indian Council of Agricultural Research to continue degree courses in forestry in 14 Agricultural Universities.

7.1.2 Indian Institute of Forest Management, Bhopal

During 1987-88, 2 short courses and 3 case study workshops have been organised by the Institute. The short courses of one week duration were on wastelands development and monitoring and evaluation. Twelve forest officers from various States participated in each short course. The case study workshops were organised to evolve methods of case study teaching. The construction of the academic complex, the hostels and residential accommodation at a cost of Rs. 660 lakhs made good progress and is almost complete.

7.1.3 Wildlife Education and Training

The Wildlife Institute of India, Dehradun was set up in 1982 to cater to the need for scientific information and trained manpower for the expanding network of national parks and sanctuaries. The Institute was registered as an autonomous registered society in April 1986 and the year is marked for the important strides made through faculty recruitment and training and development of a campus with infrastructure. The Institute conducted a 9-month Post Graduate Diploma and a 3-month Certificate Course for officers of the State Wildlife Wings at the park manager and ranger levels. The number of trainees for these two courses was 25 and 21 respectively as compared to 15 and 17 last year. In addition, a number of field workshops and short training courses for about 100 participants were conducted on wildlife census, habitat evaluation, energised fencing for animal damage control and conservation education-cum-wildlife interpretation. Two wildlife personnel from Zaire were trained in

chemical capture and domestication of wild elephants.

7.2 Non-formal Education, Information and Awareness

7.2.1 The Department gives priority for promoting environmental education, dissemination of information and creation of awareness among all groups of the country's population and concerned institutions through training programmes, seminars, exhibitions, eco-clubs, eco-development camps etc.

7.2.2 National Environment Awareness Campaign/National Environment Month 1987

7.2.2.1 The National Environment Awareness Campaign (NEAC) 1986 which concluded successfully had focussed its attention on all major environmental issues of the country. The Campaign had reached a wide spectrum of our population such as teachers, students, women, professional administrators and

legislators. The Campaign continued in the year 1987. The central theme for the 1987 Campaign was on the connection between environmental degradation and the recurring droughts and floods in the country. NEAC 1987 also focussed attention on other environment related areas such as Pollution Control, Impact Assessment, Environmental Conservation, Environmental Management etc.

7.2.2.2 As part of the NEAC, a National Environment Month (NEM) was organised during November 19, to December 18, 1987. Two hundred and seven voluntary agencies including youth and women organisations, schools, colleges, universities, research organisations, professional groups etc. from virtually every State and Union Territory have been involved in organising several environmentally related programmes. These programmes relate to organisation of seminars, public meetings, camps, rallies, padyatras, display of posters, exhibitions, tree plantation drives, essay competitions etc. All possible target groups like



Fig. 21 A view of the padyatra undertaken at Bankura, West Bengal under the National Environment Awareness Campaign 1987



Fig. 22 A view of the participants at the Environment Awareness Workshop at Meerut, UP during the National Environment Month, 1987

school children, college students, non-student youth, women, villagers, labourers, hutment dwellers, forest dwellers, tribals, peoples representatives and decision makers, Govt officials, army families, industrial workers, journalists, academicians, scientists, teachers, members of city corporations, social workers, tourists and public in general have been covered in various NEAC/NEM 1987 activities. The activities reached a peak during NEM 1987. The main theme of all these activities has been to promote better understanding of the importance of protection of environment to mitigate the suffering of our people from recurring floods and droughts.

7.2.2.3 During the Campaign, the Centre for Environment Education, Ahmedabad, organised 7 zonal and nearly 100 location specific teaching workshops, all over the country. Over 7000 middle school teachers are expected to be trained. It is

envisaged that each of these teachers will then organise environmental education programmes in their respective schools. During the Campaign, Doordarshan continued to telecast fortnightly TV programmes on environment.

7.2.3 Non-formal Education and Awareness Projects

During the year, the Department considered several proposals on non-formal environmental education and awareness and provided financial assistance to various organisations for several activities including the following:

- Environmental Camps in Karnataka;
- Environmental Camps for School Children in Mathura;
- Nature and Environment Camp in Bangalore;
- Preparation of an Audio-visual presentation on 'Floods and Droughts';
- Production of a 16 mm film on 'Kadars' of Kerala;
- A culture specific approach for creating environmental awareness in villages around Patna;
- Setting up of environment pavillion for children in Madras;
- The Social and environmental impact of overfishing in Goa;
- School environmental activities network for youth in Delhi;
- Public participation programme and Environmental protection in Warangal;
- Environmental Education Extension programmes in Visva Bharati, Shanti Niketan;
- Environment and Development programme with the rural poor in Dharwad (Karnataka);
- Production and printing of the Hindi version of an educational kit entitled 'For Every Child a Tree';
- Publication of a booklet entitled 'The Wrath of Nature';
- Preparation of Hindi and English version of the 'Nature Study Manual'; and
- Establishment of 105 Eco-clubs through voluntary organisations in various schools of Tamil Nadu and Andhra Pradesh.

7.2.4 Support to Seminar/Symposia/Workshops

The Department supports organisation of seminars to provide common platforms for sharing knowledge and experience among scientists and environmentalists from various disciplines and various technical environmental topics of current interest. The Department has provided financial assistance to 35

colleges, universities and registered societies for organisation of such seminars. These are in addition to the number of seminars supported under the NEAC 1987.

7.2.5 National Museum of Natural History (NMNH)

The National Museum of Natural History, an organisation of the Department serves to promote environmental awareness among the public through exhibitions, educational programmes, outdoor nature study tours, film shows, public lectures, special programmes for school children etc. A brief resume of its activities is given below.

7.2.5.1 New Galleries at the NMNH

- The new gallery on 'Conservation' depicting aspects of conservation relating to forests, wildlife, land, air and water has been completed.
- An 'Activity Room' for pre-school children was commissioned. It provides opportunities for Nursery School children to interact with games and puzzles related to nature, develop animal stories and participate in a variety of other interesting activities.

7.2.5.2 Education/Awareness Programmes

The museum organised exhibitions, quiz contests, film shows, workshops for students and teachers on several occasions like World Environment Day, Wildlife Week etc. A special exhibition entitled 'Our Environment' mounted in a Mobile Museum travelled to different areas for promoting environmental awareness.

7.2.5.3 Museum of Natural History, Mysore

The NMNH has acquired about 2 hectares of land in Mysore for setting up a regional museum. The project report on the same has been finalised. This Museum is intended to develop exhibits depicting the flora, fauna and geology of the region. The Line Plan for the building has been approved. A temporary office accommodation has been hired and appointment of staff is being made.

7.2.6 Centre for Environment Education, Ahmedabad

The Centre for Environment Education (CEE) Ahmedabad was established in 1984 to meet the need

for creating high quality educational material and for propagating awareness among the children and urban/rural communities. The educational material developed by the Centre includes guide books and illustrative documents on the country's natural resources.

7.2.6.1 Programmes and Activities of the Centre

- As a part of the interpretative programme, 2 visitors' centres are being installed in the Kanha National Park explaining the importance of wildlife research, its application in managing a national park etc. The planning and design for these centres has been completed.
- Wayside exhibition signs were installed at Delhi Zoo. These signs are resistant to the onslaught of weather and vandals.
- As a part of the Technology Mission for Drinking Water, a field station has been set up at Amreli, one of the fluorosis affected districts of Gujarat to study the problem and develop and test the communication material which would ensure people's acceptance of defluoridation techniques.
- CEE is also involved in creating awareness and involvement among students on the banks of the Ganga regarding the pollution of the river Ganga. For this, teacher-training material and a water quality monitoring kit have been developed. By March 1988, approximately 3000 students in 80 secondary and higher secondary schools in the three States are expected to be covered. From April 1988, this will become an on-going activity in these schools.
- A joint project between CEE and State University of New York, Syracuse has been initiated with the aim of making a series of environmental education films for middle school children. Under this project, two workshops were held in Ahmedabad during the year to discuss approaches for educational and children's films and to review experiences of Indian and US film makers in these areas.

7.2.6.2 Publications of CEE

- A draft edition of a publication entitled 'A concept base for environment education';
- A package consisting of a book of activities for teachers on the theme of floods and droughts; and

—A set of 11 posters (in English and Hindi) and a set of stickers on floods and droughts.

7.3 ENVIRONMENTAL INFORMATION SYSTEM (ENVIS)

Environmental Information System (ENVIS) a Plan Programme of the Department continued its activities pertaining to collection, collation, storage, retrieval and dissemination of scientific and technical information on environment and related areas to all concerned. The ENVIS Network with the Department as its Focal Point presently consists of 10 ENVIS Centres on diverse areas of environment such as publication of the quarterly abstracting journal sound and appropriate technology, coastal and offshore ecology, energy and environment, biodegradation of wastes etc. These ENVIS Centres have been set up in specialised and reputed institutions in the country.

The major activities continued during the year at the ENVIS Focal Point in the Department include: publication of the quarterly abstracting journal 'Paryavaran Abstracts'; publication of Department's Annual Report for the year 1986-87; updating of the existing bibliographic data bases on environment and environmental statistics; responding to over 300

national/international queries by way of providing substantive information including those received through INFOTERRA (Global Information Network) of the United Nations Environment Programme. The ENVIS Focal Point also acted as the INFOTERRA's Regional Service Centre for the South Asia Sub Region.

7.3.1 Review of ENVIS Centres

With the aim of monitoring the activities of the existing ENVIS centres, a comprehensive review of the activities of all the ENVIS Centres was made by a Review Committee consisting of invited subject specialists and ENVIS Advisory Committee Members. Based on the review, the ENVIS Centres have been given guidelines for more effective functioning in their respective fields of specialisation.

7.4 INDIRA GANDHI PARYAVARAN PURASKAR

The Bombay Natural History Society was awarded the first Indira Gandhi Paryavaran Puraskar (Environment Award) for the year 1987 for its outstanding contribution to the cause of environment. The award is of the value of Rs. 1 lakh and is to be awarded every year to any citizen of India or organisation for significant contribution in the field of environment.

8. LEGISLATION AND ORGANISATION

8.1 LEGISLATION

The Environment (Protection) Act, 1986, was brought into force with effect from 19th November 1986, and various rules notified. During the year further action taken to implement the Act, is as detailed below:

- The authorities and agencies who should be informed by an occupier about any discharge of pollutants in excess of standards have been designated.
- Environmental standards for seventeen priority industries were notified. This is in addition to the standards for seven industries notified earlier.
- Powers were delegated to the officers of the Central Government, Central Pollution Control Board, State Governments, State Pollution Control Boards and District Magistrates to lay complaints to courts regarding violation of the provisions of the Act.
- Fifty laboratories in the country were recognised as environmental laboratories under Section 12 of the Act and the qualified analysts working in these laboratories recognised as Government Analysts under Section 13 of the Act.
- Powers to issue directions under Section 5 of the Act were delegated to 12 State Governments which consented to such delegation.
- Consultants were appointed to recommend standards for six priority categories of industry.

8.2 The Air (Prevention and Control of Pollution) Act, 1981 was amended during the year to remove the difficulties encountered during implementation, to confer more powers on the implementing agencies and to impose more stringent penalties for violation of the provisions of the Act. Proposals to amend the Water (Prevention and Control of Pollution) Act, 1974 on similar lines have been finalised.

8.3 A Bill to amend the Forest (Conservation) Act, 1980 has been introduced in Rajya Sabha. The amendments seek to impose stringent penalties on violators of the provisions of the Act.

8.4 Organisation and Infrastructure

8.4.1 It is necessary to ensure adequate environmental test facilities in all regions of the country. The existing facilities in the country were sought to be inventorised by obtaining the details from all the laboratories in the country owned by Central and State Governments, Universities, Council of Scientific and Industrial Research, Indian Council of Agricultural Research etc. A Committee was appointed to analyse the facilities available and to suggest strengthening of existing laboratories or establishment of new laboratories in order to achieve the objective of providing test facilities in all regions of the country.

8.4.2 A scheme of Central grants, on a 100% basis, to environmental laboratories was sanctioned during the year. Rs. 479 lakhs are set apart for the remaining three years of the Seventh Plan. Rs. 167 lakhs were disbursed during the year.

8.4.3 The scheme for assisting the State Departments of Environment for strengthening their technical set up was continued during the year. Five States and seven Union Territories were sanctioned Rs. 95 lakhs during the year.

8.4.4 On the suggestion of the Central Government, so far 12 States and 3 Union Territories have set up Environment Protection Councils in which legislators, experts, concerned officials of the State and non-governmental organisations are represented. The Ministry of Environment and Forests has nominated representatives to these Councils. These Councils periodically review the environmental programmes of the State and suggest solutions.

9. INTERNATIONAL COOPERATION

9.1 The Ministry of Environment & Forests functions as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Cooperative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and the International Union for Conservation of Nature and Natural Resources (IUCN). Financial contributions are made to these organisations and programmes and projects connected with these organisations are taken up for implementation.

9.2 India has cooperated with World Bank, Food & Agricultural Organisation, the United Nations Development Programme, Canada, Federal Republic of Germany, Netherlands, Norway, Sweden, United States of America, and Union of Soviet Socialist Republics on environmental and forestry programmes. Details are given below:

9.2.1 World Bank

Social forestry projects in the States of Jammu & Kashmir, Haryana, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, Karnataka, and Kerala were supported.

9.2.2 Food and Agricultural Organisation/United Nations Development Programme

- Support to Wildlife Institute of India, Dehradun
- Support to Modern Forest Fire Control Projects
- Aerial seeding
- Training in forest inventory.

9.2.3 Canada

Support to Social Forestry Project in Andhra Pradesh.

9.2.4 The Federal Republic of Germany

The third and last (viz., handing over) phase of the Dhauladhar Range Erosion Control Project, currently under implementation with assistance from FRG has been approved for implementation. The scheme of assistance to pollution control laboratories by the FRG is continuing.

9.2.5 The Netherlands

Proposals for cooperation with the Netherlands in various areas of the environment have been finalised and a Memorandum of Understanding was signed between the two countries in January, 1988.

9.2.6 Norway

—A fresh Memorandum of Understanding (MOU) was signed between India and Norway on July 6, 1987 during the visit of Norwegian Prime Minister to India.

—A Norwegian consultant visited India during February, 1988 to help the government prepare guidelines regarding management of hazardous chemicals.

9.2.7 Sweden

Support to Social Forestry Projects in the States of Tamil Nadu, Orissa and Bihar.

9.2.8 The USA

—A series of workshops on various aspects of pollution monitoring was arranged by the Ganga Project Directorate in combination with various institutions in India during 1987-88 under Indo-US Cooperation activities.

—In the field of wildlife preservation, three projects under Indo-US Cooperation have been completed. Eight projects with total approved outlay of Rs. 24.44 millions are currently under progress under Indo-US Cooperation Programme.

—A project 'Conceptual Environment Management Plan for Coal Mines in India' with an approved outlay of Rs. 1.5 million had been sanctioned during the year. The project is to be undertaken in Singrauli coal fields for three years.

9.2.9 The USSR

An integrated long term programme of cooperation in Science and Technology, including environment and ecology was signed in July, 1987.

9.3 India participated in the deliberations of various international forums related to the environment.

—The Prime Minister addressed the United Nations General Assembly in connection with the debate on the report of the World Commission on Environment and Development.

—India participated in the 14th Governing Council Meeting of the UNEP at Nairobi in June 1987. A

number of important issues, directly or indirectly relevant to India were discussed.

—The World Commission on Environment and Development met in New Delhi in July, 1987. Its report "Our Common Future" was presented to 12 South and South East Asian countries and to a large number of NGOs working in the field of environment in India.

—India participated in the 8th and 9th meetings of the Board of Governors of the International Centre for Integrated Mountain Development (ICIMOD). A number of important issues relevant to the functioning of ICIMOD were discussed in the meeting.

—An Expert Consultation on Forestry and Food Production/Security organised by FAO was hosted by the Ministry at Bangalore. The consultations included field trips to Kerala, Tamil Nadu and Karnataka State followed by discussions at

Bangalore. The discussions were attended by a group of 45 experts and 3 observers drawn from 28 countries/organisations of the FAO.

—India attended as Observer, in a UNEP Conference at Montreal which finalised an international protocol on substances that deplete the ozone layer.

—India attended the Annual Conference of the International Union for Conservation of Nature and Natural Resources in Costa Rica in February, 1988.

—India has actively participated in the World Heritage Committee. During this year, the Sunderbans under the name of 'Sunderbans National Park' was inscribed in the World Heritage list at the meeting in Paris, as a national site. Four Indian natural sites are now on the list.

—India presided over the Sixth meeting of CITES Standing committee at Ottawa (Canada) in October, 1987.

10. ADMINISTRATION & BUDGET

10.1 The total staff strength of the Department including the National Wastelands Development Board at the headquarters is 970 (Group A : 177; Group B : 312; Group C : 315 and Group D : 166).

10.2 In order to provide better executive support system than hitherto available to the scientific Departments, certain changes in the following areas have been implemented.

- Finance Procedure
- Personnel Policy
- Procurement Management System
- Technical Support Service (Civil Works)

10.3 PERSONNEL POLICIES

10.3.1 In the sphere of personnel policies, the Government have decided that the present requirement of reporting vacancies of scientific posts to UPSC for recruitment will not be necessary and the scientific posts will be exempt from the purview of UPSC. The scheme of flexible complementing providing promotion which has hitherto been restricted to the grades of Rs. 2200-4000, Rs. 3000-4500 and Rs. 3700-5000 has been extended upto the scale of Rs. 5900-7300 by allowing full flexibility and by removing the restrictions as regards percentages.

10.3.2 The Ministry of Environment and Forests has implemented the new personnel policy after a thorough review of the existing recruitment practices. The Recruitment and Promotion Rules for the Group A Scientific Staff have been revised and notified incorporating flexible complementing and the exemption from the purview of UPSC.

10.4 PURCHASE PROCEDURE

A new purchase procedure has been introduced during the year and a purchase wing created to help implementation.

10.5 CIVIL ENGINEERING UNIT

An independent Civil Engineering Unit has been created for undertaking all civil works in the Ministry of Environment and Forests throughout the country. The Unit is to plan and execute several time-bound construction works related to plan schemes.

10.6 IFS CADRE MANAGEMENT

10.6.1 The Ministry of Environment and Forests is the cadre controlling authority for the Indian Forest

Service. 159 candidates recruited on the basis of IFS Examination, 1986 conducted by the UPSC were appointed to the service during the year and deputed for training at the Forest Research Institute and Colleges, Dehra Dun. One hundred and fifty one candidates recruited on the basis of the IFS Examination 1986 joined the various State cadres on completion of training. In addition, 43 officers of the State Forest Services were appointed in the Indian Forest Service during the year on promotion.

10.6.2 The revised strength and composition of a number of State cadres were notified during the year. The present authorised strength of the IFS cadre is 2363.

10.7 RESERVATION IN SERVICE

10.7.1 A statement showing representation of Scheduled Castes/Scheduled Tribes in the Department as on 1st March 1988 is given in Table 14.

10.7.2 As a result of a special drive organised by the Govt. of India, the Special Recruitment Committee constituted by the Department of Personnel and Training/Staff Selection Commission nominated persons for appointments as LDC/Group 'D' employees against vacancies reserved for handicapped. The position in this regard is given in Table 15.

10.8 USE OF HINDI

10.8.1 The use of Hindi for official work was given a greater thrust. Four more offices, in which at least 80% of the staff have working knowledge of Hindi, have been notified under Section 10(4) of the Official Languages Act, 1963. With this, 9 out of 14 offices under the Ministry stand notified under Sec. 10(4) of the Official Languages Act, 1963.

10.8.2 Specific items of work dealt with in administration sections have been designated for exclusive work in Hindi.

10.8.3 With a view to encouraging production of Hindi books on topics related to environment, a scheme to award prizes for original books in Hindi was introduced.

10.8.4 Special training classes for teaching Hindi to non-Hindi knowing officials in the Ministry were arranged in Paryavaran Bhawan. To speed up the use of Hindi in day to day official work, 3 Hindi workshops were organised.

10.8.5 Material for seminars/symposia/conferences and agenda papers for High Power Committees like Central Board of Forestry, was prepared in Hindi.

10.8.6 For effective supervision of the implementation of Official Language Policy, one post of Hindi Officer was upgraded to that of Senior Hindi Officer. Compliance with the provisions of Official Language Policy was closely supervised by periodical meetings of Departmental Official Language Implementation Committee and Hindi Salahakar Samiti. Inspections of Offices located outside Delhi were also carried out during the year.

10.9 TRAINING

10.9.1 With the object of up-dating knowledge and skills of officers/staff and inculcating in them the proper attitude to work the following training programmes were organised in the Department:

- Programme on Functional Noting
- Programme on Public Relations
- Programme on Maintenance of Photo-copiers.

10.10 JOINT CONSULTATIVE MACHINERY

10.10.1 In accordance with the scheme of Joint Consultative Machinery and Compulsory Arbitration

for Central Government Employees, a Departmental Council and an Office Council have been set up in the Ministry of Environment and Forests. The object of the scheme is to promote harmonious relations by securing the greatest measure of cooperation between the Government in its capacity as employer, and the general body of its employees in matters of common concern and to increase the efficiency of the public services. It is designed to supplement the facilities provided to the employees to make representations on matters concerning their respective services/groups. Two meetings of the Departmental Council were held during the year.

10.10.2 The functioning of the Office Councils in all the offices under the Ministry was reviewed and instructions have been issued to ensure that meetings should be held once in two months.

10.11 BUDGET

10.11.1 The Budge Estimate for the Ministry for the year 1987-88 is Rs. 180.40 crores, while the Revised Estimate is Rs. 166.65 crores.

10.11.2 Area-wise distribution of the funds for the year 1987-88 (Revised Estimate) and the major scheme-wise distribution of funds are shown in fig. 23 and fig. 24.

Table 14

STATEMENT SHOWING THE TOTAL NUMBER OF GOVERNMENT SERVANTS AND THE NUMBER OF SCHEDULED CASTES AND SCHEDULED TRIBES AMONGST THEM IN THE DEPARTMENT OF ENVIRONMENT,, FORESTS AND WILDLIFE AS ON 1.3.1988

Group	Sanctioned Strength	Number in position	Scheduled Castes	Percent to total number of employees	Scheduled Tribes	Percent to total number of employees
1	2	3	4	5	6	7
Group—A	177	125	8	6.4	1	0.8
Group—B	312	193	19	9.8	1	0.5
Group—C	315	205	13	6.3	5	2.4
Group—D	166	101	43	42.6	7	6.9
Total	970	624	83	13.3	14	2.2

Table 15

STATEMENT SHOWING THE IMPLEMENTATION OF RESERVATION ORDERS ON THE EMPLOYMENT OF PHYSICALLY HANDICAPPED AS ON 1.3.1988

Ministry of Environment & Forests (Sectt. proper), New Delhi

Class of post		No. of vacancies reserved (3% reservation for handicapped 1% for VH 1% for HH 1% for OH)	No. of nominations received	No. of offer of appointment issued	No. of persons joined	Remarks
Group 'C'	V.H.	4	4	4	1	(1 person declined the offer of appointment and 2 persons have requested for extension for joining time.)
	H.H. O.H.	2 2	2 Nil	2 Nil	2 Nil	
Group 'D'	V.H.	2	2	2	2	
	H.H.	1	1	1	1	
	O.H.	1	Nil	Nil	Nil	
		12	9	9	6	

AREA-WISE DISTRIBUTION OF FUNDS FOR THE YEAR 1987-88 (RE)
(In Rs. Lakhs)

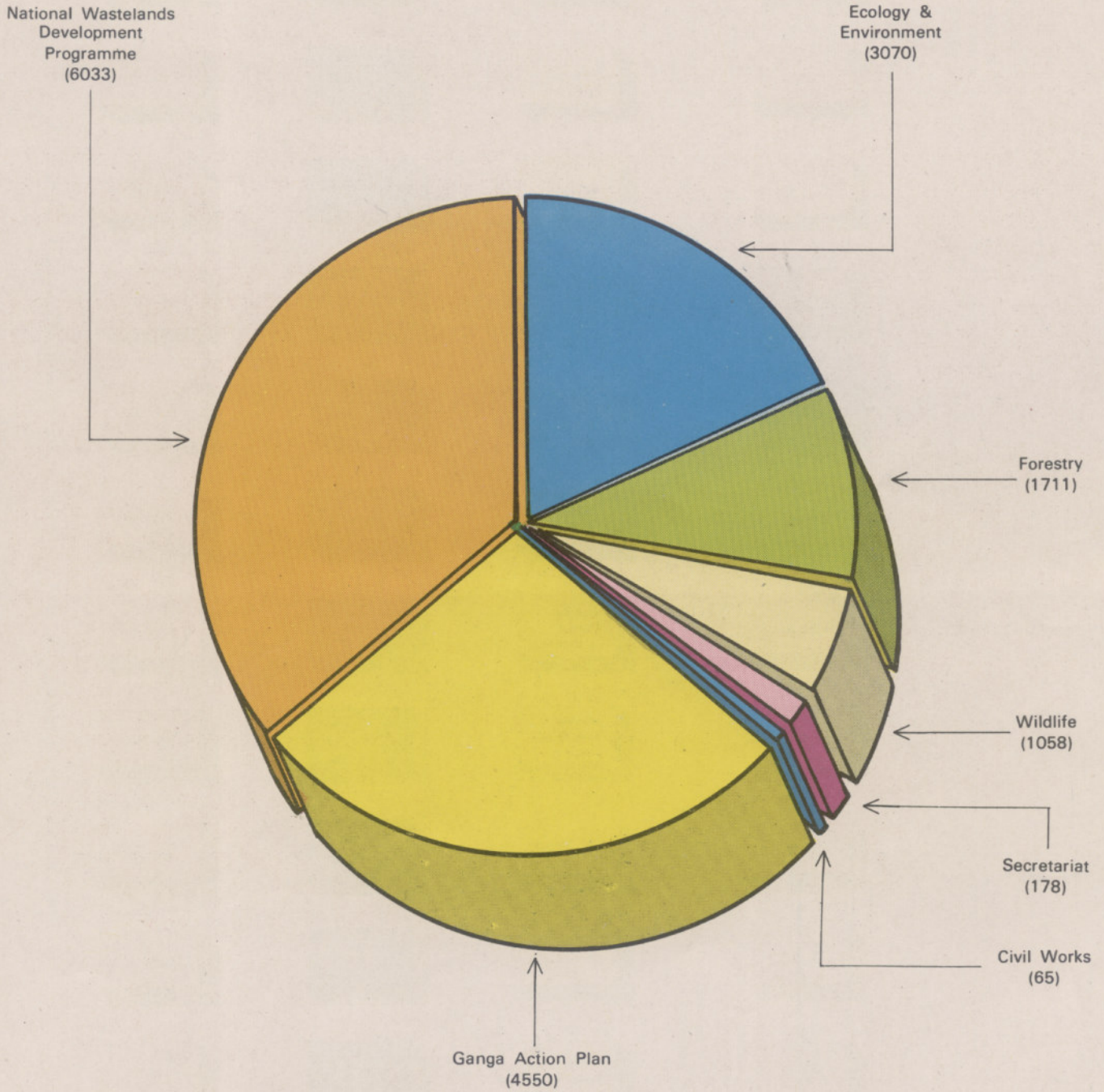


Fig. 23

SCHEMewise DISTRIBUTION OF FUNDS
(In Rs. Lakhs)

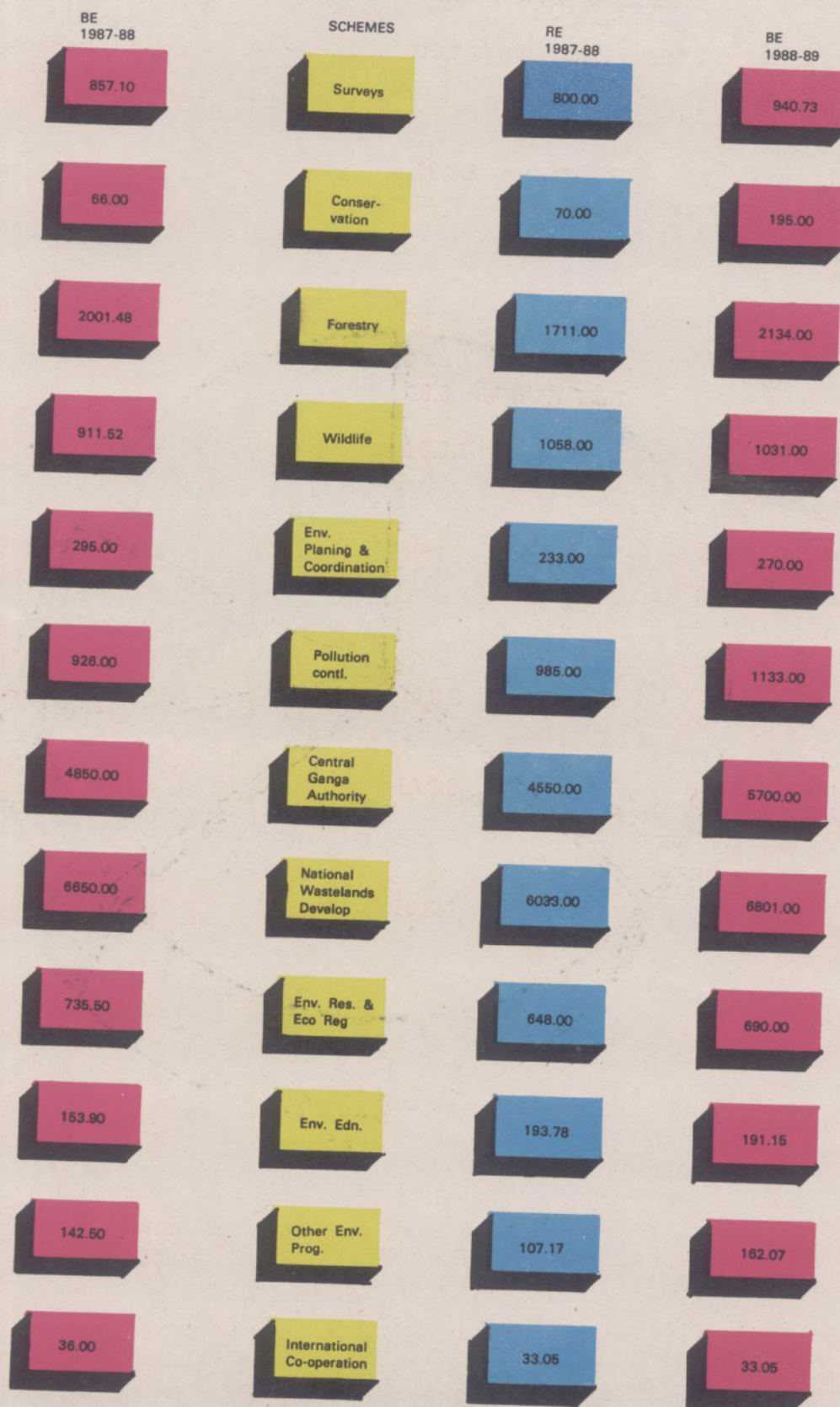


Fig. 24

ANNEXURE—I

ORGANISATION CHART OF THE MINISTRY OF ENVIRONMENT & FORESTS

