



ANNUAL REPORT 2008-2009



**MINISTRY OF ENVIRONMENT & FORESTS
GOVERNMENT OF INDIA**



Annual Report 2008-09



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जहाँ है हरियाली । MINISTRY OF ENVIRONMENT AND FORESTS
वहाँ है खुशहाली ॥ GOVERNMENT OF INDIA

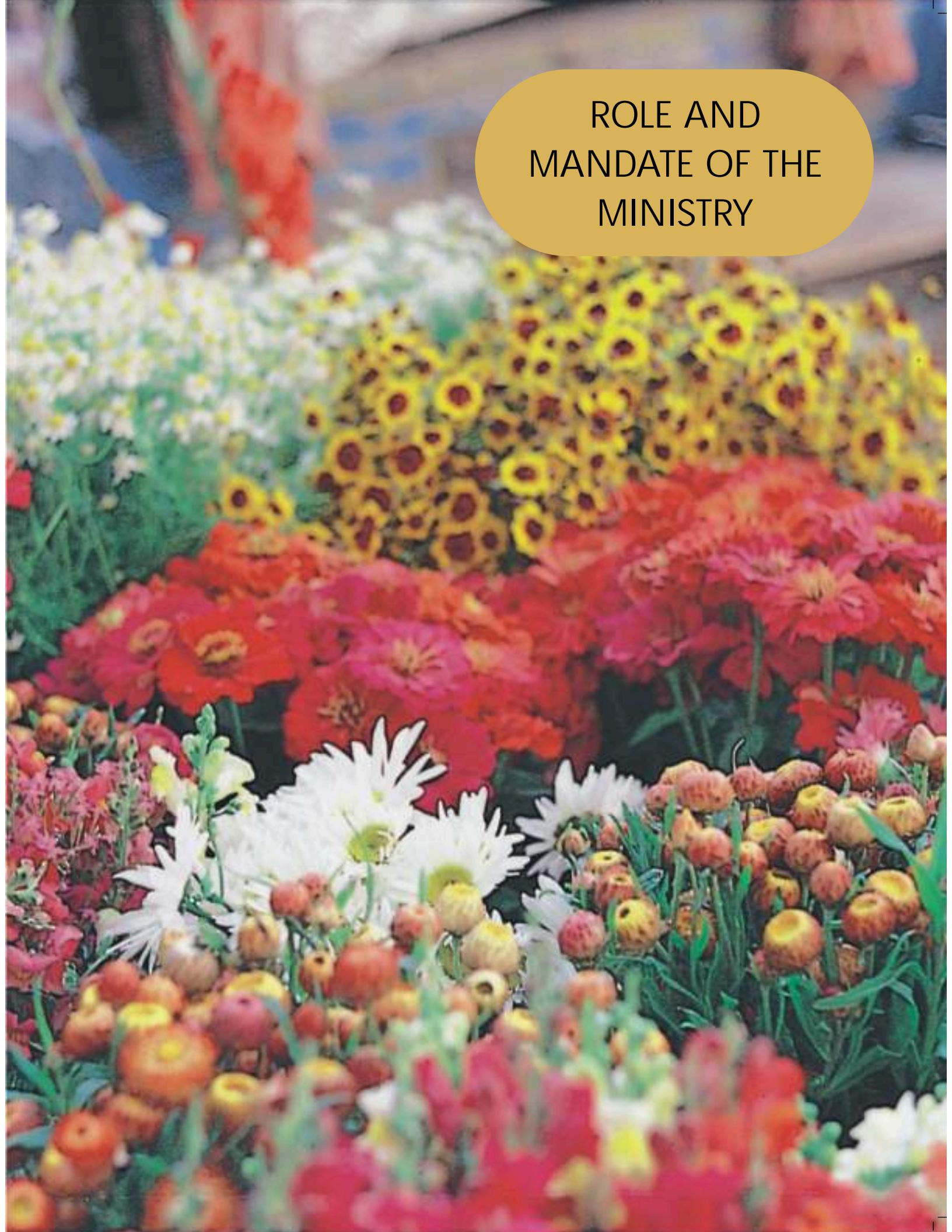


Kishongla falls in Khangchendzonga



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ROLE AND
MANDATE OF THE
MINISTRY

Role and Mandate of the Ministry

Role of the Ministry

The primary concerns of the Ministry of Environment & Forests under the Government structure are implementation of policies and programmes relating to conservation of the country's natural resources including lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals and prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being. The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations Conference on Environment and Development (UNCED). The Ministry is also entrusted with the issues relating to multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and of regional bodies like Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Cooperation (SAARC) on matters pertaining to environment.

The broad objectives of the Ministry are:

- Conservation and survey of flora, fauna, forests and wildlife,
- Prevention and control of pollution,
- Afforestation and regeneration of degraded areas,
- Protection of the environment, and
- Ensuring the welfare of animals.

These objectives are well supported by a set of legislative and regulatory measures, aimed at the preservation, conservation and protection of the environment. Besides the legislative measures, a National Conservation Strategy and Policy Statement on Environment and Development, 1992, National Forest Policy, 1988, a Policy Statement on Abatement of Pollution, 1992 and a National Environment Policy, 2006 have also been evolved.

The organization structure of the Ministry indicating various Divisions and its autonomous and subordinate offices is given at Annexure-I-A & I-B.

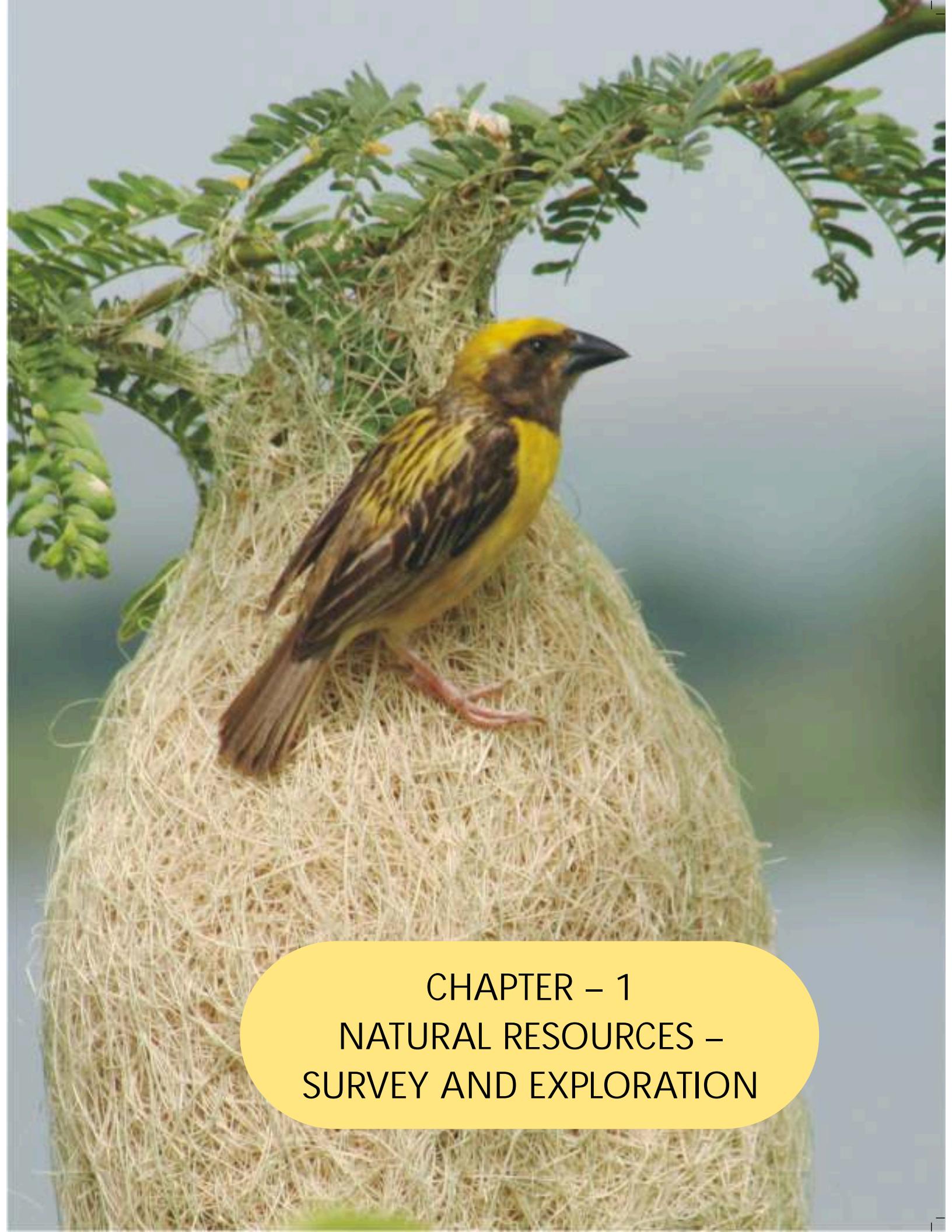
Mandate of the Ministry

Allocation of Business

- Environment and Ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas.
- Survey and Exploration of Natural Resources particularly of Forest, Flora, Fauna, Ecosystems etc.
- Bio-diversity Conservation including that of lakes and wetlands.
- Conservation, development, management and abatement of pollution of rivers which shall include National River Conservation Directorate.
- Environmental Impact Assessment.
- Environment research and development, education, training, information and awareness.
- Environmental Health.
- Forest Development Agency and Joint Forest Management Programme for conservation, management and

- 
- afforestation.
 - Wildlife conservation, preservation, protection planning, research, education, training and awareness including Project Tiger and Project Elephant.
 - International co-operation on issues concerning Environment, Forestry and Wildlife.
 - Botanical Survey of India and Botanical Gardens.
 - Zoological Survey of India.
 - National Museum of Natural History.
 - Biosphere Reserve Programme.
 - National Forest Policy and Forestry Development in the country including Social Forestry.
 - All matters relating to Forest and Forest Administration in the Andaman and Nicobar Islands.
 - Indian Forest Service.
 - Wild Life Preservation and protection of wild birds and animals.
 - Fundamental and applied research and training including higher education in forestry.
 - Padmaja Naidu Himalayan Zoological park.
 - National Assistance to Forestry Development Schemes.
 - Indian Plywood Industries Research and Training Institute, Bangalore.
 - Afforestation and Eco-development which shall include National Afforestation and Eco-Development Board.
 - Desert and Desertification.
 - Forest Survey of India.
 - Indian Institute of Bio-diversity, Itanagar.
 - Central Pollution Control Board.
 - G.B. Pant Institute of Himalayan Environment & Development.
 - Wildlife Institute of India and Indian Board for Wildlife.
 - Indian Institute of Forest Management.
 - Central Zoo Authority including National Zoological Park.
 - Indian Council of Forestry Research & Education.
 - Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited.
 - Prevention of Cruelty to Animals.
 - Matters relating to pounds and cattle trespass.
 - Gaushalas and Gausadans.
 - The Prevention of Cruelty to Animals Act, 1960 (59 of 1960).
 - The National Environment Tribunal Act, 1995 (27 of 1995).
 - The National Environment Appellate Authority Act, 1997 (22 of 1997).
 - The Water Prevention and Control of Pollution Act, 1974 (6 of 1974).
 - The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977).
 - The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981).

- The Indian Forest Act, 1927 (16 of 1927).
- The Wildlife (Protection) Act, 1972 (53 of 1972).
- The Forest (Conservation) Act, 1980 (69 of 1980).
- The Environment (Protection), Act, 1986 (29 of 1986).
- The Public Liability Insurance Act, 1991 (6 of 1991)



CHAPTER – 1
NATURAL RESOURCES –
SURVEY AND EXPLORATION

Survey of Flora

Botanical Survey of India

Introduction

The Botanical Survey of India (BSI) is the apex research organization under the Ministry of Environment and Forests for carrying out taxonomic and floristic studies on wild plant resources of the country. It was established on February 13, 1890 with the basic objective to explore the plant resources of the country and to identify the plant species with economic virtues. Sir George King, the then Superintendent of the 'Royal Botanic Garden' Calcutta was appointed as first ex-officio Honorary Director of the BSI. After independence the department was reorganized in 1954 by Government of India as a part of scientific development of the country. During the successive plan periods, the functional base of Botanical Survey of India was further expanded to include various new areas such as inventorying of endemic, rare and threatened plant species; evolving conservation strategies; studies on fragile ecosystems and protected areas like wildlife sanctuaries, national parks and biosphere reserves; multiplication and maintenance of endemic and threatened plant species, wild ornamentals, etc., in Botanic Gardens and Orchidaria; documentation of traditional knowledge associated with plants and development of National Database of herbarium and live collections, plant distribution and nomenclature, botanical paintings/illustrations, plant uses, etc.

Objectives

The primary objectives of BSI are as follows:

- Exploration, inventorying and documentation of phytodiversity in general and protected areas, hotspots and fragile ecosystems in particular;

publication of National, State and District Floras.

- Identification of threatened/red list species and species rich areas needing conservation; *ex-situ* conservation of critically threatened species in botanical gardens.
- Survey and documentation of traditional knowledge (ethno-botany) associated with plants.
- Develop a National database of Indian plants, including herbarium and live specimens, botanical paintings/illustrations, etc.

The secondary objectives are:

- Revisionary/Monographic studies on selected plant groups.
- Qualitative analysis of nutritive value of ethno-food plants and other economically useful species.
- Capacity building in plant taxonomy through refresher courses and post M.Sc. certificate course.
- Environment Impact Assessment of areas assigned by the ministry.
- Develop and maintain Botanical Gardens, Museums and Herbaria.
- Preparation of Seed, Pollen and Spore Atlas of Indian Plants.

Activities undertaken during the year

Botanical Exploration and Inventorisation of Phytodiversity

Field tours and Herbarium consultation tours

Sixty-five field tours were undertaken for floristic/ethnobotanical and other studies of higher and lower groups of plants by different circle offices and units of BSI covering



Fig-1. *Seshagiria sahyadrica*, an endemic genus of Western Ghats

Arunachal Pradesh (West Siang, Kurung Kume, Papumpare districts & Dihang Dibang Biosphere Reserve), Assam (Chukrasila Wildlife Sanctuary), Manipur, Mizoram, Sikkim (West and South), Uttar Pradesh (Bakhira Birds Sanctuary), Madhya Pradesh, Uttrakhand (Chamoli district), Gujarat (Bhavnagar & Rajkot districts), Karnataka (Mookambika Wildlife Sanctuary), Tamil Nadu (Satyamangalam Forests & Mukkurthi National Park), Andaman & Nicobar Islands (Ferrargunj & Madhuwan forests areas and Little Nicobar), Jharkhand (Dalma Wildlife Sanctuary), West Bengal (Gorumara National Park, Mahananda, Senchal, Narendrapur & Ballavpur Wildlife Sanctuaries). During the field tours, more than seven thousand specimens have been collected. Three thousand two hundred of these collected specimens belonging to ca nine hundred thirty five species were

identified by scientists of different circles and units for State Flora of Uttarakhand (Volume I), Gujarat (Volume II), Manipur (Volume II), Mizoram (Volume III), Arunachal Pradesh (Volume II), Kerala (Volume III); Protected Areas of Tamil Nadu (Mukkhurti National Park), West Bengal (Narendrapur Wildlife Sanctuary, Gorumara National Park, Senchal Wildlife Sanctuary, Mahananda Wildlife Sanctuary), Jharkhand (Dalma Wildlife Sanctuary), Arunachal Pradesh (Dehang Dibang Biosphere Reserve); Algal Flora of Tamil Nadu (East Coast), Madhya Pradesh (Govindsagar, Halili, Mod dam, Upper Lake); Bryoflora of Andaman & Nicobar Islands (South Andamans), Mizoram; Lichen Flora of Sikkim; Pteridophytic Flora of South Sikkim; Fungal (Mushrooms) flora of Sikkim (West District); underexplored areas of Tamil Nadu (Sathyamangalam forests, Vellingiri, Siruvani and Annaikatti hills)

Documentation of Phytodiversity

National Flora (Flora of India)

- Completed the revision of family Polygonaceae, Thymelaeaceae and Loganiaceae
- Taxonomic description of twelve species of genus *Ranunculus* L. and twenty species of Orchidaceae and thirty five species of Cyperaceae were completed.
- Completed the Checklist of Gymnosperms of India and Checklist of Lichens of India

Regional Flora

- Completed the revision of Aphyllophorales of North Western Himalaya
- Study of relevant literature and examination of specimens collected earlier from the area under the



Fig-2. *Paphiopedilum villosum*, an orchid from North East India

project 'Taxonomic Study of Family Aspleniaceae in North East India' and 'Pteridophytic Flora of South Sikkim' have been completed.

- Survey, identification and taxonomic description and incorporated GPS data in the GIS platform under the project E – Flora of National Capital Territory (Delhi and its environs) was completed.
- The Flora of Dampa Tiger Reserve, Mizoram was completed.

State Flora

- Flora of West Bengal Volume IV was completed.
- Taxonomic description of seven hundred fifteen species for Flora of Mizoram (Volume III), Manipur (Volume II), Sikkim, Uttar Pradesh (Volume III), Jammu & Kashmir (Volume IV), Gujarat (Volume I & II), Kerala (Volume IV & V) and Port Blair was completed.

Documentation of Indigenous Knowledge of Plant Resources

Ethno-botanical study of Orissa

Three tours to Phulbani, Rayagada and Mayurbhanj districts were carried out and ethno-botanical uses of about two hundred twenty five species recorded, including one hundred seventy five medicinal, thirty five of food value and fifteen of veterinary uses.

Ex-situ Conservation in Botanic Gardens

Introduction, acclimatization and multiplication for ex-situ conservation of rare, endangered and economically important plants in the Associated Botanic Gardens of BSI:

Introduced and maintained nine species of Bamboos, six species of *Musa* and eleven

species of Zingibers. Seven medicinally/ economically important species have also been collected, introduced and maintained. Collected *Nymphaea tetragona* for pollen viability and *in vitro* rhizome culture.

Miscellaneous

Modernisation of Industrial Section, Indian Museum

A brainstorming workshop on "Technology, scope and benchmarking for digitization of old manuscript, documents, textile designs, dyes and Herbarium specimens" was held in August, 2008 at Kolkata to implement the following projects funded by Ministry:

- Old archival documents, correspondence, manuscripts and herbarium specimens at ISIM, Kolkata
- Historic Forbes Watson and Thomas Wardle volumes on Textiles and natural Dyes at ISIM, Kolkata

Publications

Scientists of BSI published sixty four research papers in peer reviewed international journals, thirteen popular articles in Hindi and following books:

- Materials for Flora of Arunachal Pradesh, Vol. – II
- Plant Discoveries, 2007
- Oil Yielding Plants
- Meliolales of India, Vol. II
- Vanaspati Vani, Vol. 17 (in Hindi)
- Paschim Banglar Uvdid, Vol. 5, 2008 (in Bengali)

Public services rendered

BSI disseminated scientific information to public and also assisted scientists, students and researchers in their pursuit of taxonomic



Fig-3. *Arisaema sahyadricum*, an endemic aroid from Western Ghats

research on plants. During the period scientists, students and visitors, including twenty five VIPs, have visited the Botanic Gardens, Herbaria and Museums of BSI. Two hundred twenty five requests for information and supply of plant materials have been attended. Identified two hundred eighty five plant materials and supplied one thousand two hundred pages photocopied literature.

Development of Botanic Gardens

Indian Botanic Garden, Howrah

Tea and Cinchona plants from Mungpoo (Darjeeling) and Rubber plants from Thiruvananthapuram (Kerala) introduced in the Indian Botanic Garden.

Initiated development of 'Heritage Garden'

and revival of landscaped flower garden.

Botanic Garden of Indian Republic, NOIDA

Four thousand three hundred indigenous saplings and five hundred fifty four seedlings of medicinal plants have been procured from different parts of Terai region and Orissa. Potting has been done for one thousand one hundred forty nine seedlings of Terai region. About nine hundred seedlings of thirteen plant species have been raised successfully.

Maintenance and enrichment of herbaria in Botanical Survey of India

Mounted one thousand fifty six specimens, remounted six thousand two hundred fifty four sheets, stitched/labeled one thousand twenty four sheets, dusted/fumigated nineteen thousand six hundred forty five sheets, poisoned twelve thousand three hundred fifty

nine sheets. Two thousand four hundred sixty nine genus and species cover changed. Five thousand six hundred eighty nine specimens incorporated, two hundred five specimens received on exchanged/loaned, one hundred fourteen specimens loaned. Received twelve digital images and two hundred fifty four sheets from Royal Botanic Garden – Kew on gift.

Awards/Honours received

- 'The Janaki Ammal National Award for Plant Taxonomy' has been bestowed upon Dr. M. Sanjappa, Director, BSI in recognition of his outstanding contribution to Plant Taxonomy.
- Dr. P. Venu, Scientist 'F' and Dr. S. K. Srivastava, Scientist 'D' have received Prof. B. A. Razi medal, Dr. J. R. Sharma, Scientist 'E' has received Prof. K. S. Thind medal and Dr. A. Beniamin, Scientist 'C' has received Prof. S. S. Bir medal from Association of Plant Taxonomy, Dehradun.
- BSI received the KOLTOLIC SHIELD for the consecutive 2nd year for the best implementation of Official Language amongst the Central Government Offices in Kolkata.

Visit of Parliamentary Committee

- The Parliamentary sub-committee on official language inspected progress of implementation of official language in BSI, Northern Circle, Dehradun w.e.f. 17.06.08 to 22.06.08 at Rudraprayag.
- The Department related Standing Parliamentary Committee on Science & Technology, Environment & Forest visited the Sikkim Himalayan Circle, Gangtok on 26.09.2008. Activities, achievements and new initiatives of the circle were



Fig-4. *Paphiopedilum charlesworthii*, a tropical slipper orchid



Fig-5. *Gloriosa superba*, a poisonous plant of India locally known as 'Agnisikha' in Maharashtra

presented to the committee.

- The Third Subcommittee of the Parliamentary Committee on Official language reviewed the status of implementation of official language in Arid Zone Circle (AZC), Jodhpur on 10th February, 2009.

Workshop organized

- A long term funded training programme approved under All India Coordinated Project on Taxonomy (AICOPTAX) of the ministry was initiated with a two-week Capacity Building Training in Plant Taxonomy at the BSI, Eastern Circle, Shillong from November 03–15, 2008 to augment the taxonomic skills among College/University teachers and young researchers from North-eastern states.

- A Twelve-days Capacity Building Training Programme in Plant Taxonomy under AICOPTAX was organized at Southern Circle, Coimbatore from January 19 – 31, 2009 to augment the taxonomic skills among College/University teachers and young researchers from southern states. Twenty eight participants, both teachers and research scholars, from Madhya Pradesh, Chhattisgarh, Goa, Maharashtra, Tamil Nadu, Kerala, Karnataka and Andhra Pradesh, and scientific personnel and Research Fellows of the circle took part in the programme.

Digitization and establishment of integrated network of BSI Libraries

- Computerized catalogue of holdings of all BSI Libraries initiated using e – *granthalaya* Software developed by

National Informatics Centre. The software is installed in computers of all libraries for electronic cataloguing for giving access to library database through internet.

- Web portal of integrated network of BSI libraries made functional with the digitization of all holdings of BSI, Southern Circle, Coimbatore and part collections of BSI, ISIM, Kolkata.

Special information

New Species discovered

- *Boletopsis leucomelaena* (Pers.) Fayod



Fig-6. *Trachycarpus takil* an endemic palm of Kumaon Himalaya

(Polyporaceae)

- *Cololejeunea tixeriana* M.Dey, D.Singh & D.K.Singh (Lejeuneaceae)
- *Frullania pran-nathii* M.Dey, D.Singh D.K.Singh (Jubulaceae)
- *Lejeunea kashyapii* M.Dey, D.K.Singh D.Singh (Lejeuneaceae)
- *Lejeunea mehrana* M.Dey, D.K.Singh D.Singh (Lejeuneaceae)
- *Leptolejeunea arunachalensis* M.Dey, D.Singh & D.K.Singh (Lejeuneaceae)
- *Neolitsea gamblei* T. Chakrab. & P. G. Diwakar (Lauraceae)
- *Polypogon nilgiricus* K. A. A. Kabeer & V. J. Nair (Poaceae)
- *Roscoea naginoi* A. A. Mao & Manas Bhaumik (Zingiberaceae)
- *Russula koleggiensis* K. Das, J. R. Sharma & J. Hemenuay (Russulaceae)
- *Russula netrabaricus* K. Das, J. R. Sharma & J. Hemenuay (Russulaceae)
- *Vaccinium myodianum* Panda & Sanjappa (Ericaceae)

New Records for India

- *Agapetes macrantha* var. *grandiflora* (Hook. f.) Banik & Sanjappa (Ericaceae)
- *Agapetes macrantha* var. *oblanceolata* (Airy Shaw) Banik & Sanjappa (Ericaceae)
- *Bouvea macrophylla* Griff. (Anacardiaceae)
- *Bulbophyllum umbrosia* subsp. *nepalensis* J. J. Wood (Orchidaceae)
- *Curcuma yunnanensis* N. Liu & S. J. Chen (Zingiberaceae)

- *Gaultheria tetramera* W. W. Smith (Ericaceae)
- *Herniaria cinerea* (Caryophyllaceae)
- *Juncus harae Miyam.* (Juncaceae)
- *Juncus sherei Miyam.* (Juncaceae)
- *Lyonia ovalifolia* (Wall.) Drude var. *foliosa* (H. R. Fletcher) Zudd (Ericaceae)
- *Natsiatopsis thunbergiaeefolia* Kurz (Icacinaceae)
- *Passiflora jugorum* W. W. Sm. (Passifloraceae)
- *Vaccinium exaristatum* Kurz (Ericaceae)
- *Vaccinium nauttalli* (C. B. Clarke) Sleumer (Ericaceae)
- *Vaccinium papulosum* C. Y. Wu & R. C. Fang (Ericaceae)

New Records for State (Arunachal Pradesh)

- *Agapetes hillii* Brandis (Ericaceae)



Fig-7. A parasitic wild orchid

- *Agapetes kingdonis* Airy Shaw (Ericaceae)
- *Agapetes leucocarpa* S. H. Huang (Ericaceae)



Fig-8. Lotus (*Nelumbo nucifera*), beautifies the water bodies



Fig-9. *Arnebia euchroma* - a critically endangered plant found in cold desert of Himachal Pradesh

- *Agapetes megacarpa* W. W. Smith (Ericaceae)
- *Agapetes subsessilifolia* S. H. Huang (Ericaceae)
- *Agapetes subvinacea* Airy Shaw (Ericaceae)

Species collected after 50 years or more

- *Canscora stricta* Sedgw. (Gentianaceae)

Survey of Fauna

Zoological Survey of India

Introduction and Objectives

The Zoological Survey of India (ZSI), a premier taxonomic research institute of the country, established in 1916 as a national centre for faunistic survey and exploration of the resources leading to the advancement of

knowledge on the exceptionally rich faunal diversity of the country. ZSI with its headquarters at Kolkata and sixteen regional stations located in different geographic locations of the country, in recent years, has reoriented its plan to work by grouping the survey and studies under six major programmes as; (i) study of the fauna of states (ii) fauna of conservation areas (iii) fauna of important ecosystems (iv) status survey of endangered species (v) Fauna of India and (v) ecological studies & environmental impact assessments.

ZSI further provides (i) Identification & Advisory Services, (ii) Training & Extension Services in the field of animal taxonomy and faunistic surveys, (iii) Library facilities and (iv) Presentation & Publication of Research work in journals and books.

Progress / Achievements

- ZSI conducted one hundred sixteen extensive surveys and fourteen local surveys in twenty two States and UTs, viz., Andaman & Nicobar, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, & West Bengal.
- Status surveys were undertaken for Snow trout in Himachal Pradesh, for Himalayan Salamander in West Bengal, and for Tibetan Wild Ass (Kiang) and Himalayan Marmot in Ladakh.
- Surveys were conducted in three Biosphere Reserves, five National Parks, four Tiger Reserves and twenty three Wildlife Sanctuaries.

- Three Himalayan Ecosystems, four Estuarine Ecosystems, five Coastal Ecosystems and nine Wetland Ecosystems were surveyed.
- Rapid Assessment Survey of Cold Desert of Ladhak and Lahul Spiti of Himachal Pradesh were undertaken which yielded three new discoveries and three hundred fifty new faunal records for the area.
- Study of animal acoustic signals, their production and perception mechanisms, was taken up on birds by the scientists of Arunachal Pradesh Field Station, ZSI, Itanagar. This programme acts as bio-indicator (biophony), conservation and education and important communication systems in animals.
- Eastern Regional Station, Shillong participated in Indian Science Congress by setting up a stall for public highlighting the activities and achievements of ZSI as well as the faunal diversity and



Fig-10. Fan throated lizard



Fig-11. Nilgiri Tahr – an endangered and endemic species found in the Western Ghats

- distribution in Northeast India.
- One young scientist from Andaman & Nicobar Regional Station participated in Indian Antarctic Expedition. Participant for next batch (2009-10), has been nominated from the department.
 - Environmental Impact Assessments were conducted in two areas, one at Kapudi and Jalipa Lignite mining blocks of district Barmer, Rajasthan and at Lower Subansiri Hydro Electric Project was undertaken.
 - During the year, the survey yielded forty four new discoveries to science and several new records to the country.
 - Thirty four publications in the form of books, journals, pictorial handbooks, state fauna volumes, ecosystem studies & wetland fauna have been published. Two hundred sixty scientific papers were published in departmental and outside journals by ZSI scientists. Total sale of departmental publications amounted to Rs. six lakhs (approx).
 - Scientists of ZSI presented their work / attended at about one hundred thirty four Symposia & Seminars organized within the country as well as outside the country.
 - Seven Training Courses and Biodiversity



Fig-12. Bar headed goose

functions were organized by ZSI at Kolkata which included Collection and Preservation of Insects and Mites of Economic Importance as well as one training programme on "Leadership course on Environmental Awareness and Wildlife Conservation."

- One International Symposium was conducted at ZSI, Solan, Himachal Pradesh, in collaboration with Jawaharlal Nehru University (JNU), New Delhi and one National Symposium was conducted at Andaman & Nicobar Regional Station, Port Blair, on Present Status of Biodiversity in India.
- Eastern Regional Station, Shillong, Meghalaya completed fifty years of dedicated service to the nation and to commemorate the same Golden Jubilee

Celebrations were held at ZSI, Shillong which was inaugurated by His Excellency, the Governor of Meghalaya, on 19th March, 2009. On this occasion two books were released and one exhibition was inaugurated to the public

- Four hundred thirty eight identification materials were received and identification reports rendered to scientists.
- Projects related to Post Tsunami analysis of Coral reef, damage caused and Assessment of Status of Coral Reef have been taken up by scientists of ZSI, Port Blair.
- Zooplankton diversity, density and distribution were studied in eight stations Andaman Sea during September 10-20, 2008 by National Institute for Ocean Technology (NIOT) Research Vessel ORV

Sagar Manjusha as a collaborative venture between Andaman and Nicobar Regional Station-Zoological Survey of India (ANRS-ZSI), Port Blair and National Institute of Ocean Technology (NIOT), Chennai.

- Habitat analysis for translocation of Pygmy hog at Gorumara Wildlife Sanctuary, West Bengal, was taken up as a collaborative project funded by the State Forest Department (Wildlife), Government of West Bengal.
- Updated list of Indian species included under CITES completed
- Scientists of the department attended thirty four Wildlife Confiscated enquiries from April 1, 2008 to March 31, 2009 pertaining to the settlement of different pending court cases received from different Government Enforcement

Agencies (Police, Customs, Forest Department and Wildlife Wing of MoEF).

- Monthly ZSI e-News was hosted in the ZSI website from January, 2009 highlighting the activities of ZSI head quarters and Regional Stations.
- Capacity building in Taxonomy through AICOPTAX programmes were continued.
- ZSI has been recognized as the Repository of Zoological Specimens by MoEF under Biodiversity Act, 2002
- Member Planning Commission, Government of India visited ZSI and recommended to recognise ZSI as the Centre of Excellence in Animal Taxonomy
- The ENVIS in ZSI continued its activities and published one book and one News Letter highlighting the Entomofauna of Mangroves and Rapid Assessment Survey



Fig-13. A herd of wild ass

of Cold Desert respectively.

- Aquarium at ZSI, Digha and ZSI Chennai was updated with several marine animal species and visited by a large number of students and public.

Books Released during the Year by Dignitaries

- Animal Discoveries – 2008 by Hon'ble President of India
- Faunal Diversity of Andaman & Nicobar (Hindi) by Hon'ble Minister of State, MoEF.
- Fauna of Manipur by His Excellency Governor of Manipur
- Fauna of Mizoram by His Excellency, Governor of Mizoram
- Little Known Amphibians and Flood Plain Zooplankton by His Excellency the



Fig-14. India Grey Mongoose

Governor of Meghalaya

- Fauna of Conservation Area (2 books) by PCCF, Karnataka
- Faunal Diversity of India and Bharat ki Titaliyan (Hindi) by the Secretary, MoEF
- Status Survey of Kiang by Special Secretary, MoEF
- Member, Planning Commission (Environment) released two books and Joint Secretary, MoEF released four books.

Forest Resources and Survey

Forest Survey of India (FSI)

Introduction

The role of India's forests in the national economy and ecology has been reemphasized in the 1988 National Forest Policy, which focuses on ensuring environmental stability, restoring the ecological balance and preserving the forests. The policy aims at increasing the forest and tree cover to thirty three percent of the country's land area. It is important that the changes in forest cover and growing stock be regularly assessed and monitored for effective planning.

Forest Survey of India (FSI) is a premier national organization for forest resource assessment working under the Ministry. Besides carrying out forest and tree cover assessment, FSI estimates the growing stock of wood/forest biomass through national forest inventory and is also engaged in providing training, research and extension. Established on June 1, 1981, the Forest Survey of India succeeded the 'Pre-Investment Survey of Forest Resources' (PISFR), a project initiated in 1965 by Government of India with the sponsorship of Food and Agriculture Organization (FAO)



Fig-15. Swamp Deer

and to ascertain the availability of raw material for wood based industries. In 1976, the National Commission on Agriculture (NCA) recommended the creation of a National Forest Survey Organization for collection of reliable data at regular intervals. Consequently, PISFR was reorganized into FSI in 1981. After a critical review of activities the mandate of FSI was revised in 1986 in order to make it more relevant to the rapidly changing needs and aspirations of the country. The Forest Survey of India is headquartered at Dehradun and has four zonal offices located at Shimla, Kolkata, Nagpur and Bengaluru.

Objectives

The main objectives of FSI are as follows:

- To assess the forest cover of the country through remote sensing technology,

analyze the changes and prepare State of Forest Report biennially.

- To conduct inventory in forests and non-forest areas at national level and develop database on wood volume and also estimate tree cover.
- To function as a nodal agency for collection, compilation, storage and dissemination of spatial database on forest resources.
- To conduct training of forestry personnel in application of technologies related to resources survey, remote sensing, GIS, etc.
- To strengthen research & development infrastructure in FSI and to conduct research on applied forest survey techniques.

- To support State/UT Forest Departments (SFD) in forest resources survey, mapping and inventory.
- To undertake forestry related special studies/consultancies and custom made training courses for SFD's and other organizations on project basis.

Activities / Achievements

Forest Cover Assessment

FSI assesses forest cover of the country by interpretation of remote sensing satellite data and publishes the results in a biennial report called 'State of Forest Report' (SFR). Beginning in 1987, ten SFRs have been brought out so far. Starting with data of US Remote Sensing Satellite Landsat for SFR 1987, FSI switched over to the use of data of the indigenous satellite Indian Remote Sensing (IRS) LISS III sensor in 1995.

In the current cycle (i.e. for SFR 2007) FSI is using IRS P6 Resourcesat LISS III satellite data. Interpretation of satellite data for the forest cover assessment for the 'SFR 2007' is under progress. Interpretation of over 70% of the country's area has been completed and intensive ground truthing is also being undertaken.

The forest cover maps on different scales for whole of the country are available on demand at a nominal price. Since 2001, the latest forest cover maps of the country, States/UTs, and districts are available in hard copy and also in digital form.

Inventory of forest/ tree resources

Growing stock (wood volume) constitutes the most important parameter of the forest resources of the country. Historically and to a great extent even now forests have been managed to produce wood (timber) as a major product. Forest inventories are primarily



Fig-16. Purple Swamphen, in search of prey

aimed at assessing the growing stock of timber from forests. In the present scenario its role has become even more important in the context of biomass and carbon estimation in the forests. Besides wood volume, the information on annual increment, species composition, biomass, regeneration status, biodiversity, non-timber forest products etc. are required by forest managers, planners and policy makers. Forest inventory is a regular activity of the Forest Survey of India. About one hundred forty reports on forest inventory of different areas have been published. Although, some of the parameters mentioned above are still to be measured at the national level, FSI has been able to give the distribution of species and volume of important tree species within and outside the recorded forest area.

Until 2007-08, FSI was carrying out inventory of both forest and Tree Outside Forests. However, on the recommendation of

Technical Advisory Committee (TAC), from 2008-09, the forest inventory has been given a pause and in place of forest inventory, a new study on production and consumption of wood has been started on a cycle (two years). Field data are being collected from sample plots based on stratification of the country into physiographic zones and a sample of ten percent districts (or sixty districts) are taken in every cycle of two years for detailed inventory. The information, thus generated, forms a part of the biennial State of Forest Report.

The TOF are tree wealth which exists outside the forest areas. These are in the form of small woodlots and block plantations, trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. FSI has been carrying out TOF assessments since early 1990s but systematic estimate at the national level started since 2002.

The methodology followed for inventory of forests and trees outside forests carried out by FSI is as follows:

Forest and TOF Inventory

For assessment of Forest and Tree Outside Forest (TOF), the country has been stratified into fourteen physiographic zones according to tree species, composition and other ecological parameters. For forest inventory, in the selected districts, SOI toposheet of scale 1:50,000 is divided into 36 grids of $2\frac{1}{2}' \times 2\frac{1}{2}'$, further each are divided into 4 sub-grids of $1\frac{1}{4}' \times 1\frac{1}{4}'$

forming the basic sampling units. Two of these sub-grids are randomly selected and corresponding sub-grids in all the $2\frac{1}{2}' \times 2\frac{1}{2}'$ grids are selected to form the sample.

The intersection of diagonals of such sub-grids are marked as center of plot on the map. At the center of selected sub-grid a plot of 0.1 ha area is laid out in each such grid and data are collected from the plots. For TOF Rural a methodology based on remote sensing is used wherein LISS IV MX scenes (5.8m resolution multi-spectral) of IRS P6 (Resourcesat) are used for classification of image in three strata namely block, linear and scattered. Optimum plots are laid out in each stratum. For Urban TOF, Urban Frame Survey (UFS) blocks are used as basic sampling unit of data collection. For production consumption study, seventy five districts have been selected for the entire country and desired information is being collected from different offices in the selected districts. For biomass study fifteen districts have been selected and data is being collected in specific formats.

New Activities Initiated during the year

As per the recommendation of the TAC of FSI,

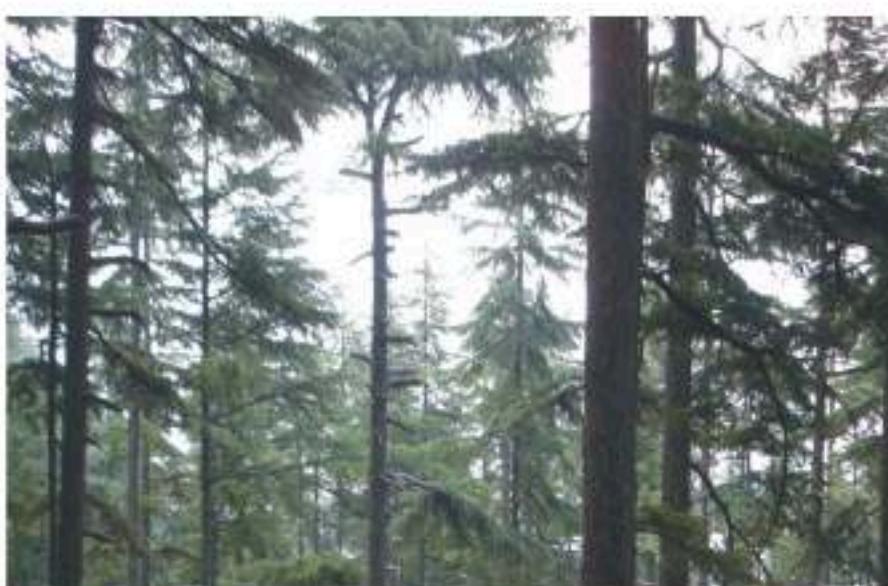


Fig-17. Himalayan Moist Temperate Forest of Udhampur District (J&K)



the forest inventory work has been given a pause and a new study regarding production and consumption of wood at national level has been taken up. In addition, FSI has also started a study to estimate forest biomass in comprehensive manner including branch wood, foliage, herbs, shrubs and dead wood etc.

Production and Consumption Study

The accurate knowledge of production and consumption of wood and other forest produce is pre requisite for the rational planning of the forestry sector. Though a few states in India have undertaken wood balance study in the last decades, there is no reliable estimate at the national level of all the forest products produced from different sources and their consumption by different users and wood based industries.

FSI therefore started a national level study on production and consumption of timber and fuel wood from 2008-09. For this study, seventy five districts spread over the entire country have been randomly selected. The data collection work has already been started.

Study for Estimation of Biomass in India's Forests

The Forest Survey of India has been entrusted with the responsibility of estimation of the carbon in forest ecosystem of India under the National Communication-II (NATCOM-II) project. For this project, the FSI is already having information on above ground woody biomass of all trees with dbh ten cm and more under National Forest Inventory (NFI). In addition, the information on carbon in forest soil (up to thirty cm depth), humus and litter (other than woody branches) is also available under NFI.

However, the information on biomass of

branches, foliage, flowers, fruits, twigs, barks and roots of NFI trees, all trees below ten Cm. dbh, shrubs, herbs, climbers etc., dead wood, litter (branches only) are not available under NFI. Therefore FSI has initiated a special study from 2008-09 to estimate the missing component of forest biomass which was not included in the regular forest inventory. For this purpose, information has to be collected from fifteen selected districts from all the physiographic zones representing almost all forest types of the country.

A total of thirty one districts were selected for TOF inventory during 2008-09 out of sixty districts for the period 2008-10. In addition, seventy five districts were selected for production-consumption study and fifteen districts for biomass study.

Data Processing

The data processing work is carried out at headquarters. The field inventory data is received from the zonal offices in the soft form. The data received from the zonal offices are checked thoroughly for any kind of inconsistencies which are then rectified before processing. Once data is fully cleaner, it is processed by using data processing software developed by FSI for estimation of total stems, stems per hectare, total volume and per hectare volume for different species and different diameter class. Presently, the data checking work for forest and TOF inventory data collected during 2007-08 is under progress.

Projects under FSI

National Forest Type Mapping

FSI is implementing a nation-wide project on mapping of forest types of India under the National Natural Resources Management System (NNRMS) project of Government of India. This first time exercise at the national



Fig-18. A view of West Coast Wet Evergreen Forest of Western Ghats

level, aims at mapping of about two hundred forest types of India described in the Champion and Seth classification (1968) on 1:50,000 scale.

In this exercise in addition to the remote sensing data, layers of temperature, rainfall, altitude, aspect, soil and other collateral and legacy data have been analyzed in GIS framework. The exercise also involves extensive ground truthing for collection of training sets and field validation. The project started in March 2005 and is expected to be completed by May 2009.

Near Real Time Monitoring of Active Fires using MODIS based Web Fire Mapper

FSI is monitoring forest fires of the country since 2004 using remote sensing based system developed and maintained by the University of Maryland (USA) and NASA viz., MODIS Rapid Response System. The detection of forest fires is made on the daily basis through the website

<http://maps.geog.umd.edu>. After collecting coordinates of the fire spots, FSI maps the forest fires through GIS analysis. The coordinates of all the forest fires are put on the official FSI website (www.fsi.nic.in), and also sent to the respective State Forest Departments through fax and email for control during fire season. From the feedback received from SFDs, it has been found that the detected forest fires are correct on more than 95% points.

Analysis of eligibility of lands for afforestation and re-afforestation projects under Clean Development Mechanism (CDM)

FSI has taken up a project for analyzing suitability of parcels of land identified for raising plantations under the proposed CDM Bio-carbon project of Himachal Pradesh Forest Department. Under this project, forest cover status of nearly 1000 parcels of land have been analysed with respect to December, 1989 rule for LULUCF CDM

projects. An intensive training programme has been conducted for the field staff of the State Forest Department to carry out the field survey required for the analysis using GPS. This is the first such project undertaken in the country. The project is nearing completion.

Mapping of change in land use in Aravalli hills of Haryana

A project for large scale mapping of Aravalli Hills in Faridabad and Gurgaon district of Haryana has been entrusted to FSI by Central Empowered Committee (CEC) of the Hon'ble Supreme court of India. FSI is using high resolution satellite data for generating current land use and land use change maps from 1998 to 2008 at interval of two years.

Coastal Zone Studies Project

FSI has undertaken a project in collaboration with Space Application Centre (SAC) on community level mapping of mangroves at large scale in selected coastal states of India. The study has been sponsored by the Ministry under the NNRMS programme. The project also envisages mangrove health assessment in Corringa Wildlife Sanctuary in Andhra Pradesh. The project is nearing completion.

Preparation of software package for



Fig-19. Trees in Village

processing of NTFP data of Chhattisgarh

On the request of Chhattisgarh State Minor Forest Produce (CSMFP) Federation, FSI has undertaken a project to develop a software package for data entry and processing of NTFP data collected by the staff of Federation for their use. The data processing module will be developed subsequent to data entry by the Federation.

Training

The training of forestry personnel in advance survey techniques and application of geometrics tools is one of the important activities of FSI. The major themes of training at FSI are forest inventory, application of Remote Sensing (RS) and GIS in forestry, application of Geographical Information System (GIS) in preparation of working plans, and application of Global Positioning Systems (GPS) in forest survey and demarcation. These training programmes are organised for the officials of the State Forest Departments at different levels of hierarchy. Duration of the training courses range from two days to two weeks. FSI also conducts outreach training courses on the specific demands of the State Forest Departments at the places and duration of their choice.

During 2008-09, 12 training courses have been planned under this programme which include three courses of two weeks duration on "Application of Remote Sensing and GIS in Working Plan Preparation" for CF/DCF/ACF level officers, one advance course of two weeks duration on "Application of GIS in Forest Resource Management" for DCF/ACF level officers, five courses on "GPS application in Forest Survey and Demarcation" of one week duration, one course of two weeks duration on "Inventory Techniques, Image Processing and GIS applications in Forestry" for Range Forest

Officers and two compulsory courses for IFS officers.

The target for training to forestry personnel from State Forest Departments during 2008-09 was one hundred. So far, (upto December 31, 2008), one hundred ninety five forestry personnel have been trained in different courses. Two compulsory courses for IFS Officers have also been completed. In addition, two outreach training courses have also been conducted one at Nagpur (Maharashtra) and another at Gangtok (Sikkim).

Survey and Utilization (SU)

The following programmes/ objectives related to forestry sector are dealt by Survey and Utilisation Division of the Ministry.

'Forest Certification' of Timber, Non-Timber Forest Products'

- Forest Certification has emerged as a voluntary market-driven mechanism in support of Sustainable Forest Management (SFM). Certification initiatives rely on consumers exercising purchasing choice in favour of products labeled as originating from forests certified to have been sustainably managed. Certification and Eco-labeling are the new mantras to enhance the product positioning for a premium price on one hand and ensuring better forest management practices on the other hand.

Objectives of Certification

- A system that assures the public that environmental concerns and values have been addressed.
- Manage resources holistically so that healthy environments are maintained.
- Control resource management

techniques.

- Control resources economically.
- Improve livelihoods
- Diminish the amount of regulation that is being imposed on a forestland owner
- Balance the need to extract resources from the environment while maintaining sustainable ecosystems.
- Control the values of private forestland owners, or for private forestland owners to maintain their values in the face of society's drive to impose its values on them.
- India thus, has to initiate a process of certifying forest/forest products to get access to Green markets and receive a premium price in the international market. This shall ultimately benefit the local communities by sustainable and improved price for the resources and value added handicraft products etc.
- The Ministry constituted a National Working Group / Governing Body to frame the policy guidelines for forest certification for timber and Non-timber forest products. For this purpose, three Committees were constituted to prepare a road map and the necessary criteria and processes for the development of National Certification mechanism in the country. These committees were merged into single committee namely the 'National Forest Certification Committee' for the development of Certification Criteria, Certification Process and Accreditation Criteria & Process towards Forest Certification of timber, Non-timber Forest Products.
- The first meeting of this Committee was convened on 11th December, 2008. It was



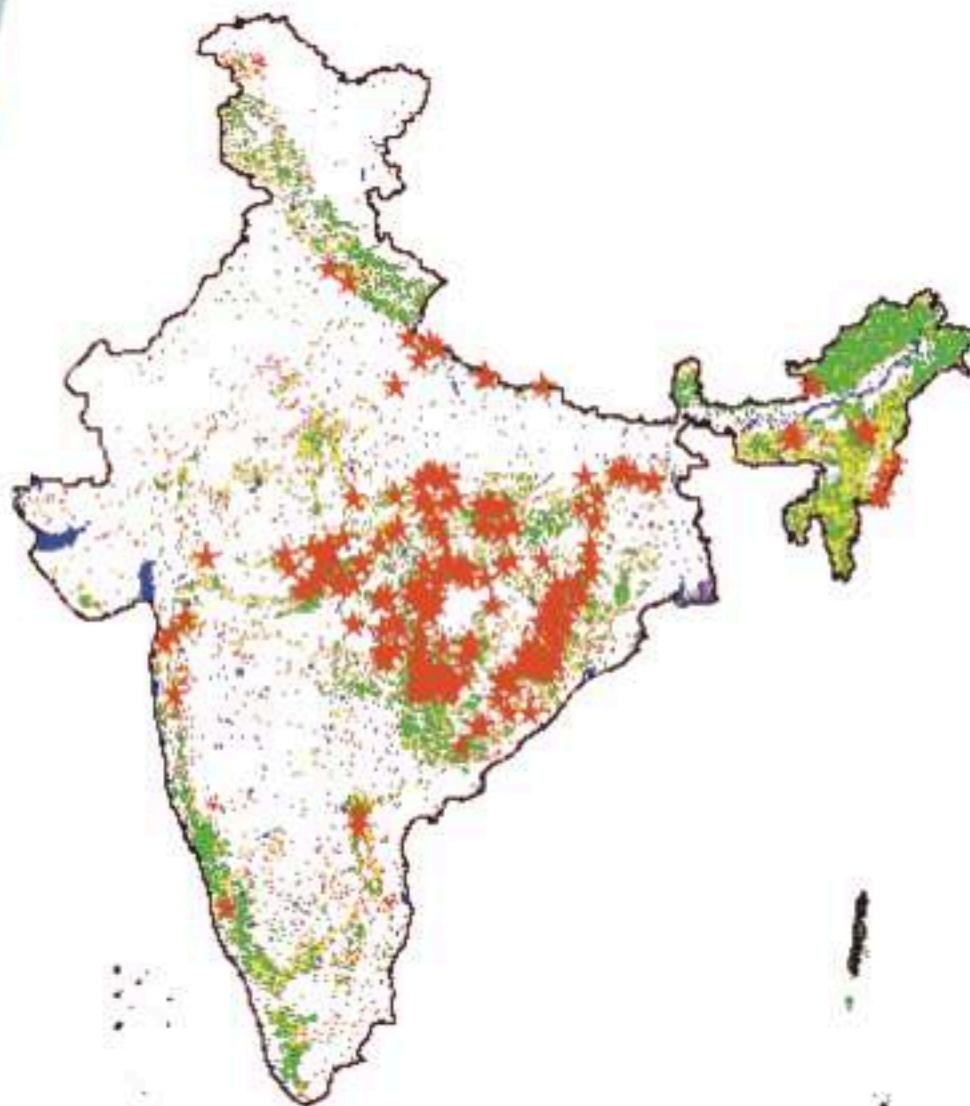


Fig.-20. Near Real Time Monitoring of Active Fires using MODIS based Web Fire Mapper

attended by a large number of stakeholders from different parts of country and abroad. It was unanimously agreed that an independent autonomous Forest Certification Council needs to be set up as the owner of the National Forest Certification Programme and to primarily take care of Standard setting and accreditation for the same which can be internationally recognised / accepted.

Export & Import of forestry products and Tariff

structure for forestry items

- The Division deals with the formulation of guidelines and directions for domestic and international trade in forest produce and the necessary regulation of export and import of forest produce as per the Foreign Trade Policy as well as the applied Tariff rates. Towards this purpose, the Ministry has constituted a Core Group to study the applied rates and import duties which are very significant in deciding the tariff rates for multilateral and bilateral trade

negotiations.

International Tropical Timber Organisation (ITTO)

- ITTO is an intergovernmental organization promoting the conservation and sustainable management, use and trade of tropical forest resources. Its members represent about 80% of the world's tropical forests and 90% of the global tropical timber trade. The Headquarter of

ITTO is at Yokohama, Japan. The International Tropical Timber Organization (ITTO) was established under the auspices of the United Nations in 1986 amidst increasing worldwide concern for the fate of tropical forests. While almost everyone was alarmed at the rate of deforestation occurring in many tropical countries, there was also considerable agreement that the tropical timber trade was one of the keys to economic development in those same countries. The reconciliation of these two seemingly disparate phenomena is ITTO's story.

- The ITTO members in 1990 agreed to strive for International Trade of Tropical Timber from sustainably managed forests by the century's end. This commitment became known as the 'Objective 2000' and a large part of the ITTO programme of projects and activities are devoted to its achievement. It remains a central goal of the Organisation, supported by renewed efforts to raise the capacity of government, industry and communities to manage their forests and add value to their forest products, and to maintain and increase the transparency of the trade and access to international markets.
- ITTO's origin can be traced back to 1976 when the long series of negotiations that led to the first International Tropical Timber Agreement (ITTA) began at the fourth session of the United Nations Conference on Trade and Development (UNCTAD) as part of that organization's Programme for Commodities. The eventual outcome of these negotiations was the ITTA, 1983, which governed the Organization's work until December 21, 1996, when it was superseded by the

ITTA, 1994. India is a signatory to the International Tropical Timber Agreement (ITTA), 1994. This is being replaced by a successor agreement , i.e. the ITTA 2006. The Ratification of this agreement i.e. ITTA 2006 has been done by India. The ITTA, 2006 is expected to come into force in the near future.

- The 44th session of the International Tropical Timber Council (ITTC), the governing body of ITTO was held at Yokohama, Japan during November 3 to 8, 2008 and was attended by delegates from India also.

Sustainable Forest Management (SFM) Cell

Sustainable Forest Management of Forests is of immense significance due to its contribution towards sustainable development. Sustainable Management of Forest is not a new concept in India. India remains committed to the goals of Sustainable Forest Management. An SFM Cell has been created in SU Division in the Ministry.

The main functions of Sustainable Forest Management (SFM) Cell are

- Co-ordinate developing Criteria & Indicators (C&I) action plans with the State / UT forest departments.
- Enable political and administrative environment toward C&I approach for SFM.
- Institutionalise C&I approach through incorporation in the National Working Plan Code and its application in the States.
- Apply C&I approach in the country in light of the Objective 2000 – certification of forest products (particularly NWFPs)
- Create awareness and sensitize various

stakeholders and enhance their capacities towards C&I approach.

- Encourage research and development on various aspects of C & I such as development of sets of C&I at State level, determining standard values (Minimum Acceptable Standard-MAS) for the indicators at national / state/ FMU levels.
- Facilitate information/data collection on C&I and exchange from different State/UT Forest Departments in the country.
- Encourage collection and dissemination of information to the stakeholders through newsletters and dedicated website etc.
- Encourage participation of local communities through awareness, capacity building towards application of C&I at FMU level including monitoring and functioning of institutional framework.
- Encourage incorporation of C&I approach in the training curricula of forest colleges / and teaching curricula of Universities and educational institutions.
- Facilitate pilot studies in different forest types of the country to test the Bhopal-India Process and develop replicable models for SFM.
- Ensure necessary infrastructure, financial and technical support for the proper implementation of the action plan at the national level.



Fig-21. Scattered Plantation

The second meeting of Sustainable Forest Management (SFM) Cell was convened on March 11 to 12, 2008 in the Ministry in which all the members of the SFM Cell and the representatives from various State Forest Departments participated. As per the decision during this meeting, the Ministry has constituted the following four teams:

- Team under the chairmanship of Sh. A. K. Mukerjee, Ex-DG (Forests) to prepare a document namely "Revised Working Plan Code" for incorporating the final draft Criteria & Indicator for Sustainable Forest Management into the Working Plan Code.
- Two teams have been constituted under the chairmanship of Sh. A. K. Mukerjee, Ex-DG (Forests) and Dr. Ram Prasad, Ex-PCCF, Madhya Pradesh respectively for the Pilot Testing of the final draft Criteria & Indicator (C&I) in the field for Northern, Central, Eastern, Western and Southern Regions.
- A team has been constituted under the chairmanship of Dr. Ram Prasad, Ex-PCCF, Madhya Pradesh for the purpose of preparation of Criteria & Indicator (C&I)

for Sustainable Management of Plantation in India.

- A team has been constituted under the chairmanship of Dr. Ram Prasad, Ex-PCCF, Madhya Pradesh for the purpose of Development of Criteria & Indicator (C&I) for Sustainable Management of Non-timber Forest Products (NTFPs).

The 1st meeting of team to prepare a document namely "Revised Working Plan Code" for incorporating the final draft Criteria & Indicator for Sustainable Forest Management into the Working Plan Code was held on 18th August, 2008 at Delhi under the Chairmanship of Sh. A. K. Mukerjee, Ex-DG (Forests). A combined meeting of two teams for the Pilot Testing of the final draft Criteria & Indicator (C&I) in the field for Northern, Central, Eastern, Western and Southern Regions was also held on 19th August, 2008 at Delhi. A project on Pilot Testing of the final draft of the National C&I has now been sanctioned by the Ministry.

National Multi-Disciplinary Team to combat smuggling of Red Sanders

- A 'National Multi-Disciplinary Team' has been constituted including DIG (SU) from MoEF and Additional Director Wildlife Crime Control Bureau to combat the smuggling of Red Sanders, under the Chairmanship of Director General of Revenue Intelligence and various important decisions were taken to control the smuggling of Red Sanders especially in custom's area.

Development of National Forestry Database Management System (NFDMS)

- The Ministry constituted an Expert/ Advisory / Working Group with an aim to support the implementation of an integrated National Forestry Database

Management System (NFDMS) in a comprehensive manner including strengthening of the technological, institutional and human capabilities to ensure continuing and effective dissemination and use of forest statistics. A project titled 'Removal of timber, fuel-wood, fodder and grasses from the forests through headloads and other means' has been sanctioned to Forest Research Institute, Dehradun.

National Workshop on Forestry Products Statistics in India

- A four days National Workshop on 'Forestry Products Statistics in India' sponsored by Intercontinental Tropical Timber Organization (ITTO) was organized by Ministry on May 13 to 16, 2008. Shri S. Regupathy, Hon'ble Minister of State (Forests & Wildlife) inaugurated the above workshop. In this workshop, the representative from ITTO and FAO, State Forest Departments / Research Institutions and other stakeholders participated. The following important recommendations have been made during the Workshop:
- Existing Information systems should be reviewed for the development of effective MIS. The Information Need Analysis (INA) should be carried out for data on State/Region/National and International level.
- The responsibility of review, planning and education should be taken up by the Ministry of Environment & Forests and adequate steps to ensure data availability with high quality and integrity.
- Directorate of Forest Economics and Statistics needs to be created under the Ministry of Environment & Forests for



Fig.22. Block Plantation

forestry data networking as the outcome of National Forestry Database Management System (NFDMS) scheme.

- FAO, ITTO and other international donor agencies may provide financial support for necessary outlook studies through Ministry of Environment & Forests.
- Statistical Cells must be created in each State/UT and must be adequately strengthened on regular basis.
- States / UTs must provide data in complete form and in time.
- The allocation of funds to the forestry sector specifically for strengthening of forestry statistics in the States / UTs must be enhanced.

Andaman & Nicobar Islands Forest and Plantation Development Corporation Limited

Andaman & Nicobar Islands Forest and

Plantation Development Corporation Limited (ANIFPDCL) is a Government of India Public Sector Undertaking, created in 1977 with the broad objectives of development and managing forestry plantations on the Islands. This Corporation has three main activities namely (i) Forestry Project, (ii) Red Oil Palm (ROP) project, and (iii) Katchal Rubber Project (KRP) in operation.

It is a loss making undertaking mainly due to the fact that its main activity i.e. logging, has been curtailed by the Hon'ble Supreme Court's Order banning the felling of trees. Due to this, even the obligatory expenses of the Corporation like the payment of salaries, wages etc. are possible only due to the sanction of interest bearing loans every year from the Govt. of India. During the year 2008-09, a budgetary provision of Rs. 10.00 crore has been made for payment as an interest bearing loan to the Corporation. Therefore, the restructuring of the corporation in order to make it financially viable has become a necessity. A proposal has been submitted by the Managing Director, ANIFPDCL regarding restructuring of the Corporation by offering Voluntary Retirement Scheme (VRS) to its employees and closure of loss making units. The proposal has been sent to the Principal Chief Conservator of Forests, Andaman & Nicobar Forest Department for their comments. A draft Cabinet Note will be prepared and submitted to the Union Cabinet thereafter.

CHAPTER – 2

CONSERVATION

Environmental Conservation

Mangroves and Coral Reefs

Introduction

The Ministry is at the forefront in regard to conservation and management of mangroves & coral reefs. The Ministry accords high priority to the Conservation and Management of Mangroves and Coral Reefs in the country. The Coastal Regulation Zone Notification (1991) under the Environmental Protection Act (1986) recognizes the mangrove and coral reefs areas as ecologically sensitive and categorizes them as CRZ-I (i) which implies that these areas are afforded protection of the highest order. Under the promotional measures, the Government has identified thirty eight mangrove areas and four coral reefs areas on a country-wide basis for intensive conservation and management (Table-1).

The National Environment Policy and the Scheme

The National Policy, 2006 recognizes that Mangroves and coral reefs are an important coastal environmental resource. They provide habitats for marine species; protection from extreme weather events; and a resource base for sustainable tourism. The National Environment Policy underlines the need to mainstream the sustainable management of mangroves into the forestry sector regulatory regime and adopt a comprehensive approach to Integrated Coastal Zone Management.

Mangroves

As per the State of Forest Report 2005, published by Forest Survey of India, the mangrove cover which was 4448 km² in 2003, has reduced to 4445 km² in 2005 i.e. there has been a marginal decrease of three

sq. km. in mangrove cover of the country. During the same period, there was increase in the mangrove areas in Gujarat from 916 sq. km. to 936 sq. km. However, there was reduction in the area in Andaman and Nicobar Islands from 658 sq. km. to 637 sq. km. and in West Bengal from 2120 sq.km. to 2118 sq. km. This is mainly because of the tsunami that hit Andaman & Nicobar Islands on December 26, 2004. Gujarat has shown an increase in mangrove cover mainly because of plantations and protection measures.

Mangroves play an important role in coastal ecology and protecting the coastal areas from the impact of tidal waves but the extent of protection is variable and is a function of several factors.

In case of Mangroves, the objectives of the Scheme is, to help the Coastal States/Union Territories in rehabilitation of degraded Mangrove Areas and enhance Mangrove cover by re-plantation in the open mud flats etc. Financial Assistance is given to coastal State Governments/Union Territories for implementation of Management Action Plan on Mangroves under the Scheme. One hundred percent assistance is given on grant basis to Coastal States / Union Territories for activities like Survey and Demarcation, Afforestation, Restoration, Alternative / Supplementary Livelihoods, Protection Measures and Education and Awareness.

On an average, an annual target of three thousand hectares on a country wide basis. The areas supported are among the thirty eight areas as already identified by MoEF for intensive conservation. During 2007-08, financial assistance to the tune of Rs. 6.25/- crores has been distributed among West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa and Gujarat

Mangrove cover in India as per State of Forest Report 2005

(Area in km²)

Sl. No.	States/UT	Mangrove Cover (2005)	Change w.r.t. 2003 assessment
1.	Andhra Pradesh	329	0
2.	Goa	16	0
3.	Gujarat	936	(+20)
4.	Karnataka	3	0
5.	Kerala	8	0
6.	Maharashtra	158	0
7.	Orissa	203	0
8.	Tamil Nadu	35	0
9.	West Bengal	2,118	(-2)
10.	Andaman & Nicobar	637	(-21)
11.	Daman & Diu	1	
12.	Puducherry	1	0
	Total	4,445	(-3)

for Conservation & Management of Mangroves in these coastal States. New areas are added to the existing list on the basis of recommendation by the National Committee on Mangroves & Coral Reefs. The National Committee has been duly reconstituted by the Ministry on September 19, 2007.

The project entitled "Mangroves for Future (MFF): a strategy for promoting investment in Coastal Ecosystem Conservation" is being coordinated by World Conservation Union (IUCN) covering, initially, six Tsunami affected countries(including India) in South & South East Asia & Western Indian Ocean. The project involves collaboration between multiple partners, including government agencies, NGOs, Research Institutes, UN agencies and other multilateral bodies. India has agreed to participate in the project. To oversee and guide the entire India country programme under IUCN-MFF (India) Programme as well as review, monitor and

evaluate its implementation, a National Coordination Body (NCB) has been constituted by the Ministry. First meeting of the NCB was held on October 21, 2007. During the meeting, geographical areas for MFF activities (four States have been selected viz., Gujarat, West Bengal, Andhra Pradesh and Orissa) and consultancy needs for India specific programs were discussed. IUCN representative informed NCB that India will be able to source small grants consultancy projects (up to USD 25,000 each), as well as services of a Swedish consultant, free of cost, under the IUCN-MFF initiative. A Stakeholders Workshop was held at GEER Foundation, Gandhinagar, Gujarat during February, 2008 with a view to assess the Capacity building & Training needs and discuss the National Strategy & Action Plan under the IUCN-MFF India Programme. The second meeting of NCB was held on May 14, 2008 in New Delhi. India has sourced approximately an amount of US Dollars

Table-1. Mangroves Sites in India

States/Union Territories	Mangrove Sites
West Bengal	1. Sunderbans
Orissa	2. Bhaitarkanika 3. Mahanadi 4. Subernarekha 5. Devi 6. Dhamra 7. Mangrove Genetic Resources Centre 8. Chilka
Andhra Pradesh	9. Coringa 10. East Godavari 11. Krishna
Tamil Nadu	12. Pichavaram 13. Muthupet 14. Ramnad 15. Pulicat 16. Kazhuveli
Andaman & Nicobar	17. North Andaman 18. Nicobar
Kerala	19. Vembanad 20. Kannur (Northern Kerala)
Karnataka	21. Coondapur 22. Dakshin Kannada/Honnavar 23. Karwar 24. Manglore Forest Division
Goa	25. Goa
Maharashtra	26. Achra-Ratnagiri 27. Devgarh-Vijay Durg 28. Veldur 29. Kundalika-Revdanda 30. Mumbra-Diva 31. Vikroli 32. Shreevardhan 33. Vaitarna 34. Vasai-Manori 35. Malvan
Gujarat	36. Gulf of Kutchh 37. Gulf of Khambhat 38. Dumas-Ubhrat

1,00,000/- for six small grand projects under the IUCN - MFF initiative. India also hosted the Fourth Regional Steering Committee Meeting at Sunderbans from 19-22 Jan, 2009. India was able to showcase the beauty, grandeur and wealth of mangrove biodiversity of Sunderbans, which is the largest mangrove swamp in the world. Apart from arriving at a number of decisions, the meeting served as common platform for sharing of experiences with other participating countries and representing from UNDP, FAO, and IUCN etc.

Coral Reefs

The four major coral reefs areas identified for intensive conservation & management are: i) Gulf of Mannar, ii) Gulf of Kachchh, iii) Lakshadweep and iv) Andaman and Nicobar Islands. The emphasis is on preventive aspects through monitoring and surveillance as the restoration work is both costly and time

Coral Reef Sites in India	
States/Union Territories	Coral Reef Sites
Gujarat	i) Gulf of Kutch
Tamil Nadu	ii) Gulf of Mannar
A&N Islands	iii) A&N Islands
Lakshadweep	iv) Lakshadweep

consuming. The Ministry provides financial assistance to the State Forest Departments of all the four identified coral reefs areas in the country for activities like monitoring, surveillance, education and awareness. Besides, the Ministry also supports R&D activities with emphasis on targeted research on coral biodiversity, its management including various aspects of pollution in these areas.



Fig-23. Mangroves – need conservation for human benefit



Fig-24. Mangrove in full bloom

The Indian reef area is estimated to be 2,375 sq km. For encouraging targeted research on both hard and soft corals in the country, the Ministry has established a National Coral Reef Research Centre at Port Blair.

The International Coral Reef Initiative (ICRI), a partnership among governments, international organizations, and non-governmental organizations throughout the world, has designated 2008 as the International Year of the Reef (IYOR, 2008).

Recognizing that the year 2008 is the International Year of Coral Reefs, the Ministry organized following events:

- The Ministry in collaboration with the South Asia Cooperative Environment Programme jointly sponsored a four day International Workshop 'Managers Exchange Programme' which was implemented by GEER Foundation during

November 5 to 8, 2008. Twenty Two delegates participated in this programme which included ten managers from South Asian countries, namely, India, Sri Lanka, Bangladesh, Maldives and Pakistan.

- A seminar on status and protection of Coral Reefs was organized by the Ministry jointly with NIO, Goa from January 21 to 23, 2008 at Kadamat Island, Lakshadweep. A total of fifty three delegates participated in this seminar which deliberated upon conservation of coral reefs.
- The Ministry is also organized a Brain Storming Session on Coral Reefs at Suganthy Devadason Marine Research Institute (SDMRI), Tuticorin on December 29 to 30, 2008 where over thirty five researchers from all over the country participated and contributed papers and

reports which are being embodied in a book form.

- The Ministry also hosted the 3rd Meeting of the South Asia Coral Reef Task Force (SACRTF) which was held on 16-17 December, 2008 at Chennai, India. India is the Chairman of the SACRTF.

Monitoring mechanism for the Scheme on Conservation & Management of Mangroves & Coral Reefs

Two tier system at National and State level are in operation for effective coordination to implement the Scheme on Mangroves & Coral Reefs:

National level

- National Committee on Mangroves & Coral Reefs monitors the implementation of the approved Management Action Plans of the Coastal States & UTs.
- To supplement base line information on priority areas of research, research projects are sanctioned to Universities and research institutes. A meeting of the Expert Group-B on 'Conservation & Sustainable Utilization of Natural Resources: Mangroves & Coral Reefs' was held in September, 2007. The Group considered 28 projects & recommended four research projects in the area of mangroves & coral reefs and these are being sanctioned by the Ministry.

State Level

- State level Steering Committee have been constituted under the Chairmanship of Chief Secretaries/ Additional Chief Secretaries/Principal Secretaries of Department concerned having members from subject matter departments/ academicians/ stakeholders/ representative from Central Government

to discuss Management Action Plans and review conservation activities undertaken from time to time.

In addition, the concept of Independent Evaluation by the State Government has also been invoked by introducing a special clause in the presidential sanction order itself and a modest budget is also being earmarked for the same. The Ministry has also carried out an independent evaluation of the achievements of the Scheme on Conservation & Management of Mangroves & Coral Reefs during the X Plan Period through GEER Foundation, Gandhinagar, Gujarat.

Biosphere Reserves

Introduction and Objective

Biosphere Reserves are areas of terrestrial and coastal ecosystems which are internationally recognized within the framework of UNESCO's Man and Biosphere (MAB) programme. These Reserves are required to meet a minimal set of criteria and adhere to a minimal set of conditions before being admitted to the World Network of Biosphere Reserves designated by UNESCO. The world's major ecosystem types and landscapes are represented in this network, which is devoted to conserving biological diversity, promoting research and monitoring as well as seeking to provide models of sustainable development in the service of human kind with special reference to the local communities which mostly consist of traditional societies.

These Reserves are rich in biological and cultural diversity and encompass unique features of exceptionally pristine nature. The goal is to facilitate conservation of representative landscapes and their immense biological diversity and cultural heritage, foster economic and human development





Fig-25. Landscape view of Simlipal Biosphere Reserves

which is culturally and ecologically sustainable and to provide support for research, monitoring, education and information exchange. The scheme is a pioneering effort at pursuing the increasingly difficult yet urgent task of conserving ecological diversity under mounting pressures. India has been divided into ten Bio-geographic Zones and these zones together consist of twenty five Bio-geographic provinces. The aim is to designate one representative site as Biosphere Reserve in each Bio-geographic province for long term conservation.

Activities undertaken

The programme was initiated in 1986 and till date, 15 sites have been designated as Biosphere Reserve (BR) in different parts of the country. Apart from 15 sites already

designated, a number of potential sites are under consideration. The Ministry provides financial assistance to the respective State/UT Governments for conservation and management of the designated Biosphere Reserves. The Indian National Man and Biosphere (MAB) Committee constituted by the MoEF is an apex body to oversee the programme, provide policy guidelines and review the programme. The BR sites are identified in consultation with the MAB Committee.

Out of the fifteen Biosphere Reserves designated nationally, seven Biosphere Reserves namely Sunderbans (West Bengal), Gulf of Mannar (Tamil Nadu), Nilgiri (Tamil Nadu, Kerala and Karnataka), Nanda Devi, (Uttarakhand), Pachmarhi (Madhya Pradesh), Simlipal (Orissa) and Nokrek (Meghalaya) have been included in the World Network of

Biosphere Reserves so far. The proposals in respect of Kanchanjunga (Sikkim), Manas (Assam) and Great Nicobar (Andaman & Nicobar Islands) are under active consideration of the UNESCO for inclusion in the world Network. Efforts are on for getting remaining Biosphere Reserves included in the World Network of Biosphere Reserves.

Research and development projects are also supported in these designated Reserves and potential sites. A number of Research projects have completed during the year which provided baseline data helpful in the scientific management of these Reserves (Annexure-IV).

Progress/Achievements

Management Action Plans (MAPs) submitted by the concerned states were scrutinized and sanctioned for implementation of approved items of activities. A Training Workshop was organized in Sunderbans for Biosphere Reserve Managers and Directors with partial financial and technical support of UNESCO, New Delhi. The Workshop provided great opportunity for the managers and representatives of Lead Research Institutions to exchange views and experiences and interact with experts in the field.

Comparison of progress in comparison to previous year

During the year, nomination for one biosphere reserve (Great Nicobar) was forwarded to UNESCO for recognition on World Network. UNESCO recognized 3 Biosphere Reserves during the year on world network based on the nomination forwarded during previous year. A new biosphere reserve in Kachchh area (Gujarat) was designated at Nation level during previous year.

State wise status

A State wise list of Biosphere Reserves designated so far along with their area and

location is given in Table-2.

Regulatory Acts /Rules governing the programme

The Core areas of the Biosphere Reserves continue to be protected under the Wild Life (Protection) Act, 1972 and the Indian Forest Act, 1927 and Forest Conservation Act, 1980. However, a separate regulation within the framework of existing Environment (Protection) Act, 1986 is being firmed up to regulate activities within buffer and transition Zones of the Biosphere Reserves.

Budget Allocation for the Scheme during the year and progress of Expenditure

An amount of Rs. 11 crore was allocated during the year and out of which Rs. 10.80 crore have been spent till March 31, 2009.

Implementing organizations in most of the States are Forest Departments and other line Departments of the concerned State Governments.

Present Biosphere Reserves (BR)

With the co-operation of State Governments/UTs 15 Biosphere Reserves have been designated till date (Table-2).

Biodiversity Conservation

Brief Introduction and Objectives

Biodiversity is the variability among living organisms and ecological complexes of which they are part, including diversity within and between species and ecosystems. Biodiversity has direct consumptive value in food, agriculture, medicine and in industry.

A scheme on biodiversity conservation was initiated earlier to ensure coordination among various agencies dealing with the issues related to conservation of biodiversity and to review, monitor and evolve adequate policy instruments for the same.

Table-2. List of Biosphere Reserves

S.No.	Name of the BR & total geographical area (km ²)	Date of Notification	Location (State)
1.	Nilgiri (5520)*	1.8.86	Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka)
2.	Nanda Devi (6497.03) *	18.1.88	Part of Chamoli, Pithoragarh & Almora Districts and Valley of Flowers (Uttarakhand)
3.	Nokrek (820) *	1.9.88	Part of Garo Hills (Meghalaya)
4.	Manas (2837)	14.3.89	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang Districts (Assam)
5.	Sunderbans (9630) *	29.3.89	Part of delta of Ganges & Brahmaputra river system (West Bengal)
6.	Gulf of Mannar (10500) *	18.2.89	Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)
7.	Great Nicobar (885)	6.1.89	Southern most islands of Andaman and Nicobar (A&N Islands)
8.	Simlipal (4374) *	21.6.94	Part of Mayurbhanj district (Orissa)
9.	Dibrus-Saikhowa (765)	28.7.97	Part of Dibrugarh and Tinsukia districts (Assam)
10	Dehang Debang (5111.5)	02.09.98	Part of Siang and Debang valley (Arunachal Pradesh)
11	Kanchanjunga (2619.92)	07.02.2000	Parts of North and West Sikkim (Sikkim)
12.	Pachmarhi (4926.28) *	03.03.99	Parts of Betul, Hoshangabad and Chhindwara, district (Madhya Pradesh)
13.	Agasthyamalai (3500.36)	12.11.2001 (area expanded on 30.3.2005)	Parts of Thirunelveli and Kanya Kumari Districts in Tamil Nadu and Thiruvanthapuram, Kollam and Pathanmthitta in Kerala (TamilNadu & Kerala)
14.	Achanakmar-Amarkantak (3835.51)	30.3.2005	Parts of Anuppur and Dindori districts of Madhya Pradesh and Parts of Bilaspur district of Chattisgarh State (Madhya Pradesh & Chattisgarh)
15.	Kachchh (12,454)	29.01.2008	Parts of Kachchh, Rajkot, Surendranagar and Patan Civil Districts of Gujarat State

* Sites have been recognized by UNESCO on World Network of BRs.

Convention on Biological Diversity

- The Convention on Biological Diversity (CBD), one of the key agreements adopted during the Earth Summit held in Rio de Janeiro in 1992, is the first comprehensive global agreement which addresses all aspects relating to biodiversity. The CBD, which has near universal membership with one hundred ninety one countries as its Parties, sets out commitments for maintaining the world's ecological underpinnings, while pursuing economic development. The Convention, while reaffirming sovereign rights of nations over their biological resources, establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. India is a Party to the CBD.
- The ninth meeting of the Conference of the Parties (CoP) to the CBD was held in Bonn, Germany from May 19-30, 2008. The official Indian delegation under the leadership of Secretary (E&F) participated actively in CoP-9. The Minister of State (E) participated in the High Level Ministerial Segment of CoP-9.
- In pursuance of various decisions of CoP-9, India has been responding to various Notifications being received from CBD Secretariat, *inter alia* by making submissions, and nominating experts for various expert group meetings.
- India is in the process of preparing its Fourth National Report to be CBD towards fulfillment of its reporting obligations. Funds have been accessed for this purpose from GEF through United Nations Development Programme (UNDP) and a consultant appointed

under this project. India also participated in the Sub-regional Workshop on preparation of the fourth national report to the CBD, held in December, 2008.

- India has offered to the CBD Secretariat to host two meetings to be organized in pursuance of decisions of CoP-9. One is a meeting of a group of technical and legal experts on traditional knowledge associated with genetic resources proposed to be held in Hyderabad from June 16 to 19, 2009. The other is Asian Regional Workshop on Protected Areas, proposed to be held in Dehradun sometime in September-October 2009. Preparatory work for organizing these international meetings has been initiated and detailed modalities for the same are being worked out in consultation with the CBD Secretariat.



Fig-26. Two-spot swordtail butterfly—
a bioindicator of environment

National Biodiversity Action Plan

- Subsequent to the approval of the National Environment Policy (NEP) by the Cabinet in 2006, preparation of a draft National Biodiversity Action Plan (NBAP) was taken up by revising and updating the National Policy and Macro Level Action Strategy on Biodiversity developed in 1999, and by using the final technical report of the UNDP/GEF project on National Biodiversity Strategy and Action Plan (NBSAP) in consonance with the NEP.
- After undertaking intra and inter-Ministerial consultations, the draft NBAP was revised. The revised NBAP as approved by the Prime Minister as MoEF, was again circulated to the concerned Ministries/Departments along with the draft Cabinet Note in May, 2008. Comments received were analyzed and a tabulated statement along with MoEF's observations was attached to the Cabinet note, which was submitted to the Cabinet Secretariat in October, 2008.
- The Cabinet in its meeting held on November 6, 2008 approved the proposals contained in the Cabinet note, i.e. approval of the draft NBAP, along with observations of MoEF on comments received. Thereafter, the NBAP document was printed and formally released by Shri Namo Narain Meena, Minister of State (E&F) during a National Workshop organized by the Ministry on February 24, 2009 in New Delhi. The printed copy was electronically communicated to CBD Sectt., and is now posted on their website and also on the website of this Ministry.
- The Ministry has sent copies of NBAP to all concerned Ministries/Departments, specialized agencies, and to all units

within the Ministry, with a request to initiate follow-up action points listed in the NBAP, keeping in view the matrix of implementation in these documents to facilitate regular monitoring for implementation of NBAP.

National Biodiversity Authority

- In pursuance to the CBD, India had enacted the Biological Diversity Act in 2002 following a widespread consultative process over a period of eight years. The Biological Rules were notified thereafter in 2004. The Act gives effect to the provision of the CBD. It also addresses access to biological resources and associated traditional knowledge to ensure equitable sharing of benefits arising out of their use to the country and its people, thereby contributing to achieving the third objective of the CBD. India is one of the first few countries to have enacted such a legislation. The Act is to be implemented through a three-tiered institutional structure: National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs). NBA has been set up in 2003. Twenty states have established SBBs, and BMCs are in the process of being set up in some states.
- Various measures were initiated to improve implementation of the Act. Following the completion of tenure of the previous Chairman, NBA, action was taken up to fill up the post by advertisement and selection through interviews, in accordance with the DoPT procedures. The new Chairman joined on December 31, 2008. The new Secretary joined on March 12, 2009. Measures were taken for filling up of the post of

Secretary, NBA on a full-time basis.

- An exercise was undertaken to review the progress in implementation of the various provisions of the Act, by identifying the Sections which need to be implemented by the NBA, and the provisions for which action is to be taken up by the Central Government. Action has been initiated on some of these provisions, and the progress is being regularly reviewed internally so as to take corrective measures, wherever required.
- An orientation and review meeting of the SBBs was organized in Ooty on April 28-29, 2008, under the chairmanship of Secretary (E&F). Another round of discussions with some of the SBBs was held on August 27, 2008 in the Ministry.
- During the year, three meetings of NBA were held on May 6, 2008, August 7, 2008 and January 28, 2009.
- An administrative order for designating certain institutions as Repositories for various categories of biological resources under Section 39 of the Act was issued on August 28, 2008, after completing consultations with these institutions.
- A Principal Notifications authorizing officers for filing complaints for cognizance of offences under Section 61 of the Act has been issued on November 17, 2008. An amendment to this Notification authorizing forest officers for this purpose was issued on August 1, 2009.
- In pursuance of Section 38 of the Act relating to Notification of threatened species, the Ministry has got prepared a State-wise list of threatened plants and animals, along with guidelines for their rehabilitation in consultation with the BSI and ZSI, and sent the same to State Governments for their comments. On receipt of comments from the State of Himachal Pradesh, Uttarakhand, Uttar Pradesh and Kerala, Notifications for threatened species for Himachal Pradesh was issued on March 19, 2009 and for the other these states is in the process of being issued.
- State Governments have been requested to send their views on the areas of biodiversity importance, which could be notified as Biodiversity Heritage Sites under Section 37. The NBA is in the process of developing draft Rules for management of these sites.
- State Governments have been requested to identify any biodiversity rich areas threatened by overuse or neglect as per Section 36 (2), and NBA has been requested to prepare guidelines for management of these areas.
- Process is underway for finalizing the list of normally traded commodities to the



Fig.27. Lichens (*Physcia caesia*) sensitive to variation in temperature and rainfall and serve as indicators of climate change



notified under Section 40.

- The matter and the format for Peoples Biodiversity Registers and guidelines for benefit sharing are in the process of being finalized in the NBA.
- In order to strengthen implementation of the Act and to build capacity of the institutional structures involved in its implementation, a project identification form (PIF) and project preparation grant were prepared for accessing funds from Global Environment Facility through UNEP.

Budget allocation of the scheme and progress of expenditure

An allocation of Rs.2.56 crore was made for the year 2008-09 against which an expenditure of Rs.2.66 crore has been incurred.

Biodiversity Scheme/Genetic Engineering Approval Committee (GEAC)

The Ministry of Environment and Forests, under the Environment Protection Act (1986), has notified the "Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells 1989" (known as Rules, 1989). The Genetic Engineering Approval Committee, the apex body under the Rules, 1989 has the mandate to approve the large scale trials and commercial release of Living Modified Organisms (LMOs) and ensure that research and development and testing of LMOs prior to release are conducted in a safe and scientific manner. The rules also cover the application of hazardous microorganisms which may not be genetically modified. Hazardous microorganisms include those which are pathogenic to animals as well as plants. Ten meetings of the Genetic Engineering

Approval Committee have been held from April, 2008 till March, 2009.

Progress/Achievements

Commercial Release of Transgenic Crops

Bt cotton is the only transgenic crop approved for commercial cultivation in India. Bt technology was deployed in cotton crop through genetic engineering techniques for control of bollworms, the major pest, thereby reducing the risk of crop failures and use of pesticides. Bt cotton produces a natural insecticide that comes from the ubiquitous soil bacterium known as *Bacillus thuringiensis* was approved by the Genetic Engineering Approval Committee (GEAC) for introduction in India in 2002 in the nine cotton growing states namely Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Tamil Nadu after extensive biosafety and agronomic testing. As of date the GEAC has approved several Bt cotton hybrids expressing Cry 1 Ac gene (MON 531 event) and stacked genes Cry1 Ac and Cry 2Ab (MON 15985 event)—BG-II developed by M/s Mahyco, encoding fusion genes (cry 1Ab+Cry Ac) 'GFM developed by M/s Nath Seeds and cry 1Ac gene (Event-1) developed by M/s J.K. Agri Genetics Ltd.

In addition, the GEAC also approved the commercial release of BN Bt (variety) developed by CICR, Nagpur. For the first time Bt technology has been introduced in a varietal background whereby the farmers can save seeds. During the period 2002 to 2008 the GEAC has approved 267 – Bt cotton hybrids of which 132 were approved during 2008.

From 2002 to 2008 the total area under Bt cotton has increased by one hundred times, the productivity per hectare and total

production has almost doubled, the use of pesticides has decreased and the export has increased by five times.

Status of approval of GM Food crops in India

The large scale field trials of Bt brinjal developed by M/s Mahyco expressing cry 1Ac gene from *Bacillus thuringiensis* tolerant to the fruit and shoot borer is under progress at eleven locations within the research farms of Indian Institute of Vegetable Research (IIVR)/State Agricultural Universities/ Indian Council of Agriculture Research. The trials are being conducted under the supervision of Director IIVR, Varanasi.

In addition, several GM food crops such as transgenic rice, okra, cauliflower, cabbage, castor, groundnut, tomato, sorghum, potato, maize are under various stages of research and development / biosafety testing.

Streamlining of the Biosafety Regulatory Procedure under Rules 1989

- The Gazette Notification exempting GM processed food and products thereof from the purview of Rules, 1989 issued on October 15, 2007 has been kept in abeyance until the Food Safety and Standards Authority set up under the aegis of the Ministry of Health and Family Welfare is made operational.
- The following new guidelines and protocols have been recently prescribed by the GEAC.
- Guidelines for Conduct of Confined Field Trials of Regulated, Genetically Engineered Plants in India and Standard Operating Procedures (SOPs), 2008 adopted by the GEAC.
- Guidelines for the Safety Assessment of Foods Derived from Genetically Engineered Plants in India, 2008

adopted by the GEAC.

- Protocols for Safety Assessment of Genetically Engineered Plants, 2008 adopted by GEAC.
- GEAC has adopted the 'event based approval' mechanism in respect of Bt cotton expressing approved events in its meeting held on April 2, 2008. A new procedure for commercial release of Bt Cotton hybrids expressing approved events has been put in place.
- Review of the existing national regulatory Biosafety framework with a view to harmonize the obligations under Cartagena Protocol on Biosafety (CPB) has been initiated.
- Development of a new Biosafety website has been initiated.
- The tenure of the re-constituted Genetic Engineering Approval Committee (GEAC) has expired on March 23, 2009. Reconstitution of the GEAC is under process.

Capacity Building to facilitate compliance of Biosafety regulation

Extensive capacity building activities for efficient management of field trials of GM crops are being undertaken. Training of SAUs covering sixteen states with respect to use of new guidelines for confined field trials, safe operational practices (SOPs), formats for monitoring and recording of data etc. have been completed.

As part of the USDA Capacity Building project on biosafety, the third Digital Video Conferences (DVCs) for scientific exchange between Indian and US scientists on biosafety issues was held on July 30, 2008. As a follow up to this initiative, a short term course on 'Confined field trials' was organized jointly by

the Ministry in collaboration with Michigan State University (MSU) in August, 2008 at MSU, USA. The exchange programme was attended by ten scientists from State Agriculture Universities, Indian Institute of Agriculture and Indian Council of Agriculture Research institutions. The second short term course for 'Risk Assessment of GM crops' at Michigan State University is tentatively scheduled in October, 2009.

Biodiversity Scheme/Cartagena Biosafety Protocol

Objectives

The Cartagena Protocol on Biosafety, the first international regulatory framework for safe transfer, handling and use of Living Modified Organisms (LMOs) was negotiated under the aegis of the Convention on Biological Diversity (CBD). The Protocol was adopted on 29th January, 2000. One hundred thirty countries have signed the Protocol. India has acceded to the Biosafety Protocol on 17th January, 2003. The Protocol has come into force on 11th September, 2003. As of date, one hundred fifty five countries are Parties to the Protocol. Four meetings of the Conference of Parties serving as Members of the Parties to the Cartagena Protocol (COP-MOP) on Biosafety have been held so far.

Progress / Achievements

Fourth Meeting of the Conference of Parties serving as Members of Parties (COP-MOP-4)

The Fourth Meeting of the Conference of Parties serving as Members of the Parties to the Cartagena Protocol (COP-MOP) on Biosafety was held in Bonn, Germany during May 12-16, 2008. The meeting was attended by four members of Indian delegation.

COP/MOP-4 adopted eighteen decisions on: the Compliance Committee; handling

packaging, transport and identification (HTPI) of living modified organisms (LMOs); the Biosafety Clearing-House (BCH); capacity building; notification requirements; socioeconomic considerations; cooperation with other organizations; public awareness and participation; risk assessment and risk management; monitoring and reporting; financial mechanism and resources; the roster of biosafety experts; assessment and review; subsidiary bodies; liability and redress; and budget.

The proposed Liability and Redress regime was the most contentious issue addressed at COP-MOP-4. Among the several controversial issues, the nature of the instrument (legally or non legally binding) was the most elusive issue during the entire four year negotiation on the liability and redress regime. While COP-MOP-4 did not complete its mandate to adopt an international regime to liability and redress, it achieved in reaching a consensus for adopting a legally binding regime on an administrative approach but including a provision on civil liability that will be complemented by non legally binding guidelines on provision on civil liability. To continue negotiation on the liability and redress regime during the inter-sessional period COP-MOP decided to set up a 'Group of the Friends of the Co-Chairs' comprising of six representatives from Asia Pacific Group, Africa Group, Latin American countries, Europe, Norway, Japan and New Zealand. Prior to COP-MOP 5, it is envisaged to hold two meetings of the 'Group of the Friends of the Co-chair'. Pursuant to the above decision, the first meeting of the 'Friends of the Co-chairs' was held in February 2008 in Mexico. The meeting was successful in streamlining the operational texts pertaining to the section on legally binding regime on administrative approach. The section on legally binding civil

liability clause and the non-legally binding guidelines for civil liability regime would be taken up in the next meeting which is tentatively scheduled for early January, 2010 at Kuala Lumpur. Preparatory work for finalizing the negotiating document has been initiated.

Dr. R.S. Rana, former Director, NBPGR, New Delhi was elected as a member of the Compliance Committee in COP-MOP 4 Meeting.

Capacity Building

The Ministry has initiated GEF Phase-II project on capacity building in biosafety. The main objective of the Phase-II Project is to strengthen the biosafety management system in India with special emphasis on Risk Assessment and Management, Handling, Transport, Packaging and Identification of LMOs, Socio Economic Considerations and Public awareness. Adopting a consultative approach, MoEF has convened a national consultation on March 27-28, 2009 as a first step to integrate stakeholder feed back in the preparation of Full Scale Project document.

Fifth Coordination Meeting for Governments and Organizations Implementing for funding Biosafety Capacity Building Activities and Sixth Meeting of the Liaison Group on Capacity Building for Biosafety was held from March 9 to 13, 2009 in San Jose, Costa Rica to discuss ways to strengthen national capacities for addressing issues related to environmental risk assessment; post-release monitoring of living modified organism; and integration of biosafety into national development plans, strategies and programmes such as Poverty Reduction Strategy (PRSs) and National programmes for achieving the Millennium Development Goals. India was represented in both the meetings.

All India Coordinated Project on Capacity Building in Taxonomy (AICOPTAX)

Taxonomy is the science which helps in exploration, identification and description of living organisms. However, the scope of taxonomy does not end with this. A sound taxonomic base is a pre-requisite for environmental assessment, ecological research, effective conservation, management and sustainable use of biological resources.

As a signatory to the Convention on Biological Diversity (CBD) held in Rio de Janeiro in 1992, India had committed itself to capacity building in taxonomy and taken up exploration and preparation of an inventory of living organisms. The Ministry has set up an All India Coordinated Project on Taxonomy. The Project has organized specialist groups drawn from Universities, Botanical and Zoological Surveys of India to take up taxonomic work on animal viruses, bacteria and archaea, algae, fungi, lichens, bryophytes, pteridophytes, gymnosperms, palms, grasses, bamboos, orchids, helminthes and nematodes, microlepidoptera and mollusca. Training in plant and animal biosystematics has also been recognized as an important component. The Scheme has been continued during the year and financial assistance has been provided to various units for undertaking taxonomic research work.

Several new records of wild flora and fauna and several discovered new species are being documented and verified with voucher specimens for authenticity before publication during the XIth Plan Period. Discovery of species new to science will be the major impact of the AICOPTAX Scheme. The significant achievement of the entire AICOPTAX Scheme since its inception till 2007 are being brought out in a book form with the help of BSI and ZSI. The summary of

the results is given in the Table-3.

Taxonomy is a dying science. The expertise available in the country is either aging or retiring. Efforts are being made to ensure that Taxonomy is revived and resurrected during the XI Plan. The Steering Committee for the AICOPTAX Scheme has been reconstituted on July 3, 2008 along with the formation of a Project Monitoring Unit (PMU). A meeting of the PMU was held on September 8, 2009. A total number of five projects were approved. A meeting of the Steering Committee was held on September 29 to 30, 2008 during which the entire scheme was reviewed and five new thematic areas have been proposed.

Assistance to Botanic Gardens

The scheme on Assistance to Botanic

Gardens, Botanic sections in popular gardens and Centers of *ex-situ* Conservation was initiated in 1992 to augment facilities for *ex-situ* conservation of rare, endangered, threatened and endemic plants. One time financial assistance is provided to identified Botanic Gardens and Centres of *ex-situ* Conservation for improvement of their infrastructural facilities to facilitate *ex-situ* conservation of rare endangered, threatened endemic plants.

Under the scheme, two hundred fifty eight projects have been supported so far to various organizations maintaining botanic gardens and Centres of *ex-situ* conservation. This is gradually helping in facilitating *ex-situ* conservation of rare endemic plants. A detailed guideline has been issued for

Table-3. Summary of the significant achievements of AICOPTAX Scheme

Heads	Total Achievements
Survey and Exploration : Tours undertaken (Major) (Minor)	1001 + 322 +
Augmentation of National reference collection of species since the implementation of the project	53,715
Total identification and taxonomical characterization of species since the implementation of the project	12,789
Documentation of Flora: (with descriptions)	6,759
Human resource development/training in Biosystematics (Capacity Building)	
No. of persons trained in taxonomy	450
No. of Ph.D. theses registered	105
Interesting Findings	
No. of taxa new to Science	493
No. of taxa new to India	449
Number of species, collected after a gap of over 50 years and above	189

guidance of proponents.

The Ministry has reconstituted the Expert Group on the scheme in December 2008. The Expert Group identifies and recommends proposals received for financial assistance under the scheme and also monitors and reviews progress of the sanctioned projects. During the year, twenty four projects have been approved for funding, which includes five Lead gardens. Based on the criteria prescribed in the guidelines, 'Lead Gardens' are being developed in different phytogeographic zones of the country to provide necessary expertise for smaller gardens. These gardens shall be equipped with modern facilities to enable them to perform their responsibilities.

During 2007-08, eleven gardens were supported under the scheme. Whereas during 2008-09, twenty four gardens have been supported and entire allocation of Rs. 2.20 crores have been spent.

A state wise list of organizations supported during the year is given in Table-4.

The projects under the scheme are implemented by various Government/Autonomous / Non-Government Organizations maintaining Botanical Gardens and Centres of *ex-situ* Conservation. The progress made by these Botanic Gardens is periodically monitored by the Botanical Survey of India which also helps in identification of rare, endangered, threatened and endemic plants requiring *ex-situ* conservation.

[Botanic Garden of India Republic \(BGIR\)](#)

[Introduction](#)

The Ministry of Environment and Forests had set up the Botanic Garden of Indian Republic (BGIR) to facilitate *ex situ* conservation and

propagation of rare and threatened indigenous plants of the country, serve as a 'Centre of Excellence' for research and training. BGIR was also mandated to build public awareness on the conservation needs through education on conservation of plant diversity. The scheme was identified as a "Green Channel" project under the National Jai Vigyan Science and Technology Mission of the Ministry of Science and Technology and approved by the Planning Commission.

[Progress / Achievements](#)

The BGIR is presently carrying out the basic scientific/technical work to address its given mandate. The following have been its major achievement during the year 2008-09:

[Plant Introduction Programme](#)

- Development of Economic Plants Section

An economic Plants Arboreta was developed in an area of about four acres. The composition of the arboretum includes indigenous tree species of high economic value; they yield timber, gums and resin, spices, fruits, medicines, dyes, oil, etc. The arboretum includes tree species that yield timber (e.g., *Toona ciliata*, *Terminalia* sp., *Sterculia urens*, etc.) oil (*Diploknema butyracea*, *Milletia pinnata*, etc.), spices (*Cinnamomum aromaticum*, *C. verum*, etc.) dyes (*Pterocarpus santalinus*, etc.), soap (*Sapindus emarginatus*), etc. The plants in the arboretum are properly labeled, with each label indicating the scientific/common name, family name and potential uses. The planning of the Economic Plant Section (EPS) was primarily to showcase the economic plant diversity for the purpose of building public awareness of plants from which daily use products are derived.



Table-4. List of organizations provided financial support during the year under the scheme on Assistance to Botanic Gardens

S.No.	Name of the Organisation	Status of Inst.
1.	Shivaji University, Kolhapur, Maharashtra	Autonomous*
2.	Rapinat Herbarium, St. Joseph College, Tiruchellapalli	Autonomous*
3.	Arunachal Pradesh Forest Research & Development Agency(SFRI), Itanagar	Autonomous*
4.	Regional Plant Resource Centre, Nayapali, Bhubneshwar	Autonomous*
5.	Central Arid Zone Research Institute, (CAZRI),Jodhpur	Autonomous*
6.	Ballu Bhai Krishan Lal Mazumdar Science College, Valsad, Gujarat	NGO
7.	Shri Shivaji Science College, Shivaji Nagar, Amravati, Maharashtra.	NGO
8.	Mizoram University, Aizwal, Mizoram	Autonomous
9.	Dr. Y.S.Parmar University of Horticulture and Forestry, (Kullu Unit), H.P	Autonomous
10.	Environmental Protection Training & Research Institute (EPTRI), Hyderabad	Autonomous
11.	Jharkhali Mangrove Ecological Garden, Calcutta Wild Life Soc., Kolkata	NGO
12.	Hindu Nadars, Senti Kumara Nadar College, Virudhnagar, Tamil Nadu	NGO
13.	Shri Parashakti College for women, Courtallam, Thirunelveli.	NGO
14.	Institute of Himalayan Bioresource Technology, Palampur, H.P	Autonomous
15.	Great Himalayan National Park, Shamshi, Kullu, H.P	State Govt.
16.	SIVP Arts Sci. and Com. College, Shahdah Distt., Nandurbar, Maharashtra	NGO
17.	State Forest Research Institute, Jabalpur, M.P	State Govt.
18.	Botanical Garden at Singri Hills, State Forest Deptt. Govt. of Assam	State Govt.
19.	Waghai Botanical Garden, Forest Deptt. Distt. Dangs, Gujarat.	State Govt.
20.	North Regional Circle, Botanical Survey of India, Dehradun.	Central Govt.
21.	Forest Deptt.Govt.of Maharashtra, Ojarkhed, Distt. Nasik Maharashtra.	State Govt.
22.	G.C. Shrivastav, Govt. PG College, Damoh, M.P	State Govt.
23.	High Altitude Botanical Garden, Tungnath, Srinagar, Uttarakhand	Autonomous
24.	K.B.Patil Mahavidyalaya, Pandarpur, Solapur, Maharashtra.	NGO

* Sites have been identified as Lead Gardens.



Fig-28. A view of a Botanic Garden

- Woodlands development -extension programme

As part of the woodlands development programme an extension of eighty metre wide area belt from the boundary wall was initiated; the woodlands development programme continued with replacements and additions to the composition of the woodlands.

- Medicinal Plants Conservation Programme

The development of Ayur Vatica continued, with efforts to augment the collection of medicinal plants in the garden. About two hundred medicinal plants are displayed both in the formal and informal sections. The Medicinal Plants Section is intrinsically linked to the education/ awareness programmes conducted by BGIR.

Research Programmes

- Database Development Programme

Data entry work on formal software initiated last year for (i) Threatened Plants Database, (ii) Introduced Plants Database, and (iii) Bibliography Database continued. Database of Oil Yielding Plants has been published in hard copy format. Software development for 'Seed Database' has been initiated.

- Conservation Research

Monitoring of multiplied seedlings of critically endangered plants such as *Cycas beddomei*, *Frerea indica*, *Trachycarpus fortunei*, *Hildegardia populifolia*, etc. continued. Orchid conservation work that was initiated last year paid dividends with as many as thirteen subtropical orchid species,



Fig-29. A view of Ayur Vatika in Botanical Garden of India Republic, Noida

including rare ones such as Paphiopedilum insigne, coming to flower in the conservatory. This was possible through proper management, including maintenance of RH and temperature.

Education Programme initiative

An Education Programme addressing the tropical environmental issue of Climate Change was designed to educate school children about the threats of global warming on biological systems and environment in general. The education programme (February 21 to 28, which is the National Science Day) was also developed to commemorate the Bicentenary Birthday celebration of the renowned naturalist, Charles Darwin, whose thought process on the science of evolution took shape during his long term association with the Royal Botanic Gardens, Kew, as well as celebrate the 150th anniversary of his famed publication On the Origin of Species (1859).

Infrastructure development

As part of the efforts towards building infrastructure by way of some enabling activities (peripheral access road and irrigation pipeline), work on construction of a WBM layered road (2.69 kms long) and

laying of an irrigation pipeline in the garden was initiated.

GOI-UNDP-CCF-II Project on Biodiversity Conservation through Community based Natural Resources Management

Introduction and Objectives

The interdependence between livelihood and ecological security makes the rural population the primary stakeholders in biodiversity conservation and sustainable use. Community Based Natural Resource Management (CBNRM) is hence a vital approach to enabling both the conservation of biodiversity and supporting local livelihoods. Therefore, integration of conservation and developmental activities addressing livelihood security of the communities assumes importance. It is also important to recognize traditional and community knowledge and its continued use to ensure conservation and to secure biodiversity-based livelihoods. Revitalization of traditional institutions of decentralized decision-making is necessary to ensure sustainability in conservation and livelihood approaches. Keeping in view these issues in background, the project envisages following objectives:

- To facilitate the process of making the national and state-level policies and programmes more responsive to linkages between sustainable rural livelihoods and biodiversity conservation.
- To enhance the capacity of communities and institutions of decentralized governance for integrating sustainable biodiversity based livelihoods through participatory approach.

The project aims to focus on conservation of species and habitats through responsible community-based management; Efforts at ecological restoration including species

recovery programmes; Issues of gender, equity, tenure and resource rights over common pool resources; Revitalization of indigenous knowledge, equitable customary laws and practices and ethical values recognizing socio-economic and gender differences; Nurturing existing as well as new self-governing community institutions following principles of participatory decision-making, gender and social equity; Facilitating democratization of existing formal and informal institutional structures and processes (community forest management, Eco-development committees, Panchayat Raj Institutions, women SHGs etc) and Facilitating integration between various sectors and coordination in the functioning of line departments for ecological sustainability.

After identification of states and coordinating partners, an introductory workshop was organized in January, 2008 to apprise the participants including concerned states about the project. The project has started in January, 2008 for a total duration of three years.

Progress / Achievements

The detailed project documents were prepared and finalized for each state during the year. A review workshop was organized along with a meeting of Empowered Project Steering Committee (EPSC) and National Steering Committee (NSC) to access the progress of the projects. As per the project documents and expected outputs for the project are as follows:

- Concepts, methods, and tools for integrating natural resource based livelihoods with gender based equality concerns into biodiversity conservation and development strategies evolved.
- Lessons from site based activities and policy analysis disseminated to for

programme and policy formulation.

- Local and sub-national networks promoting community based conservation established

During the year 2007-08, the project was introduced to different participants but actual finalization of the detailed project documents, budget and subsequent release of grant was made during 2008-09. The implementing agencies have started the projects during the current year.

The project is being implemented in four states namely Arunachal Pradesh, Chhattisgarh, Jharkhand, and Orissa. These states are primarily tribal dominated and therefore forest dependent livelihoods will be largely benefited from interventions that are proposed in this project. Arunachal Pradesh has over 80% of the land area under forests, while Jharkhand, Chhattisgarh and Orissa have large stretches of forest that are controlled and managed by the communities. In all the four states, development of alternative sources of income assumes importance as the communities depends mainly on the natural resources for their livelihoods.

A total sum of approx Rs. 13.50 crores (US\$ 3 Million) is available under the project. Out of this, a grant of Rs. 3.54 crores have been sanctioned and Rs. 2.93 crores released during 2008-09 to four identified implementing agencies.

The Ministry of Environment and Forests is the implementing agency of the project. At National level, a National Steering Committee (NSC) and an Empowered Project Steering Committee (EPSC) have been constituted for overall coordination and implementation of the project. A National Project Director (NPD) has been designated and a Project Management Unit (PMU) has



State-wise amount sanctioned and released under this project

State	Coordinating Agency	Amount sanctioned for three years	Amount released in 2008-09
Arunachal Pradesh	G.B. Pant Institute of Himalayan Environment & Development, N-E Unit, Itanagar	Rs. 252.89066 lakhs	Rs. 75 lakhs
Jharkhand	Institute of Forest Productivity, Ranchi	Rs. 250 lakhs	Rs. 58 lakhs
Orissa	Regional Plant Resource Centre, Bhubneshwar	Rs. 250 lakhs	Rs. 47 lakhs
Chhattisgarh	State Minor Forest Produce (T & D) Cooperative Federation , Raipur	Rs. 250 lakhs	Rs. 69 lakhs

been established at MOEF for administrative support to the Project. The NSC lay down the guidelines for the project implementation and also reviews the progress periodically. The EPSC approves the Annual work plan and expenditure as per approved budget and also provides the feedback for reviewing the progress by NSC.

[**UNDP-GOI-CCF-II Project on Promoting Conservation of Medicinal Plant and Traditional Knowledge for Enhancing Health and Livelihood Security**](#)

Medicinal and Aromatic Plants have been used as healers and health rejuvenators since time immemorial and have been recognized as the foundation of healthcare practices in Asia, particularly traditional or the so called alternative medicinal practices such as Ayurveda, Siddha, Unani, traditional Chinese and Tibetan medicines. Medicinal and Aromatic Plants diversity is an integral part of the Forests and Biodiversity therefore it is vital to conserve, protect, cultivate, propagate, improve harvesting and collection practices of medicinal plant diversity of the country. These also form the biodiversity based livelihoods and its continued use is

imperative.

Recognizing the urgent need to conserve and protect the medicinal plant diversity of the country, the Ministry initiated a Project namely GOI-UNDP-CCF-II National Programme on Promoting Conservation of Medicinal Plants and Traditional Knowledge for Enhancing Health and Livelihood Security. The Project has an outlay of Rs.12.90 crores and was initiated in May 2006. The Project is being undertaken in nine States.

The main objective of the project is promoting conservation of medicinal plants and traditional knowledge for enhancing health and livelihood security. The major thrust of the Project is to promote conservation of medicinal plants and associated traditional knowledge with local people and mainstreaming these into the existing policies and programmes of the forestry and health sector.

The Foundation for Revitalization of Local Health Tradition (FRLHT), Bangalore is the designated National Focal Point for the programme. The programme is being implemented through State Forest

Departments and the Conservator of Forest is the State Focal Point. The Project is overseen by a Project Monitoring Board (PMB) and is implemented by an Empowered Project Standing Committee (EPSC). During the year one meeting of PMB and two meetings of EPSC were held. The project has now been extended upto March 2010. Some of the activities carried out under the project are as follows:

- Conservation, Assessment, Management Prioritization (CAMP) workshops have been organized in Orissa, Rajasthan, West Bengal, Kerala and Tamil Nadu. A list of three hundred sixteen plants has been prepared for assessment out of which fourteen species have been identified as critically endangered (CR), forty three as endangered (EN) and fifty nine as vulnerable (VU) as per IUCN threat category. One hundred twenty six have been identified as heavily traded or endemic or conservation dependent in the project implemented States.
- CAMP Reports have been published for Orissa and West Bengal.
- Thirty five Medicinal Plants Conservation Areas (MPCAs) have been identified to conserve the endangered medicinal plants. Sites have been prepared for Madhya Pradesh, Orissa and Rajasthan. Out of these twenty are supported under the Project and the remaining are the offshoot of the study to be undertaken by the State.
- Infrastructure for five State Level Medicinal Plant Seed Centres have been developed and Nurseries to raise sixty seven prioritized species have been established in Karnataka, Kerala, Tamil Nadu and Andhra Pradesh.
- One lakh seedlings of Decalepis - a critically endangered and highly traded medicinal plant from Karnataka have been distributed.
- For sustainable harvest, twenty three prioritized species have been identified and protocols have been developed.
- Thirty thousand eight hundred Home Herbal Gardens (HHGs) and two hundred Community Knowledge Registers (CKRs) have been prepared for the State of AP, WB, Rajasthan, Maharashtra and Orissa.
- Twenty Primary Health Centers (PHCs) have been equipped for delivering health care through Traditional Knowledge Documentation in the State of Karnataka.
- Modules have been prepared in the form of interactive CD for introducing Traditional Knowledge curriculum in school and medical education. Testing of CDs have been carried out in seven schools.
- Twenty three trainings for six hundred thirty participants have been imparted.
- A visit to Kenya for studying 'Sustainable Harvesting and Management Approaches for Medicinal Plants' has been undertaken during July 23 to 31, 2008.

[UNDP-GOI-GEF Project on Mainstreaming Conservation and Sustainable Use of Medicinal Plant Biodiversity in three Indian States](#)

Encouraged with the success of the above project, the Ministry with the support of UNDP and Global Environment Facility (GEF) has now initiated another project namely "GOI-GEF-UNDP Project on Mainstreaming Conservation and Sustainable use of

Medicinal Plant Biodiversity in three Indian States" in the States of Chhattisgarh in Central India, Arunachal Pradesh in North-East India and Uttarakhand in North-West India. These States provide a broad range of ecological conditions, and hence medicinal plant diversity as well as a range of institutional arrangements relating to forest management. The total outlay of the project is US\$11,414,121 with US\$ 4.93 million of GEF and US\$ 6.4 million of Government contribution which makes it Rs.57.07 crores as the total cost of the project. The project is for seven years.

The Project is an extension of the above project with main thrust of mainstreaming the long-term conservation, sustainable and equitable use of medicinal plant diversity and associated traditional knowledge with local people into forest management policy and practices at the national, state and local levels.

The project aims to mainstream the long-term conservation, sustainable and equitable use of India's medicinal plant diversity into forest management policy and practice at the national, state and local levels. The project was launched through an Inception Workshop on September 9, 2008 in the Ministry. The Project was launched in the State of Uttarakhand through a Brainstorming Session held at Dehradun on September 27, 2008.

The State of Chhattisgarh and Arunachal Pradesh have also launched the project in their States on January 17, 2009 and February 27, 2009 respectively. The Joint Secretary (CS-III) has been designated as the National Project Director (NPD) for the Project. The Project shall be overseen by the National and State Level Steering Committees which have already been constituted. The

States have also established Project Management Units in their States.

Forest Conservation

Objective

The mandate of the Forest Conservation Division is to implement the Forest (Conservation) Act, 1980, which was enacted on 25th October, 1980. This Act deals with grant of forestry clearances for diversion of forest lands for non-forestry purposes in respect of development projects like power, roads, railways, irrigation, mining, schools, defence, drinking water, resettlement & rehabilitation of people etc. This Act is regulatory in nature, not prohibitory.

Activities undertaken

- During 01.04.2008 to 31st March, 2009, about 1,726 developmental projects involving about 60,868 hectares forest areas have been granted forestry clearance. These include the projects for power generation, irrigation, construction of roads, railway lines, transmission lines, drinking water supply projects, village electricity, schools, hospitals etc.
- During this period, 120 proposals were closed / rejected / returned / withdrawn owing to shortcomings from the established/requisite requirements for granting forestry clearance under the Forest (Conservation) Act, 1980.
- Further, to boost the development of underdeveloped area including tribal areas, general approval under Section-2 of the Forest (Conservation) Act, 1980 has been accorded for underground laying of electric cable and wires to individual household, drinking water supply/water pipelines, telephone lines which involve felling of trees not exceeding 50 numbers

per project and are outside the National Parks and Sanctuaries and are laid along the road and validity of the general approval has been extended till further orders.

- Good practices have been adopted to ensure transparency in the system of forestry clearances. Dates of meeting to be held every month in the Ministry and its Regional Offices have been fixed. Rules, guidelines, status of proposals, approvals are displayed on the Website.
- During the period, PMO references (43) and VIP references (40) have been accorded special attention and almost all of them have been processed and replied with.
- During the period, in order to operationalize CAMPA, the Compensatory Afforestation Fund (CAF) Bill 2008 was prepared. The Cabinet approved the Compensatory Afforestation Fund Bill, 2008, which was introduced in the Lok Sabha in May 2008. The Bill was referred to the Department related Parliamentary Standing Committee on Science & Technology, Environment & Forests. The Committee submitted its report on 22.10.2008 and the Bill was, subsequently, passed by the Lok Sabha on 23.12.2008. . However, the Bill could not be passed by the Rajya Sabha. The Bill stands lapsed with the constitution of the new Lok Sabha.
- Taking into account the need to commence Compensatory Afforestation in the States/UTs without further loss of any planting season, a meeting of all Chief Secretaries of States was convened on 30.03.2009, chaired by the Principal Secretary to the Prime Minister, to identify a workable mechanism. The meeting

concluded that State Level CAMPAs be constituted and model guidelines be prepared for adoption by the State/UT Governments.

Strengthening of Forests Division

Introduction

The Ministry has six Regional Offices located at Bengaluru, Bhopal, Bhubaneswar, Lucknow, Shillong and Chandigarh with its Headquarter in the Ministry at New Delhi. List of the Regional Offices is given in Annexure-II A.

Objective

The primary function of the Regional Offices is to monitor and evaluate the ongoing forestry projects and schemes with specific emphasis on conservation of forests and follow up action on the implementation of conditions and safeguards laid down by the Ministry while granting clearance to development projects under FCA, 1980 and EPA, 1986 (Table-5).

Progress of Activities Undertaken

The Regional Chief Conservator of Forests is empowered for approval of diversion of forest land for non-forestry purposes upto the extent of five ha. (except mining and regularization of encroachment) and to process cases between 5 ha to 40 ha. in consultation with the State Advisory Committee and to undertake physical inspection of sites in cases of diversion of forest lands to non-forestry purposes involving an area of more than 100 ha.

Intensification of Forest Management

(Previously Integrated Forest Protection Scheme (IFPS))

Integrated Forest Protection Scheme (IFPS) now renamed as "Intensification of Forest



Table-5. Statement showing Regional Office wise physical and financial targets and achievements for monitoring of approved project under FCA, 1980 and EPA, 1986 for the year 2008-09 (From 1-4-2008 to 31-03-2009)

(Physical in No.)

S.No.	Regional Offices	FCA		EPA	
		Target	Achievement	Target	Achievement
1.	Bengaluru	150	158	200	394
2.	Bhubaneswar	80	60	85	147
3.	Bhopal	145	08	180	174
4.	Lucknow	150	201	200	328
5.	Shillong	60	61	70	66
6.	Chandigarh	110	114	200	319
Total		695	602	935	1428
(Rs. in crores)					
Revenue head			Capital head		
Target	Achievement		Target	Achievement	
7.83	7.46		5.85	5.85	

Management" was being implemented during the X Five Year Plan and is being continued during XI Plan also. It has been proposed to broad-base the scheme by including four new components in addition to the existing two components of IFPS.

Components of IFSP

- Infrastructure Development
- Working plan preparation/Survey and Demarcation.
- Strengthening of Infrastructure for Forest Protection.
- Forest Fire Control and Management New Components
- Conservation and Restoration of Unique Vegetation and Ecosystems.
- Protection and Conservation of Sacred Groves.

- Control and Eradication of Forest Invasive Species.
- Preparedness for Meeting Challenges of Bamboo Flowering and Improving Management of Bamboo Forests.

The Central Sector Component of the Scheme is to be implemented by the Forest Protection Division of the Ministry in association with Forest Survey of India, Dehradun and other Central Institutions like Indian Council of Forestry Research and Education, Dehradun, Indian Institute of Forest Management, Bhopal etc.

The State Sector Component of the Scheme is being implemented by the Forest Departments of the concerned State Governments and UTs.

The Central Assistance is provided for various activities which will help to protect and improve the existing forests. The major items of expenditure include communication, mobility,

fire fighting measures, construction of offices and residences particularly of the front line staff, technology upgradation and skill development, survey and demarcation and writing of working plans, assistance to JFMCs etc.

The 11th Plan outlay for the Scheme is Rs.600 crore. The allocation for 2008-09 is Rs.118.30 crore.

Joint Forest Management (JFM) – the conceptual frame work for JFM emphasizes development of partnership with forest fringe people. Guidelines of JFM have been updated from time to time focusing on the management and utilization of NTFPs in coordination with PRIs at various levels. Presently, there are more than one lakh JFMCs managing an extent of 22 mha involving 22 million people of forest area.

Management of Gregarious Flowering of Muli Bamboos in North- Eastern States of India

With a view to addressing the problem of gregarious flowering and mitigating its adverse effects, the Government of India launched a Centrally Sponsored Scheme "Management of Prospective Gregarious Flowering of Bamboo in North Eastern States". This scheme is aimed at assessing the extent of gregarious flowering, facilitating extraction of flowered bamboo, generating quality planting material, regenerating the flowered area with multiple use bamboo and other species, awareness generation about the consequences of gregarious flowering, rodent control and fire control. Duration of the scheme was from 2005-06 to 2008-09 with an overall allocation of Rs. 85.00 crores. A Central Monitoring Committee under the chairmanship of Director General of Forests and Special Secretary was constituted to oversee the implementation of the Scheme

and its various components. Nine meetings of the Central Monitoring Committee have already been held and the 10th meeting is scheduled to be held in January at Agartala. An appraisal of the field works of the Scheme was carried out by the Ministry and the scheme was found to be effective in regenerating substantial area where flowering of bamboo took place. The current financial year is the concluding year of the Scheme. The financial progress of the Scheme, State-wise, is given in Table-6.

Forest Policy

The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

The Ministry has been pro-actively involved, in coordinating the Implementation of The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 along with Ministry of Tribal Affairs. In the process:

- A simplified procedure to be followed for forest diversion cases to facilitate implementation of Section 3(2) of the Rights Act, which deals with creation of public facilities for the right holders, has been finalized and communicated to Ministry of Tribal Affairs for further action.
- Guidelines for identification and declaration of critical wildlife habitats have been circulated to all the States/UTs as a preparatory step for implementation of provisions of Section 4(2) of the Act, which deals with modification or resettlement of the Forest Rights conferred under the Act, in critical wildlife habitats of National Parks and Sanctuaries.
- Monitoring formats have been developed for quarterly reporting by States/ UTs on the status of implementation of the



Table-6. Financial progress of the scheme "Management of Gregarious Flowering of Multi Bamboos in North- Eastern States of India".

(Rs in crore)

Sl. No.	Implementing States	Total approved allocation under CSS scheme	Amount released during 2005-06	Amount released during 2006-07	Amount released during 2007-08	Amount released during 2008-09	State-wise total release for the scheme
1.	Arunachal Pradesh	1.50	00.10	00.65	0.50	00.25	1.5
2.	Assam	13.00	03.25	00.00	2.045	2.204	7.499
3.	Manipur	09.90	02.41	3.034	3.000	1.456	9.90
4.	Meghalaya	06.80	01.71	00.00	3.500	1.59	6.80
5.	Mizoram	23.60	03.00	10.332	5.263	5.00	23.595
6.	Nagaland	08.00	02.10	4.219	1.6810	0.0	8.00
7.	Tripura	21.20	05.25	6.065	5.6850	4.2	21.20
8.	ICFRE*	01.00	00.00	00.70	0.00	0.30	1.00
	Grand Total	85.00	17.82	25.00	21.674	15.00	79.494

provisions of this Act, relating to Forest Departments.

- In the context of numerous Court Cases challenging the various provisions of the Act, this Ministry is regularly providing Ministry's comments to the Nodal Ministry i.e. Ministry of Tribal Affairs.
- Meetings have been conducted with State Governments/UTs representatives from Forest Departments to facilitate implementation of the Act.

United Nations Forum on Forests (UNFF)

The United Nations Forum on Forests (UNFF) in its 7th Session had adopted the Non-Legally Binding Instrument on all types of forests with the four global objectives. All member countries had agreed to implement this instrument and to make efforts for achieving global objectives. The Government of India is also committed to implementing Sustainable Forest Management (SFM). In this context, an International Expert Meeting on Financing for Sustainable Forest Management-A Country-

Led Initiative in support of UNFF was held at Paramaribo, Surinam from September 8-12, 2008 followed by the meeting of UNFF Ad hoc Expert Group to Develop Proposals for the Development of a Voluntary Global Financial Mechanism/ Portfolio Approach/ Forest Financing Framework at Vienna, Austria from November 10-14, 2008 and country's views were suitably put forward in the meetings.

Committee on Forestry

The Committee on Forestry is the highest FAO Forestry statutory body. The biennial sessions of COFO (held at FAO headquarters in Rome, Italy) bring together heads of forest services and other senior government officials to identify emerging policy and technical issues, to seek solutions and to advise FAO and others on appropriate action. Other international organizations and, increasingly, non-governmental groups participate in COFO. Participation in COFO is open to all FAO member countries. Last session of COFO (19th) was held in Rome, Italy from March 16 to 20, 2009. The Indian delegation headed by Director General of Forests and Special Secretary, Ministry of Environment and Forests, Government of India participated actively in the 19th Session of COFO.

Publishing of Asia Pacific Forestry Sector Outlook Study-II Report

The Ministry has been actively involved in the forum of Asia Pacific Forestry Commission (APFC). During the 21st Session of APFC in 2006, it was decided to conduct Asia Pacific Forestry Sector Outlook Study-II (APFSOS) for providing scenario of forestry sector in 2020 to combat the challenges through appropriate policy interventions at global as well as national level. In this context, the Ministry has come out with the country report titled "Asia Pacific Forestry Sector Outlook Study-II". The main recommendations/ future projections



Fig-30. Shompen - aboriginal tribes of Great Nicobar Biosphere Reserves

made in this report are as follows:

- To rehabilitate the degraded forests and increase their productivity, augment the contribution of forests towards poverty alleviation of the people living in and around forests, and extend the area under forest and tree cover to 33%. The lack of capacity of the community and inadequate investment are the big challenges for the country to overcome the constraints in the implementation of sustainable forest management.
- Steps have been taken for rationalization of regulatory and policy constraints for trees grown on private lands which would have 85% potential of achieving 33% forest and tree cover.
- The demand and supply gap of wood and wood products would be bridged mainly from import and private sector in the country. India will be a big market for wood and wood-based products and its demand would be 3-4 folds more in 2020.
- A separate grazing policy is urgently needed to cater to 18% livestock of the globe in the country.
- A need to invest more than 1.5 billion US\$



in the forestry sector to implement Sustainable Forest Management. The contribution of the national budget is around 30% of the need.

Celebration of World Forestry Day

The World Forestry Day was celebrated on March 21, 2008 and on March 21, 2009 with the theme 'Forests & Climate Change' and 'Sustainable Forest Management' respectively. Dr. R.K.Pachauri, Director General, TERI was the Key Note Speaker on March 21, 2008 and Dr. Anil Joshi, Padam Shree was the Key Note Speaker on March 21, 2009.

Wildlife Conservation

Introduction

The Indian Constitution entails the subject of forests & wildlife in the Concurrent list. The Federal Ministry acts as a guiding torch dealing with policies and planning on wildlife conservation while the State/ UT Governments have been vested with the responsibility of implementing national policies and plans. Realizing the huge task of conserving India's wildlife resources, the National Wildlife Action Plan (2002-2016) was adopted, emphasizing the need for peoples' participation and support for wildlife conservation.

In Government of India, the Additional Director General of Forests (Wildlife) and Director, Wildlife Preservation is the head of the Wildlife Wing in the Ministry of Environment & Forests. The Wildlife Wing has two Divisions, namely, Project Elephant Division and Wildlife Division, each headed by an officer in the rank of Inspector General of Forests. A Deputy Inspector General of Forest (Wildlife), an Assistant Inspector General of Forests & Joint Director (Wildlife) and one Deputy Director (Wildlife) provide

support to the Wildlife Wing. In addition, three autonomous bodies, National Tiger Conservation Authority (NTCA), Central Zoo Authority (CZA) and Wildlife Institute of India (WII) have been constituted for tiger conservation, zoo management, research and training in wildlife respectively under the Ministry. The National Zoological Park in the capital is also a part of the Wildlife Wing of the Ministry of Environment & Forests.

In tune with the 2006 amendment to the Wildlife (Protection) Act, 1972, a Wildlife Crime control Bureau has been established to combat wildlife related crimes. The Wildlife Crime Control Bureau has 5 Regional Offices located Delhi, Mumbai, Kolkata, Chennai and Jabalpur and 3 Sub-regional offices at Amritsar, Guwahati and Cochin.

Funding Support for Wildlife Conservation

Government of India provides technical and financial support to the State/ UT Governments for wildlife conservation under the various Centrally Sponsored Schemes - *Integrated Development of Wildlife Habitats*, *Project Tiger*, and *Project Elephant*, and also through Central Sector Scheme - *Strengthening of Wildlife Division and Consultancies for Special Tasks*, and through Grants in Aid to the Central Zoo Authority and Wildlife Institute of India, Dehra dun. The objectives and details of the Schemes handled by the Wildlife Division are as given below:

CSS - Integrated Development of Wildlife Habitats

The Protected Area network in India includes 99 National Parks and 515 Wildlife Sanctuaries, 43 Conservation Reserves and 4 Community Reserves. The objective of the Scheme is to provide financial and technical assistance to the State/ UTs to conserve wildlife resources. The Scheme supports

various activities aimed at the conservation of wildlife that *inter alia* include habitat improvement practices, infrastructure development, eco-development activities, anti poaching activities, research, training, capacity building, census of wildlife, etc.

Under this Scheme, 100% grant is provided for identified items of non-recurring expenditure. Also, 50% assistance is provided in respect of recurring items of expenditure. For areas located in mountainous, coastal, deserts and with identified endangered species, 100% financial support is provided for both recurring and non-recurring items of work. An amount of Rs 80.00 crore was allocated during the year 2008-09 under the Scheme, of which around 79.47 crore had been disbursed by March 2009.

During December 2008, the erstwhile Scheme – 'Development of National Parks and Sanctuaries' has been modified by expanding the scope and adding a few more components and activities. The total outlay for the modified Scheme - titled as 'Integrated Development of Wildlife Habitats' is Rs.800 crores for the 11th five Year Plan period. Apart from providing support to Protected Areas (National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves), the modified Scheme has also the following components – 'Protection of wildlife outside the Protected Areas' and 'Recovery programmes for critically endangered species'. Under this Scheme, during the financial year 2008-09, the central Government has launched 'Recovery Programmes" for Vulture, Snow Leopard and Hangul.

The Ministry had initiated an independent evaluation of National Parks and Wildlife Sanctuaries by a group of experts to ascertain the Management Effectiveness of Protected

Area network in the country. Five regional committees of experts have been constituted for the purpose. During 2008-09, 30 Protected Areas are being evaluated.

CS - Strengthening of Wildlife Division and Consultancies for Special Tasks

This Central Sector Scheme was launched in 1986 to strengthen the Wildlife Division in the Ministry and the Regional Offices of Wildlife Preservation for fulfilling the statutory obligations under the Wildlife (Protection) Act, 1972 and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

International trade in wild flora and fauna is regulated by the provisions of the EXIM Policy, the Wildlife (Protection) Act, 1972 and CITES convention. The Director (Wildlife Preservation) is designated as the CITES Management Authority and the Regional Deputy Directors (Wildlife Preservation) are the Assistant Management Authorities under CITES. They monitor and regulate international trade in wildlife and its derivatives at the designated ports of exit and entry. Consequent upon the creation of the Wildlife Crime Control Bureau, these regional and sub-regional offices have been now made part of the Bureau.

The Scheme "Strengthening of Wildlife Division and Consultancies for Special Tasks" provided assistance to the Regional Offices located in Delhi, Mumbai, Kolkata, Jabalpur and Chennai for manpower and development of infrastructure. Assistance was also extended to the three sub- regional offices at Guwahati, Amritsar and Cochin. In addition, the Scheme also supported the functioning of the Wildlife Division in the Ministry. The allocation of the Scheme during the year 2008-09 was Rs 4.08 Crore.





Fig-31. Flamingoes in Thol bird sanctuary, Gujarat

The Scheme also supported wildlife research activities/projects envisaged in the National Wildlife Action Plan (2002-2016). Grants were also provided to research institutes, universities, NGOs and other organizations of repute engaged in wildlife research both at the field and laboratory levels. Major areas supported *inter alia* include taxonomy, population estimation, wildlife conservation & management, restoration of degraded ecosystems, etc. About 20 projects in various disciplines of wildlife management are under various stages of consideration/implementation.

Vulture Conservation Programme

The population of vultures, especially the Gyps species, has declined in the entire region of South Asia. This is a matter of great concern as vultures are important natural scavengers playing a crucial role in the ecosystem. One of the major causes of decimation of the population of vultures is

identified as the pharmaceutical drug, diclofenac, which is toxic to the bird. As a preventive action, the Government of India has banned (in May 2006) the use of diclofenac in the country for use in veterinary sector. The Department of Animal Husbandry, Dairying and Fisheries have already issued directions to State/ UT Governments to restrict the use of diclofenac by substituting it by meloxicam and to keep vigilance about the clandestine use of diclofenac in veterinary sector. To ensure coordination among various Ministries and agencies, the Ministry is in regular contact with concerned Ministries/Departments. Apart from this, Government of India has formulated an Action Plan for Vulture Conservation, which is being implemented in collaboration with States/UTs. The Government has supported Vulture Breeding Centres at Pinjore in Haryana, Buxa in West Bengal and Rani Forest in Assam and also the captive breeding centres at 4 Zoos at Bhopal, Bhubaneshwar,

Junagarh and Hyderabad, which have been set up through CZA.

[Wildlife Crime Control Bureau](#)

The Wildlife Crime Control Bureau (WCCB) has been created under S. 38 Y of the Wild Life (Protection) Act, 1972. The mandate has been specified under S.38 (Z) which includes collection, collation of intelligence and its dissemination, establishment of a centralized wildlife crime databank, coordination of the actions of various enforcement authorities towards the implementation of the provisions of the Act, implementation of the international conventions, capacity building for scientific and professional investigation, assistance to authorities in other countries for a coordinated universal action towards control of wildlife crimes and to advise the government regarding various policy and legal requirements.

The Bureau has come into existence on 6/6/2007. The four erstwhile Regional and three sub Regional offices of Wildlife Preservation have been made part of the Bureau. Another Regional Office has been established at Jabalpur, Madhya Pradesh. The Bureau at present is manned by 44 officials including one Addl. Director in the rank of Inspector General of Police.



Fig-32. A view of Black Buck fight.

As a central agency, it is assisting the state agencies through intelligence inputs, analysis of information and providing expertise. The Bureau has also performing its role at the exit points under CITES. A total of 7943 pre/post shipment inspections have been carried out at various exist points since 1/4/08 and 85 violations under Exim Policy/CITES/Wildlife (Protection) Act, 1972 have been detected. Fourteen training programmes have been conducted for various state and central enforcement agencies regarding wildlife crime control issues. This organization has also played an active role in pursuing the interstate linkages in some important seizures of mega-fauna. The Bureau has issued alerts on trafficking in some species and advisories on collection and appreciation of forensic evidence.

The Bureau is in its formative stage and the Ministry is providing all support to build it up as professional agency to combat wildlife crime.

[National Board for Wildlife](#)

The Wildlife (Protection) Act, 1972 envisages for constitution of National Board for Wildlife (NBWL) to promote the conservation of and development of wildlife and forests and also for framing policies and advising Central Government and State Governments on the ways and means of promoting wildlife conservation, etc. The National Board for Wildlife is Chaired by Hon'ble Prime Minister with the Minister-in-charge for Environment & Forests as the Vice Chairperson. The members of the Board include Member of Parliament, Member of Planning Commission, Chief of the Army Staff, representatives of Non Governmental Organizations, eminent conservationists/ecologists/environmentalist s, Secretaries of various Ministries, Scientific institutions, etc. The National Board for



Wildlife was constituted vide notification dated 21st September 2003 for a period of three years. Thereafter, the NBWL was re-constituted vide notification dated 16th May 2007 for another period of three years. The NBWL has met 4 times since its constitution in September 2003.

Standing Committee of National Board for Wildlife

The NBWL has also a Standing Committee. The Standing Committee of NBWL is Chaired by the Minister-in-charge of Ministry of Environment & Forests. The Standing Committee was constituted vide order dated 4th November 2003 for a period of three years and thereafter, re-constituted vide order dated 9th July 2007 for another period of three years. The Standing Committee had met 14 times since its constitution in November 2003.

In view of the order of Hon'ble Supreme Court dated 9th May 2002, proposals pertaining to diversion, exploitation, etc of wildlife habitats have to be referred to the Standing Committee of NBWL for their consideration. The Standing Committee of NBWL has considered several proposals pertaining to non-forestry activities in Sanctuaries & National Parks. The recommendations/opinion of the Standing Committee has been communicated to the concerned State Governments for compliance. The State Governments /project proponents have to, however, take final clearance for the Hon'ble Supreme Court. The Standing Committee has also considered other issues pertaining to wildlife conservation.

International Conventions Related to Wildlife

India is a party to five major Multilateral Environmental Agreements related to wildlife conservation and is actively involved in its implementation. They are as follows:

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

It is a convention for regulating international trade in wild fauna and flora and its derivatives. India ratified the Convention in 1976. India had represented in the meeting of the Standing Committee of CITES held at Geneva during 14th to 18th July 2008 as well as in the 23rd meeting of the Animal Committee of CITES held at Geneva, during 19th to 24th April 2008.

UNESCO -World Heritage Convention

India is a member of World Heritage Convention responsible for listing of World Heritage Sites, which include both cultural and natural sites. Currently, five natural World Heritage Sites have been recognized by UNESCO in India viz, Nanda Devi National Park, Kaziranga National Park, Manas National Park, Keoladeo National Park and Sundarbans National Park. Apart from these, the Valley of Flowers National Park has also been included in the list of World Heritage Sites as an extension to Nanda Devi National Park. Four new natural heritage sites viz, Western Ghats cluster, Kangchendzonga National Park, Namdhapha National Park and Wild Ass Sanctuary, Little Rann of Kutch have been included in the tentative list of World Heritage Sites. Considering the importance of World Natural Sites, an externally aided project titled "World Heritage Bio-diversity Programme for India: Building Partnerships to Support UNESCO's World Heritage programme' is being undertaken.

Convention on the Conservation of Migratory Species (CMS)

India is a signatory to the Convention on Conservation of Migratory Species (CMS) or

Bonn Convention since 1983. India has signed an MoU with the CMS for the conservation and management of Dugongs and their habitats on 28th May 2008 at Bonn, Germany. An Indian delegation participated in the 9th Conference of Parties (COP-9) of the CMS held at Rome, Italy from the 1st to 5th December 2008. Keoladeo National Park, Rajasthan was identified as one of the sites under the Siberian Crane network.

International Whaling Commission (IWC)

India has been a member of the International Whaling Commission since 1981 and has played a pro-active and prominent role in bringing about a moratorium on commercial whaling and supporting the Commission in its efforts towards conservation of migratory species of wild animals..

IUCN : World Conservation Union

International Union for Conservation of Nature (IUCN) is a unique global organization, which started working in 1948, where both Governments and non-Governmental bodies work together as parties. Government of India was the first country in South Asia to join IUCN as a state member in 1969. An Indian delegation participated in the 4th World Conservation Congress held at Barcelona, Spain during 5th to 14th October 2008.

Other Recent/ New Initiatives

- The 'Project Snow Leopard' was launched by Hon'ble Minister of State for Environment & Forests (Forests & Wildlife) on 20th January 2009. The project envisages conservation of Snow Leopard and its habitat. A Steering Committee for the Project Snow Leopard has also been constituted.
- The Secretary, Ministry of Environment &

Forests, had signed an MOU, on behalf of Government of India, with the CMS, for the Conservation & Management of Dugongs and their Habitats, on 28th May 2008 at Bonn, Germany.

- India has signed a Memorandum of Understanding (MoU) with the Convention on Migratory Species (CMS) on 20th February 2007 at Bangkok, for the conservation and management of marine turtles and their habitats. A National Marine Turtle Advisory Committee has been constituted on 25th November 2008 under the Chairmanship of Secretary (E&F), as per the MOU on Marine Turtle Conservation between India and the Convention on Migratory Species (CMS).
- A Sub-Committee for Conservation of Marine Species has been constituted under the Chairmanship of Addl. Director General of Forests (WL), as per the decision on the National Board for Wildlife. The Sub-Committee has identified Marine species for recovery programmes.
- A Sub-Committee for Conservation & Recovery of Terrestrial Species has been constituted under the Chairmanship of Addl. Director General of Forests (WL), as per the decision on the National Board for Wildlife. The Sub-Committee has identified flagship species for recovery programmes.

Wildlife Institute of India (WII), Dehradun

Wildlife Institute of India (WII) was established in 1982. The institute has emerged as a premier training and research institution in the field of wildlife and Protected Area management in South Asia. WII is an autonomous institute of the Ministry of Environment & Forests, with a 49 member WII



Society as the apex body. The Society is chaired by the Union Minister for Environment & Forests, Government of India. The Institute's wide array of capacity building programmes provide a practical and realistic direction to the concept and practice of wildlife conservation.

Academics and Training

Courses and Training Programmes

XXIX Post Graduate Diploma Course in Wildlife Management, (*September 1, 2007 to May 3, 2008*). 15 officer trainees were awarded 'Diploma in Wildlife Management' on successful completion of the course.

XXX Post-Graduate Diploma Course in Wildlife Management, (*September 1, 2008 to May 31, 2009*.) Seven officer trainees joined the course, of which three are from Forest Departments of various Indian States and four from neighbouring countries.

XXIV Certificate Course in Wildlife Management, (*November 1, 2008 to January 31, 2009*). Thirteen officer trainees (Range Forest Officers and equivalent) from different States within country including five foreign nationals (one each from Bhutan, Indonesia & Nepal and two from Pakistan) have joined the course.

Meetings, Workshops, Seminars and Conferences

Two-week training programme for the probationers of 58th batch of Indian Revenue Service (Customs & Central Excise) Group "A", Dehradun, (*March 30-April 11, 2008*). The main objective of this course was to sensitize the Indian Revenue Service Probationers about the unique biodiversity of this country and the problems of illegal trade in wildlife and wildlife products. The course was attended by 53 probationers.

Training Course on Ecological and economic evaluation approaches for mainstreaming Biodiversity in EIA at Perth, Australia, (*May 4-5, 2008*.) The course was attended by 14 participants from 11 countries representing the five different regions of Africa, Asia, Australasia, South America and Europe.

Training Programme on Wetland Conservation and Management for Northern Region, Srinagar, (*June 16-20, 2008*.) The training programme was sponsored by the Ministry of Environment and Forests, Government of India and was organised by the Wildlife Institute of India, Dehra Dun in association with the Department of Wildlife Protection, Government of Jammu & Kashmir.

Two-day training workshop on "Strengthening Wildlife Enforcement: Issues related to Illegal Wildlife Trade and Wildlife Crime Investigation", Dehradun, (*May 13-14, 2008*). The training workshop was organized by TRAFFIC-India in collaboration with Wildlife Institute of India. Eleven trainee officers from the Department of National Parks and Wildlife Conservation and Department of Forests, Govt. of Nepal participated in the workshop. The aim of the workshop was to provide training to officers about Wildlife Forensics and tools and techniques needed for strengthening conservation.

Collaborative workshops on "Leadership and organization development for performance and results" & "Proposal writing and project management", Dehradun, (*July 7-15, 2008*.) In order to provide a better learning environment and considering the security issues, the United Nations Institute for Training and Research (UNITAR) Hiroshima Office for Asia and the Pacific (HoAP) requested the Institute to organize a workshop for Afghan civil servants.

Teacher's Training Course in Environment

Education, Dehradun, (August 7-12, 2008). The objectives of the course were to: (i) help teachers understand the linkages between environmental and sustainable development; (ii) equip teachers to use a problem-solving, activity oriented, participatory approach suitable for their students; (iii) help teachers acquire those values of responsible citizenship and care for the environment which will motivate them to take appropriate action where necessary to protect and the environment; and (iv) help teachers to realize the necessity for continued updating of their knowledge and skills. Seven participants attended the course.

Training course on "Mainstreaming Biodiversity in Impact Assessment" for ICFRE Officers, Dehradun, (August 18-22, 2008). The course was organized for the officers of the Indian Council of Forestry Research & Education. The objectives of the training course were to provide a theoretical rationale for mainstreaming biodiversity in impact assessment and improved decision-making and the guidance needed for developing an impact assessment framework for integrating biodiversity; stimulate the importance of integrating socio-economic issues and economic valuation principles in EA framework for biodiversity; and facilitate peer-based learning among IA professionals. A total of 24 participants from different institutes under ICFRE participated in the course.

Summit of ISSC-MAP workshop, Dehradun, (August 26, 2008). Summit of ISSC-MAP workshop in collaboration with the Industries Association of Uttarakhand was organized at the Institute.

School in Herpetology, Dehradun, (September 1-14, 2008). An intensive course in Herpetology (study of amphibians and reptiles) called the "School in Herpetology"



Fig-33. King kobra – needs proper habitat

was conducted at the Wildlife Institute of India. This unique programme was supported by the Science Engineering and Research Council, Department of Science and Technology, Government of India. 26 participants from India, three from Sri Lanka, one from Bhutan, one from Nepal, one from Bangladesh, were selected for the course.

IV-Internal Annual Research Seminar (IARS), (September 16-17, 2008); and XXII Annual Research Seminar (ARS) of WII, Dehradun, (September 18-19, 2008). 25 presentations were made in seven sessions. These included studies on large carnivores, vegetation and habitat, herpetofaunal studies, human and development aspects, avifaunal studies, molecular genetics and forensics, and studies on insects.

Ecological and economic evaluation approaches for mainstreaming biodiversity in EIA Al Khobar, Saudi Arabia, (November 3-6, 2008). In response to the request received from the Chairman, Environmental Technology and Management Association (ETMA), three day course on 'Ecological and economic evaluation approaches for mainstreaming biodiversity in EIA', was conducted by WII faculty members during 3rd



to 6th November 2008 in Saudi Arabia. The course was attended by 17 participants representing EIA experts, environmental engineers, and EIA professionals from Saudi Aramco, King Fahad University of Petroleum and Minerals and EIA consulting agencies in Saudi Arabia.

Training programme on 'Wildlife Conservation: Issues and Concerns' for Representatives of Indian Army in the State Boards for Wildlife, at Kanha Tiger Reserve, Madhya Pradesh (*December 4-6, 2008*). Twelve officers of Brigadier rank and 3 of Colonel rank representing 15 states mainly from the north, east and north-east India , along with Director, Policy (Ecology) from army headquarters attended the course.

Other Activities

Celebration of the World Environment Day, (*June 5, 2008*). The Institute celebrated the World Environment Day on June 5, 2008 to renew its commitment to protect the environment.

Celebration of Wildlife Week, Dehradun, (*October 2-8, 2008*.) The Wildlife Week was celebrated at the Institute. The following activities were organized during the Wildlife Week : (i) Drawing & Painting Competition and Puppet Show were organized at St. Mary's Secondary School, Dehradun (ii) Drawing & Painting Competition and Puppet show were organized for the school children at Than village in collaboration with 127 Infantry Battalion (TA) Eco Garh Rif. More than 500 children participated in these activities.

Research

Research Projects

Wildlife research at the Institute covers ecological, biological, socio-economic and

managerial aspects of wildlife conservation. The research projects generate valuable scientific data, help evolve study techniques relevant to the Indian ground condition, and also create a group of trained field biologists, socio-economists and wildlife managers. The scientific information generated is utilized for management of protected areas. Research also enables the institute's faculty to keep abreast of the current field situations, management needs and research trends in the field and thus constantly enhance its professional skills and update its teaching inputs. During the reporting period, 44 research projects were ongoing in the Institute.

In an effort to build population of tigers at Sariska Tiger Reserve, Govt. of India entrusted responsibility on Wildlife Institute of India and Rajasthan Forest Department for the re-introduction operation. The tiger translocation program was a unique initiative of its kind. It was for the first time, the planned and scientific translocation of a big cat was undertaken in the country. A male and a female tiger, fitted with satellite radio collar and tracking system, were reintroduced in Sariska.

Central Zoo Authority

Zoos in India are regulated as per the provisions of the Wild Life (Protection) Act, 1972 and are guided by the National Zoo Policy, 1998. The Central Zoo Authority was established by the Government of India in the year 1992 through an amendment in the Wild Life (Protection) (1991 amendment) Act, 1972. The main objective was to enforce minimum standards and norms for upkeep and health care of animals in Indian zoos and restrain mushrooming of unplanned and ill-conceived zoos that were cropping up in the country as adjuncts to public parks, industrial

complexes and way sides.

The Central Zoo Authority is a 12 member body headed by Chairman. Minister of State for Environment & Forests (Forests & Wildlife), Government of India is the ex-officio Chairman of the Authority. Member Secretary, Central Zoo Authority is the Chief Executive Officer of the Authority.

To carry out the different functions of the Authority, two committees namely the Administrative Committee (headed by the DGF & SS – to decide on administrative and budgetary issues) and Technical Committee (headed by the Addl. DGF(WL) – to take decisions on technical matters) have been constituted in the Authority. An expert group on zoo designing has also been formed in the Authority to give recommendations on zoo master plans and approval of the enclosure designs submitted by different zoos.

Activities / Achievement

Prescribing standards and norms

An Expert Group for giving recommendations on rationalization of the Recognition of Zoo Rules, 1992 was formed. The Expert Group had two sittings during the year. The final draft of the revised Recognition of Zoo Rules along with compilation of different guidelines issued by the Central Zoo Authority for scientific management of zoos has been finalized.

Evaluation of Zoos

Five large, three medium, six small, eighteen mini zoos and five Rescue Centres have been evaluated as zoos during the year.

Recognition/ De-recognition of Zoos

Five large, two medium, five small, twenty mini zoos and four Rescue Centres have been given conditional recognition. Six mini zoos



Fig-34. Rhino, needs protection from poachers.





which were denied recognition earlier were also considered for recognition during the year.

Conservation Breeding Programme

The Central Zoo Authority has decided to coordinate planned conservation breeding of 63 critically endangered wild animal species in Indian zoos. Wild animal species with less than 2500 individuals left in the wild and less than 100 animals in captivity in India are taken up under the programme. Funds have been released for creation of eight no. off-display conservation breeding centres under the programme during the year.

Exchange/ transfer of animals by Zoos

Nineteen exchange proposals of animals between Indian zoos and nine exchange proposals between Indian and foreign zoos were approved by the Authority during the period of the Report.

Maintenance of National Stud Books

A National Stud Book Cell has been established in Wildlife Institute of India, Dehradun for preparation and updating of National Studbooks of fourteen different species under the Programme. The Central Zoo Authority is also compiling the animal profiles of founders of all the identified species taken up under the conservation breeding programme. The first compilation of animal profiles of 35 different species has been brought out along with the inventory of animals in Indian zoos.

Theme/ planning in zoos

All the zoos have been given time upto 31st March, 2009 to prepare and submit the Master Plans for approval to the Central Zoo Authority. The Central Zoo Authority is assisting the different zoos for finalization of Concept Plans for preparation of detailed

master plans by organising facilitation workshop.

Human Resource Development

The Central Zoo Authority has organized an International Conference on "India's Conservation Breeding Initiative" in the month of February,08 at New Delhi. 92 delegates from 18 different countries participated in the Conference. Two weeks training programme for middle level zoo personnel was organized at Dehradun in collaboration with WI. 7 short term training programmes were organized for zoo keepers on regional basis. One zoo Director and one zoo veterinarian attended three weeks training at Durrell Wildlife Conservation Centre, Jersey, U.K. Member Secretary of the Authority participated in the Annual meeting of Conservation Breeding Specialist Group (CBSG) and 63rd meeting of World Association of Zoos & Aquariums (WAZA) at Adelaide, Australia during the year.

Research

The Central Zoo Authority has signed MoU with Indian Veterinary Research Institute (IVRI), Bareilly to work on "Standardization of animal diet in captive conditions". The Authority has also approved studies to deal with local issues in zoos at Pune, Chennai and Sepahizala under Small Grant Fellowship Scheme.

Improvement of Zoos

An amount of Rs.1111.77 lakhs has been released to different zoos and related organizations for creation of better animal housings, veterinary facilities, infrastructure development, research and training during the year 2008.

Other Activities

- The Central Zoo Authority has also

provided Rs.352.97 lakhs to seven number Rescue Centres created for rehabilitation of animals rescued from circuses.

- The Central Zoo Authority has also decided to sponsor joining of 57 Indian zoos and 4 institutions to International Software ISIS for record keeping and scientific management.

Awards and fellowships

As recognition in the field of wildlife conservation, every year the Ministry confers two awards viz. Amrita Devi Bishnoi Wildlife Protection Award and Rajiv Gandhi Wildlife Conservation Award.

National Tiger Conservation Authority

(Previously Project Tiger)

Brief Introduction and Objective

The Centrally Sponsored Scheme "Project Tiger" was launched in April, 1973 with the objective "to ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values, and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people".

Progress / Achievements

Legal Steps

- Amendment of the Wildlife (Protection) Act, 1972 for providing enabling provisions for constitution of the National Tiger Conservation Authority and the Tiger and Other Endangered Species Crime Control Bureau. The punishment in cases of offence within a tiger reserve has been enhanced. The Act also provides for forfeiture of any equipment, vehicle or weapon that has been used for

committing any wild life offence.

Administrative steps

- Strengthening of anti-poaching activities, including special strategy for monsoon patrolling, by providing funding support to Tiger Reserve States, as proposed by them, for deployment of anti-poaching squads involving ex-army personnel/ home guards, apart from workforce comprising of local people, in addition to strengthening of communication/ wireless facilities.
- 100 % Central Assistance provided to seventeen Tiger Reserves as an additionality for deployment of Tiger Protection Force, comprising of ex-army personnel and local workforce.
- Constitution of the National Tiger Conservation Authority with effect from September 4, 2006 for strengthening tiger conservation by, *inter alia*, ensuring normative standards in tiger reserve management, preparation of reserve specific tiger conservation plan, laying down annual / audit report before Parliament, constituting State level Steering Committees under the Chairmanship of Chief Ministers and establishment of Tiger Conservation Foundation.
- Constitution of a multi-disciplinary Tiger and Other Endangered Species Crime Control Bureau (Wildlife Crime Control Bureau) with effect from June 6, 2007 comprising of officers from Police, Forest, Customs and other enforcement agencies to effectively control illegal trade in wildlife.
- Approval accorded for declaring eight new Tiger Reserves. In-principle approval accorded for creation of four new Tiger



Fig-35. *Panthera tigris*, our national animal, needs conservation

Reserves namely Sahyadri in Maharashtra, Pilibhit in Uttar Pradesh, Ratapani in Madhya Pradesh and Sunabeda in Orissa.

- The revised Project Tiger guidelines have been issued to States for strengthening tiger conservation, which apart from ongoing activities, *inter alia*, include funding support to States for enhanced village relocation/rehabilitation package for people living in core or critical tiger habitats (from Rs. one lakh/family to Rs.10 lakh/family, rehabilitation/ resettlement of communities involved in traditional hunting and mainstreaming livelihood and wildlife concerns in forests outside tiger reserves and fostering corridor conservation through restorative strategy to arrest habitat fragmentation.

- A scientific methodology for estimating tiger (including co-predators, prey animals and assessment of habitat status) has been evolved and mainstreamed. The findings of this estimation/assessment are bench marks for future tiger conservation strategy.
- An area of 29484.752 sq.km. has been notified by fifteen Tiger States (out of seventeen) as Core or Critical Tiger Habitat under section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006 (Andhra Pradesh, Arunachal Pradesh, Assam, Karnataka, Kerala, Jharkhand, Madhya Pradesh, Maharashtra, Mizoram, Rajasthan, Tamil Nadu, Uttarakhand, Orissa and West Bengal). Two tiger states (Bihar and Uttar Pradesh) have taken a decision for notifying the core or critical tiger habitats

(1528.627 sq.km.). The State of Madhya Pradesh has not identified / notified the core /critical tiger habitat in its newly constituted tiger reserve (Sanjay National park and Sanjay Dubri Wildlife Sanctuary).

- Memorandum of Understanding (MoU) developed for better/ concerted implementation of conservation inputs through tiger reserve States.

Financial Steps

- Financial and technical help is provided to the States under various Centrally Sponsored Schemes, viz. Project Tiger and Development of National Parks and Sanctuaries for enhancing the capacity and infrastructure of the States for providing effective protection to wild animals.

International Cooperation

- India has Memorandum of Understanding with Nepal on controlling trans-boundary illegal trade in wildlife and conservation, apart from a protocol on tiger conservation with China.
- A Global Tiger Forum of Tiger Range Countries has been created for addressing international issues related to tiger conservation.
- During the 14th meeting of the Conference of Parties to CITES, which was held from June 3 to 15, 2007 at The Hague, India introduced a resolution along with China, Nepal and the Russian Federation, with directions to Parties with operations breeding tigers on a commercial scale, for restricting such captive populations to a level supportive only to conserving wild tigers. The resolution was adopted as a decision with minor amendments. Further,

India made an intervention appealing to China to phase out tiger farming and eliminate stockpiles of Asian big cats body parts and derivatives. The importance of continuing the ban on trade of body parts of tigers was emphasized.

Reintroduction of Tigers in Sariska Tiger Reserve

- A male tiger and a tigress have been reintroduced in the Sariska Tiger Reserve (Rajasthan) in last week of June, 2008 and first week of July, 2008, based on a recovery strategy suggested by the Wildlife Institute of India. The tigers are being closely monitored by radio telemetry. Another female has been re-introduced in Sariska on February 25, 2009, from Ranthambore Tiger Reserve.

Reintroduction of Tigers in Panna Tiger Reserve

- Two tigresses, one from Kanha and another from Bandhawgarh Tiger Reserves have been re-introduced in Panna Tiger Reserve in March, 2009. Tigresses are being closely monitored by radio telemetry.

Creation of Special Tiger Protection Force (STPF)

- The policy initiatives announced by the Finance Minister in his Budget Speech of February 2, 2008, *inter alia*, contains action points relating to tiger protection. An one time grant of Rs.50.00 crore has been provided to the National Tiger Conservation Authority (NTCA) for raising, arming and deploying a Special Tiger Protection Force, the proposal for the said force has been approved by the competent authority for 13 tiger reserves. Rs.93 lakh each has been released to Corbett, Ranthambore and Dudhwa



Fig-36. Tiger triggering a camera trap

Tiger Reserves for creation of STPF during 2008-09. Central Assistance will be provided to States for creation of STPF in remaining 10 Tiger Reserves in 2009-10.

Constitution of Special Investigating Team (SIT)

- The Ministry has constituted a Special Investigating Team (SIT) to ascertain the causative factors for disappearance of tigers in Panna Tiger Reserve.

Biodiversity Conservation and Rural Livelihood Improvement Project

Brief Introduction and Objectives

The objective of the Project is to conserve biodiversity, while improving rural livelihoods through testing and establishing decentralized participatory approaches across a range of globally and nationally important landscapes under different management regimes (six landscape) viz. Satpura (Madhya Pradesh), Agasthiyamalai (Kerala and Tamil Nadu), Little Rann of Kutch (Gujarat), Askot (Uttarakhand), Upper Indus

(J&K) and Dampa (Mizoram).

Activities undertaken

Final reports for consultancy services for 'Preparation, Designing and Developing a project report' and 'Social and Environmental Assessment' have been received from the consultant and same were reviewed by the Review Committee.

Progress / Achievements

- Environment, Social and Indigenous Development Plan (ES&IDP) Reports were sent to all respective State Governments for their vetting and comments.
- Foundation established by States.
- Project Implementation Plan (PIP) and Project Appraisal Document (PAD) is under preparation.
- Financial Management Manual is under preparation.
- Procurement manual prepared.
- Project Cost Estimate (Headquarter)

prepared.

- Eighteen months procurement plan for Headquarter prepared.
- The budget allocation of the scheme is Rs.300 lakhs (Plan).

Release to States as grant during 2008-09
(Rs. in lakhs)

Sl. No.	State	Amount
1	Jammu and Kashmir	16.50
2	Mizoram	15.24
3	Uttarakhand	13.10

Project Elephant

Introduction and Objective

Project Elephant (PE) was launched by the

Government of India in the year 1991-92 as a Centrally Sponsored Scheme with following objectives:

- To protect elephants, their habitat & corridors
- To address issues of man-animal conflict
- Welfare of domesticated elephants

Financial and technical supports are being provided to major elephant bearing States in the country. The project is being mainly implemented in 13 States/UTs, viz. Andhra Pradesh, Arunachal Pradesh, Assam, Jharkhand, Karnataka, Kerala, Meghalaya, Nagaland, Orissa, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal. Small support is also being given to Maharashtra and Chhattisgarh. Main activities under the project are as follows:

- Ecological restoration of existing natural



Fig-37. Forest products - used by locals for their livelihood

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

Ex-gratia payments

Under the PE scheme, amounts released to states and for ex-gratia payments during the Xth Plan and 1st year of 11th Plan is given in Table-8.

**Table-7. State Wise Funds Released Under Project Elephant from 2002-03 to 2007-2008
(Rs in lakh)**

STATES	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Andhra Pradesh	50.00	55.00	48.00	60.00	64.774	60.00	25.00
Arunachal Pradesh	52.00	61.00	59.00	71.50	61.00	54.50	65.00
Assam	116.00	134.10	130.00	40.00	75.00	144.00	130.00
Chhattisgarh	-	-	-	-	80.00	83.77	-
Haryana	-	-	-	-	50.00	-	-
Jharkhand	45.00	93.00	105.96	75.00	74.446	132.17	80.00
Karnataka	93.00	149.66	186.22	168.00	167.82	212.65	150.00
Kerala	111.88	188.28	167.40	170.00	169.40	147.70	100.00
Maharashtra	-	-	-	-	25.00	56.86	50.00
Meghalaya	41.00	64.00	70.00	30.00	61.55	68.39	-
Mizoram	5.00	0.00	-	-	-	1.33	-
Nagaland	49.00	42.00	29.00	48.00	52.45	26.60	12.00
Orissa	108.39	116.10	137.96	114.00	153.94	148.50	110.00
Tamil Nadu	71.26	117.00	84.00	112.00	153.41	124.978	160.00
Total	934.27	1285.09	1333.98	1207.20	1509.00	1640.938	1186.20
Tripura	3.00	16.00	17.00	-	-	12.00	15.00
Uttar Pradesh	-	-	12.00	-	6.20	55.33	30.00
Uttarakhand	107.00	129.00	138.90	137.70	153.12	126.46	157.20
West Bengal	86.47	119.95	148.54	181.00	160.89	185.725	102.00

Table-8. Fund released for Ex-Gratia Payment under Project Elephant
(Rs in lakh)

STATES	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Andhra Pradesh	2.00	3.00	3.00	6.00	6.00	1.50
Meghalaya	20.00	12.00	15.00	15.00	27.00	25.00
Uttarakhand	-	12.00	12.00	6.00	-	-
Arunachal Pradesh	7.00	7.00	7.00	7.00	15.00	20.00
Karnataka	17.00	10.00	20.00	24.00	30.00	15.00
Chhattisgarh	-	-	-	-	31.00	25.00
Assam	18.00	23.00	23.00	30.00	40.00	40.00
Kerala	10.00	5.00	8.00	6.00	5.00	10.00
Tamil Nadu	20.00	20.00	23.00	23.00	30.00	10.00
Tripura	-	-	2.00	-	-	1.00
Nagaland	5.00	5.00	6.00	6.00	1.00	2.00
Jharkhand	20.00	20.00	25.00	35.00	-	-
Orissa	30.00	30.00	30.00	35.00	65.00	40.00
West Bengal	15.00	20.00	26.00	27.00	40.00	40.00
Uttar Pradesh	-	-	1.00	-	2.70	2.70
Maharashtra	-	-	-	-	-	10.00
Total	164.00	167.00	201.00	220.00	292.70	242.20

Estimation of elephants in the year 2007

The all India enumeration of wild population of elephants in the country is carried out at every five year interval. For the current year the estimation has been completed in all states except NE states where the exercise will be done in February 2008. The comparative figures in Table-9 for the states shows that the estimated population of elephants in these states has increased by about one thousand compared to the 2002.

Elephant Reserves

Singhbhum Elephant Reserve in Jharkhand was the first reserve to be notified in the country in the year 2001 and since then twenty six Elephant Reserves (ERs) extending

over about 60,000 sq. km. have been formally notified by various State Government. Consent for establishment of Baitarini ER and South Orissa ER in Orissa, Lemru and Badlkhod in Chhattisgarh and Ganga-Jamuna (Shivalik) ER in Uttar Pradesh, Khasi ER in Meghalaya has been accorded by MoEF. The concerned State Governments are yet to notify these ERs. Out of twenty six ERs, twenty one were created during the Xth Plan.

Animal Welfare

Introduction and Objectives

The Animal Welfare Division is entrusted with the work of implementation of the provisions of the Prevention of Cruelty to Animals Act,

Table-9. Estimated Population of Wild Elephants

REGION	STATE	ELEPHANT POPULATION			
		1993	1997	2002	2007
North-East	Arunachal Pradesh	2102	1800	1607	1690
	Assam	5524	5312	5246	5281
	Meghalaya	2872	1840	1868	1811
	Nagaland	178	158	145	152
	Mizoram	15	22	33	12
	Manipur	50	30	12	NA
	Tripura	100	70	40	59
	West Bengal (North)	186	250	292	300-350
Total for North-East		11027	9482	9243	9305-9355
East	West Bengal (South)	14	26	36	25
	Jharkhand	550	618	772	624
	Orissa	1750	1800	1841	1862
	Chhattisgarh	-	-	-	122
Total for East		2314	2444	2649	2633
North	Uttarakhand (* part of erstwhile UP)	828*	1130*	1582	1346
	Uttar Pradesh	47	70	85	380
Total for North		875	1200	1667	1726
South	Tamil Nadu	2307	2971	3052	3867
	Karnataka	5500	6088	5838	4035
	Kerala	3500	3600	3850	6068
	Andhra Pradesh	46	57	74	28
Total for South	Maharashtra	-	-	-	7
		11353	12716	12814	14005
Islands	Andaman & Nicobar	35	35	40	NA
Grand Total		25604	25877	26413	27669-27719

1960 (59 of 1960). Plan Schemes are in operation for implementation of the statutory obligations under this Act. Two statutory bodies viz. Animal Welfare Board of India (AWBI) and Committee for the Purpose of Supervision and Control of Experiments on Animals (CPCSEA) have also been set up under this Act.

The mandate of the Animal Welfare Division is to prevent the infliction of unnecessary pain or

suffering on animals.

Progress of Activities

- To accomplish the mission, a three-pronged approach has been adopted.

Regulatory

Some of the important Rules framed under the Prevention of Cruelty to Animals Act 1960 which are regulatory in nature include

- Performing Animals (Registration) Rules, 2001 as amended.
- Transport of Animals Rules, 1978 & 2001.
- Prevention of Cruelty (Slaughter Houses) Rules, 2001.
- Prevention of cruelty to Animals (Establishment and Regulation of Society for Prevention of Cruelty to Animals) Rules 2001.
- Animal Birth Control (Dogs) Rules, 2001.
- Breeding of and Experiments on Animals (Control and Supervision) Rules, 1998 as amended.

[Animal Welfare Board of India \(AWBI\)](#)

AWBI is a statutory body under Section 4 of the Prevention of Cruelty to Animals Act 1960,

with head quarters at Chennai. The Board is a statutory body consisting of 28 members including six members of Parliament, (four from Lok Sabha and two from Rajya Sabha), Govt. officials viz., Director General of forests and Special Secretary, Animal Husbandry commissioner (as ex-officio) and representatives from Ministry of Home Affairs and Education, India Board for Wildlife, Medicine, Veterinary care, municipal Corporation, Humanitarian and SPCAs/ AWOs. Its basic mandate is to advise the Government on animal welfare issues, and create awareness in animal welfare.

- Under a Plan scheme, the Animal Welfare Board of India gives financial assistance to eligible Animal Welfare Organisations for regular schemes viz. maintenance of animal shelters, medicines, purchase of medical equipment and conducting of



Fig-38. An Elephant, needs protection as well as proper habitat.

veterinary camps etc.

- The Animal Welfare Division releases funds to the Animal Welfare Board of India for regular schemes of AWBI as well as for four Central Sector Schemes.
- Scheme for Shelter Houses for looking after the Animals.**
- The objective of this scheme is to establish and maintain shelter houses for distressed animals in the country. Primarily, Non-Governmental Organisations (NGOs) and Society for Prevention of Cruelty to Animals (SPCAs) are given grants of upto Rs.22.50 lakhs for construction of boundary walls, shelters, water tank, drains In-house Dispensary, Medical Equipment, contingencies etc.
- During the financial year 2008-09, 60 shelter houses have been constructed.

Scheme for Birth Control and Immunization of Stray Dogs

- The scheme is meant for controlling the population of stray dogs by sterilization & reducing incidences of rabies by immunization. NGOs and SPCAs working in collaboration with local bodies are eligible for this grant.
- Under this scheme financial assistance is given @ Rs.370/- per dog for pre & postoperative care, including medicines and anti rabies vaccine (ARV); and Rs.75/- per dog for catching and relocation of the dog. The aid is released in three installments.
- During the financial year 2008-09, 1,03,067 animal birth control operations have been conducted upto November, 2007.

Scheme for Provision of Ambulance Services to Animals In Distress

- Under this scheme the animal welfare organizations are given grant for purchase of suitable vehicle for transportation, rescue and also for providing emergency services to animals in distress.
- NGOs are assisted to the extent of 90% of project cost of purchase of a suitable vehicle and equipment and fitting thereon. The maximum amount of grant-in-aid is limited to Rs.3.50 lakhs for purchase of vehicle and Rs.1.00 lakhs for equipments and fitting thereon.
- During the financial year 2008-09, 31 ambulances have been given to Animal Welfare Organisations (AWOs).

Scheme for Relief to Animals during Natural Calamities and Unforeseen Circumstances

- Every year, there are natural calamities in the form of floods, droughts or earthquakes. In such circumstances there is an immediate requirement for provision of fodder, adequate shelter, medical attention etc. for the affected animals or otherwise they are smuggled across the borders for slaughter. Funds for relief of such animals are provided under this scheme.
- Twelve AWOs were granted 0.22 crore for relief work under the Natural Calamity Scheme. while the Board received of Rs.0.27 crore during the period.

Other activities of AWBI

- The Board has granted recognition to 149 newly established Animal Welfare organizations (AWOs) during the year 2008-09.
- The Board is providing free, on the spot veterinary treatment to sick and injured animals belonging to the poor and

downtrodden people through its Mobile Clinic (MAC) programme operating from the Headquarters at Chennai.

- One of the main functions of the Board is propagation of Humane Education. The Animal Welfare fortnight (January 14 to 30) and World Animal Day (4th October) are celebrated by all animal Welfare Organizations, SPCAs.
- During the year, the board published AWBI publications viz Animal Citizen (English), Jeev Sarthi (Hindi) and AWBI Newsletter (English and Hindi). The Animal Citizen/Jeev Sarthi was brought out special on "Rabies Free India" and various issues were highlighted by AWBI Newsletter of the Animal Welfare.
- Under Rule 3 of the Performing Animals (Registration) Rules, 2001 the Board is the prescribed authority to issue registration certificates.
- Throughout the year, the Board continuously received complaints regarding cruelty to animals from various parts of the country which were prevented with the help of District Collectors/District Magistrate/District superintendent of Police. The cruelty matters were always given priority and a total 185 cruelty cases were reported for action. The AWOs filed several FIRs against animal cruelties and the offenders were prosecuted.
- The Animal welfare Board of India has taken initiatives for modernizing the Gaushalas through in house training of goshala personnel at few of the Model Gaushalas on the issues of Bio-gas generation and production of Methane gas.
- The Board is making all the efforts to

modernize the goshalas by utilizing the huge potential of Bio-mass for production of Bio-gas, Bio-fertilizers & Bio-pesticide would go a long way in upliftment of rural economy. Earlier, the Board has encouraged the gaushalas to utilize the huge bio-mass by establishing the Institutional Biogas Plants in their gaushala and to utilize the gas for various purposes including generation of electricity for utilizing it in different implements viz., for glowing bulb, grass cutting machine, drawing well water, and others.

Educational

- One of the main functions of the Board is propagation of Human Education. The Animal Welfare fortnight (14-30 January) and World animal Day (4th October) were celebrated by all Animal Welfare Organizations, SPCAs, Animal Welfare Trainers, Hon. Animal Welfare Officers, Govt. Animal Husbandry Departments, Zoological Parks and Voluntary organizations throughout the country with great interests, Zeal and enthusiasm. During the fortnight celebration, the activists were involved for feeding of animals, free veterinary treatment to sick animals. Seminars Radio and TV talks student rallys, oratorical and painting competitions, distribution of pamphlets were also undertaken for spreading the message of having compassion to our animals companions.

National Institute of Animal Welfare (NIAW), Ballabgarh, Faridabad, Haryana

- The NIAW, a sub-ordinate office of the Ministry imparts training and education in Animal Welfare on diversified basis comprising, among other things, animal management, their behaviour and ethics.

The aim is to create an enabling environment for fulfillment of the statutory requirements as laid down in the Prevention of Cruelty to Animals Act, 1960.

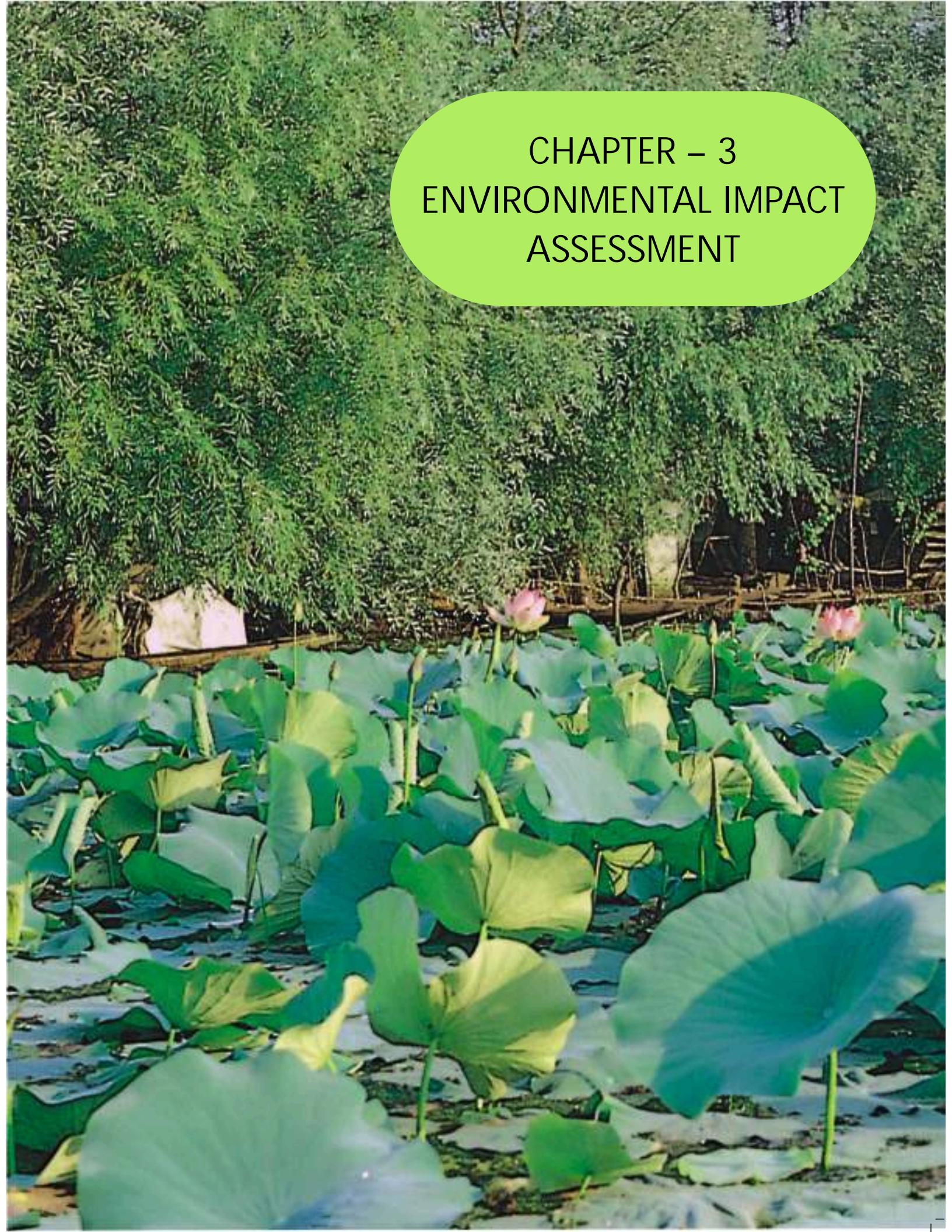
- NIAW has been conceptualized as an apex body in the field of animal welfare and its broad mandate covers the need to improve animal welfare through education, research and public outreach. The Institute is expected to evolve as a premier body with international stature, with participation of faculty / trainees from other countries.
- A Steering Committee has been set up under the Chairmanship of Secretary (E&F) to review the modalities of operation of NIAW and to facilitate constant review of the functioning of the Institute. Apart from officials of the Ministry, the Steering Committee comprises of DG (CSIR) or his representative, Member Secretary (CZA), Animal Husbandry Commissioner, Ministry of Agriculture and representatives of the Ministries of Information and Broadcasting and Urban Development.
- Important stake holders in the training programmes have been identified, including municipal officials, animal welfare organizations, animal readers, transporters, faculty of veterinary colleges, animal traders, animal trainers, employees of slaughter houses and SPCA inspectors and specialized courses are being designed in consultation with AWBI.
- Ministry has entered an agreement with renowned international NGO namely, Vet Beyond Borders (VBB) to provide the practical training and to develop the clinical skills of Veterinary Graduates and Para-Veterinaries working with animal-

welfare projects. The pilot phase training programme namely "Project Vet train" for a period of six months were inaugurated by Special Secretary (E&F) on February 4, 2009. This institute has successfully completed the training programme of three weeks duration for the month of February, 2009 and March, 2009. Each batch of the training has the trainees from different Stakeholders registered with AWBI.

- The Internship Programme for the first batch of final year students of B.V.Sc. & A.H. course of G.B. Pant University was also successfully completed. The Internship Programme for remaining batches is going on as per schedule.

Committee for Purpose of Control & Supervision of Experiments on Animals (CPCSEA)

- CPCSEA is a statutory body under Section 15 of Prevention of Cruelty to Animals Act, 1960. The mandate of this Committee is to ensure that while conducting various types of experiments, in connection with medical research or education, animals are not subjected to avoidable pain or suffering. The main function of this Committee is to register institutions carrying out animal experimentation and / or breeding; to consider approval of animal house facilities and to regulate use of animals in experimentation.
- So far, 1245 establishment have been registered with this Committee. One hundred and seventy five project proposals on large animals have been received and 106 have been approved during the year. Six inspections were conducted and animal house facilities of six institutions have been approved during the year.



CHAPTER – 3
ENVIRONMENTAL IMPACT
ASSESSMENT

Environment Impact Assessment

Introduction

The Environment Impact Assessment has been used as a management tool to minimize adverse impacts of the developmental projects on the environment and to achieve sustainable development. In the re-engineered Environmental Impact Assessment (EIA) Notification of September 2006, projects have been categorized into category 'A' and category 'B' depending on their likely pollution generation potential and are appraised for prior environmental clearance at the Central and the State level respectively. Further the notification provides for screening, scoping, public consultation and appraisal. For appraisal of category 'B' projects and activities, State Level Environment Impact Assessment Authorities (SEIAAs) and State Expert Appraisal Committees (SEACs) are required to be constituted.

Appraisal of Developmental Projects

As per the provisions of the EIA Notification 2006 and the operating guidelines issued by the Ministry from time to time, ninety three meetings of the Expert Appraisal Committees were convened by the Ministry during this year for appraisal of projects from sectors of

industry, thermal power, infrastructure, river valley, mining and construction. The Expert Appraisal Committees also undertook inspections of selected projects for ascertaining the ground realities. The environmental clearance was accorded to 1412 projects and TORs were prescribed to 1141 projects for conducting EIA studies. Three hundred twenty two project proposals were rejected/returned during this period. Various streamlining procedures have been undertaken such as regular meetings of the Expert Appraisal Committee(s) for a longer duration and continuous review for liquidating the pendency. The model Terms of Reference (TORs) for preparation of EIA Reports in coal mining area have also been evolved and put on Ministry's website for use by various stakeholders. Due to various measures undertaken, the pendency has been reduced to seven hundred twenty two (March, 2009). Environment Clearances (EC) and Terms of Reference (TOR) issued during the period from April 2008–March 2009 is given in Table-10. Consequent upon the constitution of SEIAAs, the Ministry transferred six hundred thirty seven projects of 'B' category pertaining to all the sectors to the respective SEIAAs for their consideration for prior environmental clearance

Table-10. Status of Environmental Clearance to Developmental Projects (April 2008–March 2009)

Status of Projects	Sectors												Total	
	Industry		Thermal		River Valley		Mining		Infrastructure & Miscellaneous		Construction and Industrial Estate			
	EC	TOR	EC	TOR	EC	TOR	EC	TOR	EC	TOR	EC	TOR		
Cleared	744	519	59	118	11	42	190	369	98	64	310	29	2553	
Pending	66	229	24	36	13	23	111	106	35	26	54	-	723	
Rejected/ Returned	295		02		Nil		08		Nil		17		322	
Transferred To SEIAAs	109		08		07		116		07		390		637	

Note: EC – Environmental Clearance
TOR – Terms of Reference



Fig-39. A panoramic view of Nanda Devi Peak

Constitution of State Environment Impact Assessment Authorities (SEIAA)

The Ministry, in consultation with the State Governments and Union Territories has constituted so far twenty one State level Environment Impact Assessment Authorities (SEIAAs) and one for Union Territory under sub-section (3) of section 3 of the Environment (Protection) Act 1986 for appraisal of all 'B' category projects and activities notified in the EIA Notification 2006. During the year, seven SEIAAs have been constituted in the States of Delhi, Haryana, Maharashtra, Orissa, Rajasthan, Sikkim and Uttarakhand. Table-11 gives a complete list of SEIAAs constituted in the States/ UTs till date.

Interaction meeting with SEIAA

An interaction meeting with the Chairmen and the Member Secretaries of the SEIAAs was

organized in May, 2008 in Paryavaran Bhawan, New Delhi under the Chairmanship of the Secretary (E&F). During the first meeting, detailed presentations were made on appraisal methodology in various developmental sectors and the processing of the cases etc. to familiarize them with the appraisal procedure and to discuss general administrative matters. In the second meeting various issues pertaining to procedures and difficulties faced by the SEIAAs were discussed. The officials of the Ministry also visited offices of SEIAAs in the States of Madhya Pradesh and Chhattisgarh to facilitate which were constituted during the year.

Draft Coastal Management Zone (CMZ) Notification, 2008

The Ministry had issued the Coastal Regulation Zone (CRZ) Notification, 1991

Table-11. Constitution of State Level Environment Impact Assessment Authorities (SEIAA)

S. No.	Name of States / UTs	Date of Notification
1	West Bengal	13.4.2007
2	Meghalaya	23.7.2007
3	Karnataka	11.6.2007
4	Gujarat	12.6.2007
5	Andhra Pradesh	5.7.2007
6	Uttar Pradesh	12.7.2007
7	Daman, Diu & Nagar Haveli *	11.10.2007
8	Himachal Pradesh	11.11.2007
9	Punjab	19.11.2007
10	Puducherry	13.12.2007
11	Madhya Pradesh	8.1.2008
12	Jammu & Kashmir	8.1.2008
13	Chhattisgarh	29.1.2008
14	Tamil Nadu	3.3.2008
15	Arunanchal Pradesh	27.3.2008
16	Maharashtra	21.4.2008
17	Haryana	21.4.2008
18	Rajasthan	30.7.2008
19	Delhi	30.7.2008
20	Uttarakhand	22.9. 2008
21	Orissa	18.11.2008
22	Sikkim	8.7.2008

* One SEIAA constituted for two UTs

under the Environment (Protection) Act, 1986, which provides a regulatory framework for the conservation and prevention of adverse impact on the coastal resources by regulating developmental activities within the CRZ area. However, Ministry had received representations indicating certain inadequacies in the notification and therefore, to address these inadequacies, number of Expert Committees were constituted in the past to look into these inadequacies and several amendments have been made in the notification since 1991.

As part of new initiative to review environmental regulatory systems, the Ministry constituted an Expert Committee under the chairmanship of Prof. M.S.Swaminathan in July, 2004 to review the existing CRZ Notification.

The Expert Committee carried out a comprehensive review of the said Notification including all its amendments in the light of findings and recommendations of previous Committees, judicial pronouncements, representations from various stakeholders, and suggested suitable amendments to make

the coastal regulatory framework consistent with well established scientific principles of Integrated Coastal Zone Management.

The Committee had recommended to build on the strengths of existing regulations and institutional structures and to fill the gaps for conservation and improving the management of the coastal resources by enhancing the living and non-living resources of the coastal zone, by ensuring protection to coastal population and structures from risk of inundation from extreme weather and geological events and by ensuring that the livelihood security of coastal populations is strengthened.

The report was accepted by the Ministry in April, 2005. As per the recommendations, a draft Coastal Management Zone (CMZ) Notification was issued in May, 2008 inviting public suggestions and objections from stakeholders.

The broad features the draft Coastal Management Zone (CMZ) Notification, 2008 include:-

- The objective of this Notification is protection and sustainable development of the coastal stretches and marine environment through sustainable coastal zone management practices based on sound scientific principles taking into account the vulnerability of the coast to natural hazards, sustainable livelihood security for local communities, and conservation of ecologically and culturally significant coastal resources.
- The CMZ area is classified as CMZ-I which is ecologically sensitive area, CMZ-II areas of particular concern, CMZ-III open areas including the coastal waters upto territorial limits and CMZ-IV Islands of Andaman & Nicobar Islands,

Lakshadweep, offshore islands and islands in coastal backwaters.

- For the purpose of management, the CMZ-I areas would be mapped, notified by the Central Government.
- For the purpose of regulating the activities in the CMZ area, a setback line on the landward side in the CMZ area would be demarcated based on vulnerability of the coast to natural and manmade hazards. The setback line will be demarcated taking into account the parameters such as elevation, geomorphology, sea level trends and horizontal shoreline displacement.
- The implementation and enforcement of the notification shall be by the National and State/Union territory Coastal Zone Management Authorities. A National Board for Sustainable Coastal Zone Management shall be set up to provide policy advice to the Central Government on the matters related to Coastal Zone Management.

Further, to give wider publication and consultation, State level discussions have been organized during November-December, 2008 to evolve a protocol and methodology for demarcation of setback line. Ministry has received a large number of suggestions and observations on the draft CMZ Notification, 2008, which are presently being examined and analyzed.

Monitoring Cell

The objectives of the Post Project Clearance Monitoring are (i) to ensure that action has been taken in accordance with the conditions stipulated in the Environment Clearance letter; and (ii) to take appropriate corrective measures to prevent adverse impact on environment during operation of the



respective projects. The six Regional Offices of the MoEF carry out monitoring of the projects. Six hundred fifty seven monitoring reports have been received from the regional offices of the Ministry, of which four hundred and seventy one reports have been examined and necessary action is initiated for projects where non-compliance is noticed.

To have a direct interaction with all the stakeholders in the developmental projects, interactive meetings are organized by different Regional Offices. This provides a forum for all the stakeholders to discuss the various issues. During the current financial year, three interactive meetings have been organized at Chandigarh, Sambalpur (Orissa) and Bengaluru. Monitoring Cell is also entrusted with the responsibility of monitoring the projects approved by the State level Environment Impact Assessment Authorities (SEIAAs)/ State Level Expert Appraisal Committees (SEACs).

Preparation of sector-wise Manuals/ Guidelines for appraisal of projects

For facilitating preparation of better quality EIA Reports, Ministry has sponsored a project for preparation of sector-specific Manuals through two agencies, namely the Administrative Staff College of India (ASCI), Hyderabad and IL&FS Ecosmart Ltd., New Delhi for various sectors such as Mining, Industry, Construction, Infrastructure, etc. Presently, the Ministry has received inception report from both the organizations. Draft model TORs have been prepared for four sectors: Ports & Harbours, Mining & Mineral Sector, Airports and Thermal.

Integrated Coastal Management Zone (ICMZ) project of World Bank

An Integrated Coastal Zone Management (ICZM) project has been initiated with

financial assistance from the World Bank which has following three major components:

- (i) Vulnerability and Ecologically Sensitive Area Mapping;
- (ii) National Institute Building and Capacity Strengthening;
- (iii) Development and Implementation of State Level approaches to Integrated Coastal Zone Management on pilot scale in the States of Gujarat, West Bengal and Orissa.

The project is under implementation and studies have been initiated relating to Methodology for mapping and delineation of ecologically sensitive areas, management effectiveness of coastal zone environmental projects etc. The project preparation facilities have been established at Ministry in the three States where pilot studies have been initiated.

Ecologically Sensitive Areas

Introduction

Environmentally Sensitive Zones may be defined as areas with identified environmental resources having "Incomparable Values" which require special attention for their conservation. The Ministry has already notified ecologically-sensitive areas in respect of Matheran, Mahableshwar-Panchgani, Doon Valley, Taj Trapezium, Numaligarh, Aravalli and Dhanu Taluka under the Environment (Protection) Act, 1986. Zonal Master Plan / Area Development Plan for all notified / to be notified environmentally sensitive areas would be prepared by the concerned State Governments as per the provisions of the said respective draft notifications involving local communities / experts and got approved by the Ministry for regulating development activities and protection and conservation of Entities of



Fig-40. Mangroves – the natural coast guard

Incomparable Values. Monitoring Committees with representatives of Government, Experts and local representatives as per the notifications would be constituted to ensure compliance of approved Zonal Master Plans / Area Development Plan.

Objectives

a) In order to conserve and enhance these resources, without impeding legitimate socio-economic development of these areas, the following actions will be taken:

- Identify and give legal status to Environmentally Sensitive Zones in the country having environmental entities with "Incomparable values" requiring special conservation efforts.
- Formulate development plans for these

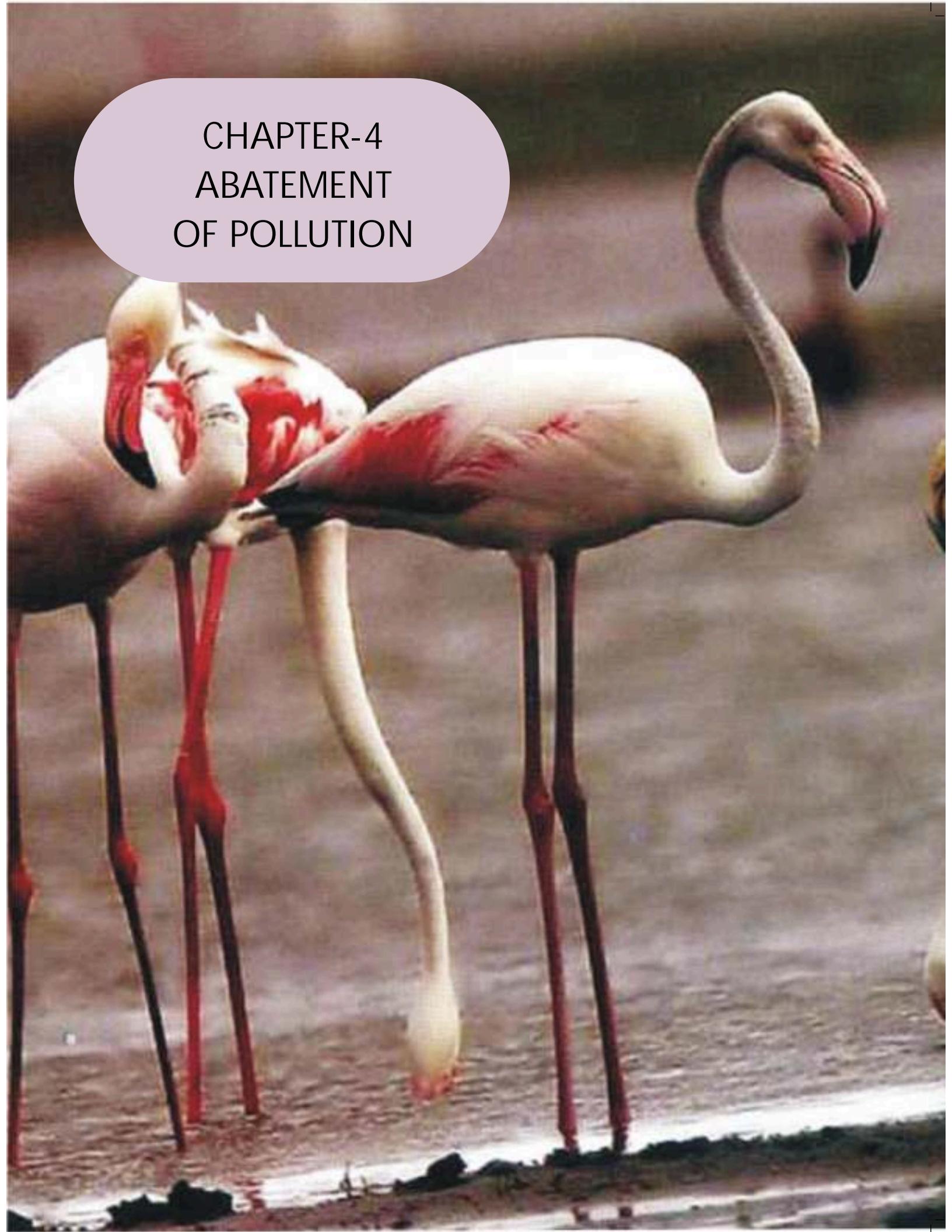
zones on a specific basis, with adequate participation by the local communities.

- Create local institutions with adequate participation for the environmental management of such areas, to ensure adherence to the approved area development plans, which should be prepared in consultation with the local communities.
- Adopt "best practice" norms for infrastructure construction in mountain regions to avoid or minimize damage to sensitive ecosystems and despoiling of landscapes.

Progress / Achievements

- The Final Notification to declare Mount Abu (Rajasthan) as Eco-Sensitive Zone has been published in the Gazette of India. Rajasthan State Government and local

- 
- stakeholders have been made aware of the Notification.
- Areas around National Parks / Sanctuaries in Haryana are considered for the declaration as Eco-Sensitive Zones and the Draft Notifications in respect of Sultanpur National park, Kalesar National Park, Kalesar Wildlife Sanctuary, Khol Hi Raitan Wildlife Sanctuary, Bir Shikargarh Wildlife Sanctuary, Nahar Wildlife Sanctuary, Chhilchhila Wildlife Sanctuary, Abubshaher Wildlife Sanctuary, Bhindawas Wildlife Sanctuary and Khaparwas Wildlife Sanctuary have been published in the Gazette of India. Haryana State Government and local stakeholders have been made aware of the Notification.
 - Pachmari (Madhya Pradesh) is in various stages of being notified as Eco-Sensitive Zone.



CHAPTER-4
ABATEMENT
OF POLLUTION

Control of Pollution

Introduction

The concern for environmental quality has become the top most issue in the present scenario of increasing urbanization, industrial and vehicular pollution as well as pollution of water courses due to discharge of effluents without conforming to the environmental norms and standards. Realizing this trend of pollution in various environmental media like air, water, soil etc., the Ministry adopted a policy for abatement of pollution in 1992, which provides multi-pronged strategies in the form of regulations, legislations, agreements, fiscal incentives and other measures to prevent and abate pollution. To give effect to various measures and policies for pollution control, various steps have been initiated which include stringent regulations, development of environmental standards, control of vehicular pollution, control of air & water pollution, spatial environmental planning etc. The Government further adopted the National Environment Policy (NEP- 2006) which seeks to extend the coverage, and fill in the gaps that still exists, in the light of present knowledge and accumulated experience. This policy does not displace, but builds on the earlier policies of the Government.

Progress of activities undertaken under various programmes are as follows:

Control of Air Pollution

- The air pollution and the resultant air quality can be attributed to emissions from vehicular, industrial, construction, agricultural and domestic activities. The air quality has been, therefore, an issue of social concern in the backdrop of various developmental activities. The norms for ambient air quality have been notified and various industry specific emissions
- The monitored ambient air quality data indicates that the level of Sulphur Dioxide (SO_2) is within the prescribed air quality norms in residential area in all cities and that of Nitrogen Dioxide (NO_2) is within norms in most of the cities. However, the level of Respirable Suspended Particulate Matter (RSPM) exceeds the prescribed norms in many cities including Delhi.

standards are evolved and notified from time to time. For control of air pollution, with a view to initiate policy measures and to prepare ambient air quality management plans, with addition of twenty three stations during the year, three hundred forty two ambient air quality monitoring stations are operational covering one hundred twenty eight cities/towns in twenty six States and four Union Territories. Presently, only the criteria pollutants namely; sulphur dioxide (SO_2), oxides of nitrogen (NO_x) and Respirable Suspended Particulate Matter (RSPM) are monitored by the Pollution Control Boards (PCBs), Pollution Control Committees (PCCs), Universities and Research Institutes including National Environmental Engineering Research Institute (NEERI), Nagpur. Besides, additional parameters for other toxic trace matters and polycyclic aromatic hydrocarbons are also being monitored in selected cities of the country. Installation of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) is proposed for sixteen cities for air quality monitoring on 24x7 basis. A total of thirty three CAAQMS have been installed across the country. The continuous ambient air monitoring has been introduced in six cities namely; Mumbai, Bengaluru, Kolkata, Pune, Solapur and Hyderabad, so far apart from Delhi.

- The monitored ambient air quality data indicates that the level of Sulphur Dioxide (SO_2) is within the prescribed air quality norms in residential area in all cities and that of Nitrogen Dioxide (NO_2) is within norms in most of the cities. However, the level of Respirable Suspended Particulate Matter (RSPM) exceeds the prescribed norms in many cities including Delhi.

Assistance for Abatement of Pollution

- Under this scheme, grants are being provided to the State Pollution Control Boards/UT Pollution Control Committees, Environment Departments, Central/State Research Institutes, and other government agencies/organizations with the aim of strengthening their technical capabilities to achieve the objectives of the Policy Statement. Assistance is also provided to North Eastern Pollution Control Boards & Pollution Control Committees as salary support for the technical staff. In addition, support is also extended for undertaking projects for Abatement of Pollution.
- During the 11th Plan period, financial outlay is to the tune of Rs. 45.00 crore and the financial allocation for the current financial year is Rs. 5.00 crore.

Auto Fuel Policy

- The Ministry of Petroleum and Natural Gas (MoP & NG), Government of India has enunciated an Auto Fuel Policy which aims to comprehensively and holistically address the issues of vehicular emissions,



Fig-41. Lichens (*Candelaria concolor*) - the delicate symbiotic association between algae and fungi, make them useful indicators of air pollution

vehicular technologies and auto fuel quality in a cost-efficient manner while ensuring the security of fuel supply. The Government has also published Gazette Notification vide G.S.R. 84(E) on 9th February 2009 for introducing Bharat Stage IV and III norms, as applicable, for new vehicles in selected cities. The Policy objectives include ensuring sustainable, safe, affordable and uninterrupted supply of auto fuels; optimum utilization of infrastructure for import of crude and crude products, processing and production, and the storage and transportation; assessing the future trends in emissions and air quality requirements from view point of public health; adopting such vehicular emission standards that will be able to make a decisive impact on air quality etc. The Policy provides for a road map for reduction in vehicular emission norms for new vehicles as well as for reduction of pollution from in-use vehicles. It also sets standards for quality of fuel and other kits. The road map for new vehicles is given in Table-12.

Source Apportionment Studies

- Due to multiplicity and complexity of air polluting sources, apportionment of contribution to ambient air pollution from the sources is important for planning cost effective pollution control strategies. In view of this, a study on "Air Quality Assessment, Emission Inventory/Source Apportionment Studies for Indian Cities" has been initiated.
- To evaluate contribution from various sources to air quality, Source Apportionment Study (SAS) has been initiated for six cities namely; Delhi, Bengaluru, Chennai, Mumbai, Pune and Kanpur involving the institutions like

Table-12. New Auto Fuel Policy

Coverage	Passenger Cars, light commercial vehicles & heavy duty diesel vehicles	2/3 wheelers
Entire country	Bharat Stage II (Euro II equivalent) 01.04.2005 Bharat Stage III (Euro III equivalent) 01.04.2010	Bharat Stage III – Euro III equivalent - 1.4.2010
Eleven major cities (Delhi/NCR, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad, Pune, Surat, Kanpur & Agra)	Bharat Stage II (Euro II equivalent) 01.04.2003 Bharat Stage III (Euro III equivalent) 01.04.2005 Bharat Stage IV (Euro IV equivalent) 01.04.2010 (except for vehicles holding Inter-State permits or National Permits or All India Tourist permits)	

- National Environmental Engineering Research Institute (NEERI), Nagpur, The Energy and Resources Institute (TERI), New Delhi, Indian Institute of Technology (IIT), Chennai, Automotive Research Association of India (ARAI), Pune and Indian Institute of Technology (IIT), Kanpur. The objective frame work for Source Apportionment Study includes preparation of emission inventory, emission profile, monitoring of ambient air quality, assessment of data and its authentication and source apportionment of RSPM (PM10) using factor analysis and receptor modeling etc. Application of Chemical Mass Balance (CMB-8) Receptor model and ISC dispersion model have been included in the study.
- For appraisal and guidance during the survey and study, a National level Steering Committee under the chairmanship of Secretary (E&F) has been constituted. In order to provide technical assistance and guidance during data collection, use of appropriate model etc. a

Technical Committee has also been constituted under the chairmanship of Chairman, Central Pollution Control Board (CPCB) and members drawn from various technical institutions and organizations.

- The data collection has already been completed while the report writing is in progress. An interim report of the study has been submitted to the Government by the CPCB. The study is likely to be over by September 2009.

Development of Environmental Standards

- Environmental Standards refer both to the acceptable levels of specified environmental quality parameters at different categories of locations i.e. 'ambient standards' as well as permissible levels of discharge of specified waste streams by different classes of activities i.e. 'effluent standards' and discharges of gaseous pollutants i.e. emission standards.

- Environmental standards cannot be universal, and each country should set standards in terms of its national priorities, policy objectives, and resources, as stated in the National Environmental Policy, 2006. These standards, may, of course, vary (in general, become more stringent) as a country develops, and has greater access to technologies and financial resources for environmental management. Within the country different States, UTs and local bodies may adopt stricter standards based on local considerations.
- In order to abate pollution from various sources, Ministry notifies general as well as industry specific emission and effluent standards for various categories of industries under the Environment (Protection) Rules, 1986 as per procedure specified in the Environmental (Protection) Act, 1986. Based on development of new pollution control technologies and their feasibility, these standards are reviewed from time to time and new ones are notified.
- The Ministry has constituted an Expert Committee (EC) to evolve Environmental Standards and consequent upon the adoption of the National Environment Policy-2006 (para 5.3: Environmental Standards, Management Systems, Certification and Indicators), the said Committee has been reconstituted in April 2008. A social scientist, public health expert and environment economist are now on the committee. Based on the recommendations of the Committee, the Standards are notified after legal vetting by the Ministry of Law & Justice, Government of India.
- All the notified Standards have been loaded on the website of this Ministry in a

separate subhead 'Environmental Standards' under 'Legislation' head. During the year, Standards in respect of following category of industries have been evolved and are being finalized for notification:

- Plaster of Paris Industry;
- Hotel Industry;
- Petrochemical Plants;
- Brick kiln;
- Cashew Seed Processing Industry;
- Iron Ore Mines; and
- SRU in Petroleum Oil Refinery.

The environmental standards for the following industry/process have been notified during the year

Effluent & Emission Standards

- Petroleum Oil Refinery (18.03.2008)
- Sponge Iron Plants (30.05.2008)
- Incinerator for Pesticide Industry (18.02.2009)
- Refractory Industry (18.02.2009)
- Incinerator for Pharmaceutical Industry (04.03.2009)

Emission Standards

- Sulphuric Acid Plants (07.05.2008)
- Common Hazardous Waste Incinerator (26.06.2008)

Effluent Standards

- Coffee Industry (06.08.2008)

Noise Pollution

- Noise levels have been a matter of concern due to various activities, religious functions, festivals and related celebrations. The main sources of noise

pollution include industrial activities, use of public address system, construction activities, use of generator sets, pressure horns, fire crackers etc. Keeping in view the increasing trend in noise levels, Ministry has issued various regulations from time to time to control noise pollution in ambient air, at source and at manufacturing stage. To control community noise, Noise Pollution (Regulation and Control) Rules, 2000 were notified in February, 2000.

- In Civil Writ Petition No. 72 of 1998 regarding Noise Pollution-Implementation of Laws for restricting Use of Loudspeakers and High Volume Producing Sound System, the Hon'ble Supreme Court in its judgment of July, 2005 and October, 2005 has given detailed directions regarding implementation of laws for controlling noise.
- In pursuance of the said judgement and to collect bench mark data, all the regulatory agencies of the State Government/Union Territories are being regulatory advised to comply with stipulated norms and to draw an Action Plan for ensuring the compliance of the directions of Hon'ble Court. The concerned agencies are regularly advised to strengthen/establish environmental cells at the State and district levels to check noise pollution and also to undertake surveys in major cities specially before and after the festivals to ensure compliance. A monitoring protocol for noise level and ambient air monitoring especially during Diwali festival has been developed and ambient noise and air quality monitoring has been undertaken all State Pollution Control Boards (SPCBs), Pollution Control Committees (PCCs) and CPCB across the
- country during Diwali- 2008 in accordance with the said protocol.
- In pursuance of the aforesaid judgements of July 2005 and October 2005, draft rules have been published vide G.S.R. 158(E) on 9th March, 2009 for inviting public suggestion(s) &/or objection (s) within 60 days so as to amend existing Noise Pollution (Regulation and Control) Rules, 2009.
- The noise limits for Diesel Generator (DG) sets up to 1000 KVA were notified in May, 2002 and are under implementation since 1st January, 2005. The Ministry has issued a notification in October, 2008 for amending the said notification on 'Noise Limit for Generator Sets run with Diesel' under the Environment (Protection) Rules, 1986 so as to make the definition of 'manufacturer' broad based by including assemblers of DG sets and to facilitate transportation of DG sets above 250 KVA capacity without compromising with emission and noise norms after considering suggestions and objections received from various stakeholders as a follow-up of draft notification dated November 12, 2007.
- The CPCB has been advised for drawing a monitoring protocol for ambient noise and prepare a blue print to have national ambient noise monitoring network in place. A beginning to monitor ambient noise would be made during XI Plan.

Charter on Corporate Responsibility for Environmental Protection (CREP)

- After a series of industry specific interaction meetings, the Charter on Corporate Responsibility for Environmental Protection (CREP) was adopted in March, 2003 for seventeen

categories of polluting industries and is a road map for progressive improvement in environmental management.

- For effective implementation of the Charter, eight task forces comprising of experts and members from institutions and industry association have been constituted. These task forces are meeting regularly to monitor and to provide guidance to the industries for adopting necessary pollution abatement measures.

Environmental Authorities

Environment Pollution (Prevention and Control) Authority for the National Capital Region

- The Environment Pollution (Prevention and Control) Authority (EPCA) for National Capital Region was constituted under Sub- Section (3) of Section 3 of the Environment Protection Act, 1986 on January 29, 1998 vide S.O. No. 93 (E) dated January 29, 1998 under the chairmanship of Sh. Bhure Lal. The tenure of the EPCA was extended from time to time, and at present extended upto 28th July, 2009 vide S.O. No. 1720 (E) dt. 18th July, 2008.
- The issues considered by the Authority include environment related matters covering vehicular pollution control, sewage treatment and assessment of operations and handing over of Common Effluent Treatment Plants (CETPs) in National Capital Region (NCR) to the concerned societies, monitoring of action plans for improvement of air quality in seven metro cities etc. and in addition, the matters referred to it by Hon'ble Supreme Court in its various judgements.
- EPCA is reporting the compliance status and special tasks assigned to it to the Hon'ble Supreme Court from time to time.

National Environment Appellate Authority (NEAA)

The National Environment Appellate Authority (NEAA) was established under the National Environment Appellate Authority Act, 1997 (22 of 1997) to hear appeals in regard to restriction of areas in which any industries, operations or class of industries, operations or process shall not be carried out or shall be carried out subject to certain safeguards under the Environment (Protection) Act, 1986 and for matter connected therein or accidental thereto.

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

In compliance with the Hon'ble Supreme Court's order dated August 28, 1998 in Writ Petition (Civil) No. 914 of 1991 viz. Vellore Citizen's Welfare Forum versus Union of India and Others, the Ministry constituted the Loss of Ecology (Prevention and Payments of Compensation) Authority for the State of Tamil Nadu under the Chairmanship of a retired Judge of madras High Court vide notification SO 671 (E) dated September 30, 1996, to deal with the situation created by the tanneries and other pollution industries in Tamil Nadu. The tenure of the authority has been extended up to December 28, 2009 vide Notification S.O. 2979 (E) dated December 26, 2008.

Recognition of Environmental Laboratories under Environment (Protection) Act, 1986

- The successful implementation of environmental protection programmes essentially requires us to identify and quantify the pollution sources and pollutants, conduct baseline survey, lay down standards and build-up monitoring systems. To meet these requirements an environmental laboratory requires to be

provided with all the necessary instruments and equipments as also expertise and capability of its staff for monitoring all groups of parameters including water, air, noise, hazardous waste, soil, sludge etc.

- For effective implementation of environment protection programmes there is an inescapable need for an efficient and reliable institutional arrangement and facilities for survey, identification, quantification and systems for monitoring. In this context, the role of an environmental laboratory assumes paramount importance and significance especially for the assessment of the status of environment and its components and can facilitate effectively in prevention and control of pollution. The Ministry has been implementing a programme for recognition of environmental laboratories with the aim of increasing facilities for analysis of environmental samples. Twelve cases of private laboratories were considered for recognition under E (P) A, 1986 during the year.

Revision of Guidelines for Evaluation and Recognition of Environmental Laboratories under E(P)A, 1986

- The extant guidelines (1994-95) for establishment and recognition of the laboratories have been revised and procedures streamlined. The revision had become necessary as the Environment (Protection) Act, 1986 has been strengthened over the years with the enactments of various rules and notifications there under. Further, environmental standards have been formulated for various parameters in different industrial sectors. The guidelines for recognition of environmental

laboratories under E(P)A 1986 have been revised by the Ministry with emphasis laid on quality assurance and quality control aspects. The revised guidelines have been placed on the website of Ministry (<http://envfor.nic.in>) for wider circulation. The revised guidelines (June 2008) are a definite improvement in the content and the procedures for recognition of the environmental laboratories.

- On the whole, through these revised guidelines, an attempt has been made to bring in synergy in requirements between the three Environmental Acts, viz the Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981 and the Environment (Protection) Act 1986. While the recognition of the environmental laboratories under the Air Act and the Water Act are considered by the respective State Pollution Control Boards, the labs under the provisions of Section 12 and 13 of E(P)A 1986 are considered by the Ministry of Environment and Forests (MoEF) and Central Pollution Control Board.

- The revised guidelines have been operationalized. The Expert Committee on Laboratories is meeting once every month to discuss all the cases of Govt. and Private Sector Labs.

Common Effluent Treatment Plants (CETPs)

- The concept of the Common Effluent Treatment Plants (CETPs) arose in order to make a co-operative movement for pollution control. The main objective of the CETPs is to reduce the treatment cost to be borne by an individual member unit to a minimum while protecting the water environment to a maximum. Wastewater

treatment and water conservation are the prime objectives of the CETP. The concept of CETPs was envisaged to treat the effluent emanating from the clusters of compatible small - scale industries. It was also envisaged that burden of various Government authorities working for controlling pollution and monitoring of water pollution could be reduced once the CETPs are implemented and commissioned.

- A Centrally Sponsored Scheme has been undertaken by the Government for enabling the small scale industries (SSI) to set up new and upgrade the existing Common Effluent Treatment Plants (CETPs) to cover all the States in the country. A scheme for financial assistance for the CETPs has been formulated as follows:
- State subsidy – 25% of the total project cost;
- Central subsidy – 25% of the total project cost;
- Entrepreneurs contribution – 20% of the total project cost;
- Loan from financial institutions – 30% of the total project cost.

(e.g. IDBI, ICICI or any other nationalized banks, State Industrial Financial Corporation etc.)

- During this year, an allocation of Rs. 4.40 crore was made for providing financial assistance to the on-going CETP projects and for new projects. Financial assistance was provided for the ongoing projects namely, Mahad, Roha, Tarapur, Taloja and Dombivili in Maharashtra. Three new projects for setting up CETPs at Nacharam, Mallapur in Andhra Pradesh, Waluj in Maharashtra and Palsana in

Gujarat have been provided financial assistance during the year.

Taj Protection Mission

- In pursuance of the Hon'ble Supreme Court's Order, projects for environmental protection of World Heritage Site of Taj Mahal were initiated and funded by the Ministry. The Planning Commission approved Rs. 600 crore on a 50:50 cost sharing basis with the State Government to implement various schemes in the Taj Trapezium Zone for environmental protection of the Taj Mahal. In the first phase during the IX Five Year Plan, ten projects were approved by the Government to be implemented by the State Government of Uttar Pradesh.
- The Ministry has sponsored a post-evaluation study for completed projects through the National Environmental Engineering Research Institute (NEERI), Nagpur for ascertaining the improvement in environmental status of the area. The revised report of the study by NEERI is yet to be submitted.

Eco-cities

- The Eco-cities Project aims at improving the existing environment and at changing those aspects that are causing environment damage. The focus of the project includes protection of environmental resources like water bodies, forests etc., improving infrastructure and sanitary conditions in the towns and creating aesthetic environs.
- The Eco-cities Programme was initiated to bring in visible environmental improvement in the small and medium towns. The following towns were taken under first phase of Eco-cities programme to bring in visible environmental

improvement:

- Vrindavan (Uttar Pradesh)
- Tirupati (Andhra Pradesh)
- Puri (Orissa)
- Ujjain (Madhya Pradesh)
- Kottayam (Kerala)
- Thanjavur (Tamil Nadu)
- An Expert Committee has been constituted for the identification of the projects and approval of Environmental Developed Plan (EDP) and Detailed Projects Reports. The project in Kottayam is aimed at rejuvenating Mundar River and Kacherikadavu Boat Jetty and Canal that have severe siltation and pollution problems. The Project in Ujjain is aimed at improvement around Mahakal Temple and cleaning of Rudra Sagar lake, which is highly silted and polluted with sewage. While the project in Vrindavan aims at improvement of historic core of the town located around Rangnath Temple, the project in Tirupati is for improvement of storm water drains in the northern, southern and western side of the Gobind Raja Swamy Temple. Similarly, Project in Puri is to improve around Jagannath Temple, renovation of three of the religious ponds, shifting of garages and automobile workshop and improvement of existing solid waste disposal facility. In Thanjavur towns, the activity on 'Renovation of old tanks' has been proposed to be taken up to protect presently used and potentially useable aquifers from further degradation and to facilitates the rainwater harvesting system.
- The Eco-city Programme has been continued during the Eleventh Five Year

Plan Period with inclusion of three more towns/cities namely, Chanderi (Madhya Pradesh) Sawai Madhopur (Rajasthan) and Darjeeling (West Bengal). The concerned Urban Local Bodies (ULBs) and the State Pollution Control Boards (SPCBs) have been asked to take further necessary action for implementation of various projects under this programme.

Industrial Pollution Abatement through Preventive Strategies

Four important activities are going on under this sub-scheme

- Waste Minimization for small & medium scale industries;
- Environmental Statement;
- Environmental Management;
- Environmental Statistics & Mapping.

Waste Minimization for Small and Medium Scale Industries

Introduction and Objectives

The policy statement for abatement of pollution lays emphasis on preventive aspects of pollution abatement and promotion of technical inputs to reduce Industrial pollution. One of the simplest preventive strategies is to minimize the waste in production of products and goods. The main objective of waste minimization is to optimize the consumption of raw materials and also reduce waste generation by adopting production techniques which are cleaner in nature and which can be adopted by the existing units without necessarily changing the production processes or unit operations. The approach to the problem is towards utilizing the existing production facilities in an optimal manner. The objectives of the scheme are following:

- To assist the primary small units and some

medium scale units who do not have access to the requisite technical expertise to achieve waste minimization but excludes procurement of equipment and hardware.

- Establishing and running Waste Minimization Circles (WMCs) in clusters of Small & Medium Industries.
- Capacity building in the area of Waste Minimization/Cleaner Production through training.
- Waste Minimization demonstration studies in selected industrial sectors.
- Preparation of sector specific technical manuals on waste reduction, reuse and recycling.
- Awareness programmes and preparation of compendium of success stories on cleaner production/waste minimization

Activities undertaken

The National Productivity Council (NPC), New Delhi coordinates the activities pertaining to Waste Minimization Circles (WMCs) through facilitators designated by it, training and awareness activities by NPC itself as well as through Dev Commissioner, Small Scale Industries (DC, SSI). Through WMC facilitator Training programmes, NPC has trained one hundred thirty two participants in one hundred sixty two organizations. NPC has also prepared compendium of success stories in this area for mass awareness and have also brought out through Centre or State level organizations or Consultants. A sector-wise list of one hundred thirty two Waste Minimization Circles (WMCs) has been established in various cities and towns. In this process, forty one WMC Facilitator Organizations have taken initiatives in establishing WMCs under the

guidance of National Productivity Council. The WMC training programmes are integral part of the activity. The participating organizations facilitate NPC in conducting the training programme by providing necessary logistic assistance.

Waste Minimization/Cleaner Production

Waste Minimization Circles

- Synergies would be drawn with other grant-in-aid schemes of the Ministry, like demonstration projects, Clean Technology, etc.
- Mass dissemination of results of the studies in the area of waste minimization in industrial clusters across the country through electronic and print media.
- Sensitization of financial institutions like SIDBI etc. through meetings and consultations for easy uptake of Waste Minimization (WM) solutions by Small and Medium Industries (SMI).

Waste Minimization Demonstration Projects

- As vast majority of the small and Medium Industries (SMIs) in the country are still unaware of the benefits of waste minimization and resource conservation and its potential. The proposed activities would support the demonstration projects in designated industrial sectors. In order to spread geographically, it would be desirable to use the network of facilitators/ capacity that is already built through Waste Minimization Circles.

Capacity Building on Waste Minimization

The ongoing initiative needs to be regularly reviewed and strengthened by developing and implementing new strategies for waste minimization. The training programmes are integral part of the activity, in which the

participating organizations facilitate in conducting such programmes. These training programmes need to be taken forward for a multiplier effect. Therefore, the current scheme shall support the following additional components namely:

- "Training of the Trainer" programmes on Waste Minimization
- National and Regional Waste Minimization Awareness Workshops

Developing Awareness Material on Waste Minimization

In order to sustain various Waste Minimization efforts and to provide a continuing impetus to the programme, continued publicity and dissemination of the waste minimization activities is also proposed by including the following activities:

- Development of publicity materials such as news letters, posters, video films etc., on waste minimization in English and local languages
- Development of guidelines on waste minimization
- Compilation of Waste Minimization success stories
- Development of sector specific database on waste minimization.
- Continuous updating of Ministry's website with new information, findings of the studies and the success stories
- The sector specific training manuals and a compendium of success stories prepared by NPC are utilized in the dissemination of the findings and these are also made available in the NPC website. In addition to these, the site specific problems of some of the sectors are discussed during the training programmes.

Progress/ Achievements

Under the grant-in-aid scheme on "Waste Minimization" so far, seven demonstration studies have been funded under this component to organizations like Andhra Pradesh Industrial and Technical Consultancy Organisation Ltd. (APITCO), Enviro Control and Development Consultants, National Productivity Council (NPC), Administrative Staff College of India (ASCI) and Andhra Pradesh Pollution Control Board (APPCB), Ramky, Winrock, Aligarh Muslim University, Aligarh; Yenapoya University, Mangalore; Environment Protection and Training Research Institute, Hyderabad; etc. various projects continued during the period and their progress was monitored through Monitoring Committee, organising workshops and field visits. These projects are as follows:

Waste Minimization Studies in Small Scale Industries in Balanagar Industrial Area, Hyderabad

The proposed study is for (i) reduction in gaseous/fugitive emissions (ii) reduction in dust emissions (iii) reduction of manual intervention to prevent spills (iv) reduction in water consumption and usage by recycle/reuse techniques and (v) performance evaluation of existing ETP and study the various processes in the industry and to prescribe waste minimization procedures to reduce the pollution load.

Waste Minimization Studies in Small Scale Industries – Textile Sector in Nandigaon Village, Kothur Mahboobnagar Distt., Andhra Pradesh

The proposed project is for (i) reduction in water consumption and usage by recycle/reuse (ii) up-gradation of existing ETP to meet the standards stipulated by APPCB (iii) Handling and disposal of ETP sludge/Boiler

Ash and study the various processes in the industry and to prescribe waste minimization procedures to reduce the pollution load.

Waste Minimization in Small Scale Industries – WMC Extension – Phase III

In Waste Minimization Circles extension Phase III, National Productivity Council (NPC) will undertake the activities which includes conduction of training programme for WMC facilitators, facilitating the establishment of circles (conduction of the awareness programme for each circle, conduction of the training of the participating industries, periodic supervision of the WMC activities etc.), conduction of the sustenance meeting of the previous WMCs, providing them technical inputs, conduction of regional workshops etc.

Waste Minimization, Environmental Audit and Management System for the Industries and Regulatory Agencies

In pursuance with Ministry's notification for submission of "Environmental Statements" by the industries to the respective State Pollution Control Boards (SPCB) in April, 1992 and further amended in April, 1993. Environmental Statement is a pro-active tool for self-examination of the industry itself to reduce/minimize pollution by adopting process modifications, recycling and reuse of the resources. The regular submission of Environmental Statement will indicate the systematic improvement in conservation of resources and environmental pollution control being achieved by the industry. In other way, the items of Environmental Statement may be used as environmental performance indicators for relative comparison, implementation and to promote better practices. There is a need to conduct awareness programme among the industries and State Pollution Control Boards, so that industries are made aware of the requirement

of providing appropriate data/information and SPCBs officials to make use of such information/evaluation of statements. Therefore, the Central Pollution Control Board is of the opinion to conduct awareness programmes as a continuation to the "Review of Environmental Statements submitted by selected eleven industrial sectors" which have been studied through reputed consultants.

Project proposal on "Minimization of Environmental impacts of Slaughter House Wastes by Value Addition as Pet Foods"

The study will attempt to minimize the environmental pollution caused by Slaughter House Wastes by utilizing them for the production of value added per-foods resulting in better economic returns. The laboratory scale studies for development of pet-foods has already been completed and now the proposed work will be taken up to standardize and stabilize the value added foods on a large scale.

Project proposal on "Demonstration of Waste Minimization in Basic Chrome Manufacturing Unit"

The main objective of the project is to demonstrate the resource conservation & Waste Minimisation in Basic Chrome Sulphate (BCS) manufacturing unit. The subsequent objectives are resource recovery, recycle & reuse, improve upon the shop floor environment and enhancement of productivity.

Project proposal on "Clean Technology for Waste Minimization from Nutraceutical Industry"

The investigation under the proposal is to carry out phyto-chemical study on biological activity and characterization of active phyto-chemicals for commercial applications and waste minimization. The objectives of the

study will be to reduce the level of wastes, enhance opportunities for waste recycling and promote novel uses of nutraceutical industrial wastes. The focus of the demonstration research will be on bio-based economy which mimics natural ecosystems-recovery, reuse and regenerate and these will be the areas which will be explored to find value addition to the thousands of tones of organic residues generated every year by the nutraceutical industry.

Sixth meeting of the Evaluation and Monitoring Committee was held and the Committee has recommended four projects for financial assistance. These are as follows:

- Waste Minimisation study in Electroplating Operation in Imitation Jewellery Unit Machilipatnam, Krishna Distt. Andhra Pradesh M/s Andhra Pradesh Industrial & Technical Consultancy Organisation Ltd. (APITCO), Hyderabad.
- Project proposal on "Biological Liquefaction of Waste Fleshing and Treatment with Tannery Effluent for Biogas Generation in Single Reactor" by Central Leather Research Institute, Chennai.
- Proposal on "Enhancing the Environmental Performance and Competitiveness of Vegetable Oil Industry in Andhra Pradesh- Waste Minimisation (WM) Assessment, Demonstration of WM Measures, and Training" by M/s Winrock International, Hyderabad (A.P).
- Proposal on "Waste Minimisation in Small Scale Industries" by National Productivity Council (NPC), New Delhi.

Three projects are likely to be completed during the current financial year

- Waste Minimization Studies in Bulk Drug

Manufacturing Units in and around Hyderabad by Andhra Pradesh Industrial and Training Consultancy Organization (APTICO), Hyderabad.

- Waste Minimization and Demonstration Studies in Textile Dyeing Industries in Kolkata by M/s Environ Control and Development Consultants, Kolkata.
- Demonstration of Waste Minimization in Basic Chrome Manufacturing Unit by Ramky Enviro Engineers Ltd., New Delhi.

Environmental Statement

Under this component, various studies relating to preparation of sector specific performance have been initiated. Project has been sponsored to the Central Pollution Control Board (CPCB) in this regard for development of environmental statements in the sectors of sugar, pesticide, thermal power, cement, textile, iron & steel, tanneries, petrochemicals, oil refineries, pulp & paper and bulk drug industries.

Environmental Management

Environmental Management System provides a systematic approach for effective environmental management in industry. It enables the industry to combine systems improvement with simultaneous legislative and regulatory compliance. The activities being pursued under this include the following

- Training and awareness programme.
- Development of criteria for accreditation of certification bodies.
- Development of guidelines for certification bodies to conduct Environmental Management System audit.
- Development of criteria for assessing the performance of certification bodies.

- Conducting model Environmental Management System audits in selected sectors of the industry.

Environmental Statistics & Mapping

Various studies under this component have been initiated through research institution, organisations, universities and State Pollution Control Boards, which are in final stages of completion. During the year, funds were released for the following new projects under the scheme:

- Industries Pollution Abatement through Preventive strategies in Nanjangered area of Mysore District by Mysore University.
- Cleaner Production Demonstration in Rice Mills and Pharmaceuticals Industries by A.P. Pollution Control Board.

Development and Promotion of Clean Technologies

Introduction and Objectives

Clean Technologies, as distinct from "end-of-pipe" abatement technologies minimize the generation of waste streams in the production processes and utilize waste from other consumption goods and production processes, rather than treating the waste after generation. In general, clean technologies are less intensive in use of raw materials and energy, than conventional technologies, which rely on pollution abatement after generation. For this reason, they may also offer significant cost advantages to the producer.

Adoption of cleaner technologies and cleaner production strategies is considered to provide a balance between Development & Environment through economic benefits by way of increased resources efficiency, innovation and reduced cost for

environmental management. A grant-in-aid Scheme on Development and Promotion of Clean Technologies was initiated in 1994 with the following objectives:-

- Development and Promotion of Cleaner Technologies.
- Development of Tools and Techniques for Pollution Prevention.
- Formulation of Sustainable Development Strategies.

Activities undertaken and completed

Since the inception of the scheme in 1994, activities undertaken include (i) Carrying Capacity Studies in various parts of the country namely Greater Kochi Region, Doon Valley, Damodar River Basin, Tapi Estuary and National Capital Region (NCR); (ii) Natural Resource Accounting Studies for Upper Yamuna Basin; (iii) Life Cycle Assessment (LCA) Studies in Thermal Power Plants, Steel, Pulp and Paper and Cement (from cradle to gate). Second phase of the project i.e. gate to grave is likely to be started soon; (iv) Other pollution prevention and waste utilisation and management studies.

Progress/ Achievements

Under the grant-in-aid scheme on Development & Promotion of Clean Technology, various projects continued during the period 2008-09. Four projects mentioned below are likely to be completed during the current financial year.

- Recycling of Marble Slurry Waste for environmental improvement in Rajasthan
- Bio-remediation of Railadevi Lake in Thane District, Maharashtra
- Development of Adhesive from Biomaterials

- R&D application in Technology Upgradation of CETP in Tannery Cluster in Dindigul, Tamil Nadu.

The Ministry has sanctioned eleven demonstration projects to various research institutions in the country. These are:

Recycling of Marble Slurry, Udaipur, Rajasthan

The Indian Environmental Society, Delhi have set up two demonstration units at Udaipur and Rajsamand Districts of Rajasthan, with the aim of utilizing marble slurry wastes arising out of marble cutting and processing. Based on the successful demonstration of technology at the above two locations, the project proponents have set up brick and tiles manufacturing unit utilizing stone slurry at Kota also. Awareness workshops were also organized to promote the usage of bricks made out of marble slurry. The project is likely to be completed during the current financial year.

Bio-remediation of Railadevi Lake, Thane, Maharashtra

The ongoing demonstration project relating to cleaning of Railadevi Lake in Thane District of Maharashtra, using bio-remediation technique has been completed. Final Technical Report is awaited.

Development of Adhesive from Bio-material, IPIRTI, Bengaluru

The project has been sponsored to Indian Plywood Industries Research & Training Institute (IPIRTI), Bengaluru for development of adhesive for use in the manufacture of plywood drawn from biological materials like tannin from tree bark, cashew nut shell, liquid and lignin

obtained from black liquor wastes generated by Pulp and Paper Industry. The material so developed will replace existing adhesives based on organic compounds like phenol formaldehyde and urea formaldehyde. In a recent Monitoring Committee Meeting it was decided to study the commercial aspect of the bio-adhesives.

Effective removal of arsenic from ground water covering Maslandapur – Ghoshpur blocks of 24 – Paraganas (N) (Phase-II)
Central Salt and Marine Research Institute, Bhavnagar, Gujarat

The objective of the project is to develop easy and affordable field testing kit for arsenic and to explore the possibilities of installing at least ten community scale units in a cluster of houses for De-arsenicating 1000 liters of water per day in an eight hour shift. There is a good scope to exhaustively study the resin and establish the relationship between the resin structure and its coordinating ability for scavenging arsenic from raw as well as chemically treated water. The project envisages development of domestic units in the form of a portable unit to meet the drinking water needs of a small family of five for a period of one month.

Defluoridation of water using natural materials for better drinking water supply in rural regions by Jawaharlal Nehru University, New Delhi and Annamalai University, Tamil Nadu.

The proposal is eco-friendly fluoride removal technology developed already will be established and standardized on a large scale to cater the fresh water needs of the affected villagers. The primary research has already been completed and it has been successfully demonstrated

in the affected areas, but on a small scale. The technology established will be practically demonstrated to all the departments concerned in the country for implementation. The column method of fluoride removal will be adopted using locally available materials like red soils, charcoals, brick powder, ash and serpentine. First Project Review Committee will review the progress soon.

Development & Demonstration of Environmentally sound Technology for Regenerating/Recovery/Recycling of Paint Sludge by National Productivity Council, New Delhi.

One lakh thirty two thousand and three hundred kilolitres of liquid paints produced by the leading manufacturers in India are used in automobile sector and they generate paint sludge management are potential threats to environment and

health. Therefore, the newly proposed study awarded to National Productivity Council (NPC) would aim at to reduce the actual sludge generation, through regeneration recovery recycling of paint sludge.

Design and Development of Computer Numerical Controlled Eco-friendly Welding Machine by Annamalai University, Tamil Nadu.

The objective of the project is to develop a low cost computer numerical controlled environmentally cleaner Friction Stir Welding (FSW) technology to weld almost all structural application materials. The effect of toxic exposures to the workers at the work place and surrounding environment due to the toxic fumes generated in metal cutting industries will be reduced by application of this technology. The proposal for eco-friendly



Fig-42. Computer numerical controlled eco-friendly welding machine

technology to be developed will also contribute to minimize air, soil and water pollution. It will also help to minimize and control the causative factors for dreadful diseases like Cancer, Bronchitis, Pneumonitis, etc. There will be a process automation and analysis of emission/radiation levels and optimization of welding input parameters for fabrication of different metals or combination of metals. The machine has already been fabricated and installed. Final experiments are in progress.

Environmental Pollution Control in Agro-based Paper Industry by Implementation of Lignin Precipitation System (LPS) Technology by Punjab Pollution Control Board and M/s ABC Papers, Hoshiarpur, Punjab.

The objective of the project is to assess and analyse the final outcome of Black Liquor and implementation of Corporate Responsibility for Environment Protection (CREP). The Project can reduce the effective treatment cost due to quantum reduction of COD load in black liquor stream and there will be recovery of valuable by product namely lignin. The project has been awarded to M/s ABC Paper, Hoshiarpur, Punjab and is monitored by Punjab Pollution Control Board. The project is at final stage of completion.

"R&D application in Technology Up-gradation of CETP in Tannery Cluster" in Dindigul, Tamil Nadu by Central Leather Research Institute (CLRI), Chennai.

The objective of the project is to up-scaling of the pilot developments, demonstration of technology and dissemination, reduce the pollution with recovery of energy from tannery wastewater and waste fleshing by applying Upflow Anaerobic Sludge



Fig-43. R&D application in technology up-gradation of CETP in Tannery Cluster in Dindigul, Tamil Nadu

Blanket (EASB) as an integrated system, increase efficiency of anaerobic process in treating tannery wastewater along with biologically liquefied fleshing, reduce green house emission from degradable waste, reduce Total Dissolved Solid (TDS) in the wastewater by recovering elemental sulphur from sulphate, convert biogas into electrical energy. The energy will be used for CETP operation and sulphur can be used in the leather process.

Development of Natural Dyes from Forest Wastes by FRI, Dehradun

The objective of the project is to explore new plant sources for natural dyes, extraction of natural dyes, identification of their chemical constituents responsible for dye character and synthesis of the so identified dye molecules. Developing processes of dyeing depending on their targeted use e.g. fabric, food plastic, paper. Inviting industries to jointly or on their own, develop natural dyes/ processes of dyeing so as to commercialize them. The project is likely to be completed during the year.

Development of Air Pollution Control Package for medium Scale Lime Kilns, NEERI, Nagpur

The main objective of the present proposal is to provide cost effective air pollution control package for lime kiln emission through physical simulation and control studies. The studies under this project would be carried out at NEERI, Nagpur and at various kilns of medium scale (size 10-20 TPD) around the city. Simulation of flue gas from medium scale lime industries, optimization of facilities/equipments for generation and control of emission, emission monitoring and calibration of equipments for various flow characteristics, performance evaluation studies of various equipments for air pollution control to assess their techno-economic feasibility, design packages for medium scale lime kilns, dissemination of the design package.

Progress / Achievement

There has been notable progress under various projects pursued by the Ministry during the year as compared to previous years. Sixth meeting of the Evaluation and Monitoring Committee was held in September, 2008. The Committee has recommended six projects for funding. These are as follows:

- Project proposal entitled "Life Cycle Assessment of Wood and Bamboo Composite Products" by Indian Plywood Industries Research & Training Institute, Bengaluru.
- Project proposal entitled "Life Cycle Assessment for Construction Industry – Concrete (gate-to-grave)" by National Council for Cement and Building Materials, Ballabgarh, Haryana.
- Project proposal entitled "Development of

Fly Ash Based Geo-polymer Concrete Pre-cast Elements by Annamalai University, Annamalai Nagar, Tamil Nadu.

- Project proposal entitled "Improved Chromium Recovery System Integrated with Water Recovery for Reuse in Tanneries under Zero Discharge Concept" by Central Leather Research Institute (CLRI), Adyar, Chennai.
- Project proposal entitled "Promotion of Cleaner and Environmentally Friendlier Technology in the Highly Polluting Small-Scale Glass Industry Cluster at Firozabad" by M/s Winrock International India, Gurgaon, Haryana.
- Project proposal entitled "Capacity Building of Environmental Officers on Cleaner Production/Technology Integrated Environment Management" through Five-Day structured Training Programmes by Federation of Indian Chambers of Commerce & Industry (FICCI), New Delhi.

Water Cess

- Water Cess is levied on water consumed by persons carrying on certain industries with a view to augment the resources of Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) for UTs for the prevention and control of water pollution. The proceeds of the Cess levied are first credited to the Consolidated Fund of India and after that the Central Government makes available the proceeds to PCCs and SPCBs.
- During the year an amount of Rs.295.68 crore were collected by SPCBs/PCCs and Rs.79.80 crore were reimbursed to different SPCBs and PCCs by the Central Government.

Environmental Health

The urban environmental degradation, through lack of (or inappropriate) waste treatment and sanitation, industry and transport related pollution, has adverse impacts on air, water, and soil quality, and thus pose health related disease to the urban poor. This, in turn may affect their capability to seek and retain employment, attend school, and enhances gender inequalities, all of which perpetuate poverty.

The National Environment Policy (NEP) brought out by the Ministry is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48A and 51A(g), strengthened by judicial interpretation of Article 21. It is recognized that maintaining, a healthy environment is not the state's responsibility alone, but also that of every citizen, Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

In order to protect the human health from the impacts of pollutants, the effort may be made to-relate the manifestations of various diseases with the environmental factors especially respiratory diseases and cardiovascular diseases contracted due to exposure to various pollutants. As such, the long term studies (cohort studies) to find out any co-relationship between the dose and the response would be useful for evolving the strategies for the protection of human health which have line data are being collected through various studies.

The key benefit arriving out of the studies will help in evolving strategies for health risk reduction. It will also strengthen the comprehensive approach to the environmental health management plans,

which would be a systematic approach to estimate the burden of disease due to different environmental pollutants.

World Bank Aided Capacity Building for Industrial Pollution Control Project

The World Bank is providing assistance in the form of advance to finance for the "Preparation of the Capacity Building for Industrial Pollution Management Project (CBIPMP)". Under this project, four consultancy contracts for preparation of the following feasibility studies were assigned:

- Need Assessment for Implementation of Hazardous Waste Management and Preparation of National Programme for Rehabilitation of Polluted Sites
- Improved Implementation of Municipal Solid Waste (MSW) Management
- Institutional Gap Assessment for the Strengthening of State Pollution Control Boards
- Environmental and Social Assessment

The draft final report from all the consultants have now been received and sent to World Bank, Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) including Andhra Pradesh Pollution Control Board and West Bengal Pollution Control Board for their comments. The draft final report of Environment and Social Assessment has been uploaded on the Ministry's website: <http://moef.gov.in> for comments and suggestions that are required under the World Bank guidelines.

The World Bank pre-appraisal mission for the project have last visited India from September 22, 2008 to October 3, 2008 and after reviewing the reports of the consultants, have decided to implement Capacity Building for Industrial Pollution Management Project in two



1999 resulted in steady increase in the utilization of flyash. However, the utilization has not reached to 100%. Therefore, certain additional measures were required to further promote and facilitate its use.

Objectives

- To protect environment
- To conserve top soil
- To prevent dumping of fly ash from Thermal Power Stations on land
- To promote utilization of ash in the manufacture of building materials and construction activity

Programmes / Achievements

A draft notification intending to replace the existing notification of 1999 and amended in 2003 was issued on 3rd April, 2007 inviting objections and suggestions from all persons likely to be affected. The objections/ responses were examined by a committee. On the basis of the recommendations of the Committee and after further consultations with the concerned Ministries viz., Coal, Power & Mines and experts, it has been decided to issue a notification amending the existing notification of 1999 and amended 2003. Accordingly, a draft amendment notification inviting objections / comments from the affected persons has been issued vide Notification S.O.2623(E) dated November 6, 2008 and has been widely circulated to all the concerned and also placed on the website of the Ministry.

The main amendments proposed in the notification include the following:

- The clay brick manufacturers have been excluded from the purview of this notification, as they are usually in the unorganized sector and the utilization of

States (Andhra Pradesh and West Bengal) on pilot basis. The expected cost of the project is likely to be US\$68.5 million for five years. Negotiations in this regard are taking place with the World Bank, MoEF and Department of Economic Affairs, Ministry of Finance for implementation phases, which will include preparation of Detailed Project Reports, rehabilitation and remediation measures of the selected sites in Andhra Pradesh and West Bengal.

Fly Ash Utilization

Fly ash is the finely divided mineral residue resulting from the combustion of ground powdered coal in electric generating plant. Fly ash consists of inorganic matter present in the coal that has been fused during coal combustion. The fast increasing demand of power coupled with its dependence on coal for at least 2/3rd of its energy requirement is generating large volume of fly ash. Generation of about forty million tonnes fly ash during 1994 increased to about one hundred million tonne/year by 2001 and one hundred and thirty million tonne in 2007. The projections made by Planning Commission as well as Ministry of Power upto 2031-32 indicate that 2/3rd of power generation in the country would continue to depend on coal. The annual generation of fly ash is expected to be around one hundred seventy five million tonne by end of XIth Five Year Plan Period, two hundred twenty five million tonne by end of XIIth Five Year Plan Period and around five hundred million tonne by 2031-32.

The first Fly Ash Notification was issued by Ministry of Environment & Forests in September 1999 to regulate the disposal of fly ash and ensure its proper utilization. A second Notification making amendments was issued in August, 2003.

The implementation of this Notification since

fly ash by them is not significant. The construction agencies engaged in the construction of buildings have been made responsible for use of only fly ash based products for construction.

- The minimum fly ash content for building material / products to qualify as "fly ash based products" category has been stipulated.
- Use of certain minimum percentage of fly ash for stowing of underground mines and backfilling of opencast mines has been made mandatory.
- All Coal / Lignite based thermal power plants have been allowed to sell fly ash to the user agencies except the pond ash and mound ash which should be made available free of cost.
- In addition, at least 20% of dry ESP fly ash should also be made available free of charge to the fly ash or clay fly ash bricks, tiles & blocks manufacturers on priority basis.
- Fly ash utilization targets for thermal power plants / expansion of plants commissioned before and after issue of this notification have been stipulated.
- A Monitoring committee to monitor the implementation of the provisions of the notification and submit its recommendations / observations every six months has been proposed.
- All the Financial institutions and agencies which fund construction activities shall include a clause in their loan / grant document for compliance of the provisions of this notification.

All the State Governments have been made aware of the draft Amendment Notification and further instructed to sensitise all

concerned with the said draft notification.

Central Pollution Control Board

Brief introduction and objectives

The Central Pollution Control Board (CPCB) performs functions as laid down in The Water (Prevention & Control of Pollution) Act, 1974, and The Air (Prevention and Control of Pollution) Act, 1981 and is responsible for planning and executing comprehensive nation wide programme for the prevention and control of water and air pollution, for advising the Central Government on matters concerning prevention and control of water and air pollution and for coordinating activities of State Pollution Control Boards and providing technical assistance & guidance to State Pollution Control Boards.

The Central Pollution Control Board has been playing a key role in abatement and control of pollution in the country by generating relevant data, providing scientific information, rendering technical inputs for formation of national policies and programmes, training and development of manpower and organizing activities for promoting awareness at different levels of the Government and Public at large.

The Central Pollution Control Board coordinates with State Pollution Control Boards for enforcement and implementation of Rules framed under the Environmental (Protection) Act, 1986 and is associated with and provides support to various committees and authorities constituted by the Government of India such as The Environmental Pollution (Prevention and Control) Authority for the National Capital Region.

Activities undertaken so far

- Coordinating activities of State Pollution Control Board for prevention and control

of pollution

- Development of industry specific national minimal effluent and emission standards
- Development of industry specific environmental guidelines and comprehensive documents
- Development of charter/requirements for Corporate Responsibility for Environmental Protection (CREP) for 17 major polluting industrial sectors and monitoring its implementation through eight task forces and steering committees
- Action plans for improvement of environment in 24 critically polluted areas and monitoring progress
- Action plans for improvement of air quality in 16 polluted cities and monitoring progress
- National water quality monitoring and publishing annual water quality reports
- National ambient air quality monitoring and publishing annual water quality reports
- Carrying out and sponsoring research activities relevant to environment protection
- Publishing material relevant to environment protection

Progress / Achievements

Development of industry / waste specific standards and guidelines

Comprehensive Industry Document on Sponge Iron Industry

CPCB undertook the study to develop 'National Environmental Standards' and prepare 'Guidelines / Code of Practice' for prevention and control of pollution in Sponge Iron Plants. After detailed celebration at CPCB

and in the Expert Committee for Finalisation of Environmental Standards in the Ministry, the standards were approved by the Ministry. The approved standards have been notified by the Ministry vide notification No. GSR 414 (E) dated May 30th 2008 under the Environment (Protection) Rules, 1986. The Comprehensive Industry Document on Sponge Iron Industry based on the study has been prepared and published under series COINDS/66/2007.

Effluent & Emission Standards for Oil Refineries

The revision of emission and effluent standards with consideration of additional parameters viz. NOx, Ni^{+V}, PM, etc., higher efficiency for Sulphur Recovery Unit, Leak Detection and Repair (LDAR) programme and specific requirements for minimizing vapour losses from storage tanks and product loading/unloading facilities was undertaken. In the revised standards, additional parameters have been added and limiting values for existing parameters revised. These standards have been notified (Gazette Notification No.GSR 186(E) dated March 18, 2008).

Emission Standards for Petrochemical Industry

The petrochemical production plant emission constitutes Volatile Organic Compounds (VOCs) – SPM, SOx, NOx, and CO). Some of these pollutants generate secondary pollutants. The emission standards and guidelines were finalized for petrochemical of Ministry of Environment & Forests.

Comprehensive Industry Document on Iron Ore Mining Industry

CPCB undertook the study of develop National Environmental Standards for Iron Ore Mining and to prepare Guidelines/ Code of Practice for Pollution Prevention for

Iron Ore Mining. The Comprehensive Industry Document on Iron Ore Mining has been finalized.

Comprehensive Industry Document on Stone Crushers Units

CPCB undertook the study to revise National Environmental Standards for stone Crushers and to prepare Guidelines/ Code of Practice for Pollution Prevention for stone Crushers On the basis of the study Comprehensive Industry Document on stone Crushers has been prepared.

Bacteriological Standards for Treated Sewage

CPCB in collaboration with IIT, Roorkee and Anna University, Channai has undertaken the study reduction of coliform in conventional treatment technologies being adopted in India. This study includes Sewage Treatment Plants (STPs) with different technologies in north and south India. Based on the study results proposed standards for fecal coliform in treated sewage were finalized by Peer & Core Committee, which after approval of the Board and have been forwarded to the Ministry for consideration.

Effluent Management in Textile Industries

On the basis of study of effluent management in few textile industries, CPCB has published the report "Advance Methods for Treatment of Textile Industry Effluents" to explain various options for redressal of pollution problems in textile industries.

Revision of system and Procedure for Compliance with Noise Limit for Diesel Generators Sets (upto 1000 KVA)

The Noise limit for diesel generator sets (upto1000 KVA), at manufacturing end, became effective from January 1, 2005. The certification system and testing procedure, developed earlier, were taken up for revision

in collaboration with the Automotive Research Association of India and finalized. The revised procedure has been made effective from 15th January 2008.

Guidelines for Bulk Drug Manufacturing Industry

To promote optimum utilization of water in bulk drug manufacturing units, CPCB has suggested guidelines for reduced water consumption by 15-50% depending upon the process followed and the products manufactured.

Co-incineration of High Calorific Value Hazardous Wastes in Cement Kiln

CPCB had conducted trial run for co-incineration of high calorific value hazardous wastes in cement kilns, as fuel supplement for which, the Ministry of Environment and Forests has provided concurrence. The SPCBs and Pollution Control Committees have been informed to encourage use of high calorific value hazardous waste as fuel supplement in cement kilns.

Viable Scale of Operation and Waste Treatment Options in Pulp & Paper Industry

The black liquor contributes more than 80% of the total pollution load of agro- based pulp & paper mills. It is a major problem for such small & medium pulp & paper mills where Chemical Recovery System is not technoeconomically viable option due to low scale of operation. The study undertaken by Central Pollution Control Board indicates that agro based mills having pulp mill capacity above 75 tpd can easily adopt modified chemical recovery system for black liquor treatment, while the pulp mill having capacity between 50-60 tpd need to expand their capacity for adoption of modified chemical recovery system.

Odour Control in Pulp & Paper Industry

The odorous emissions from kraft pulp and paper mills is basically due to total reduced sulfur (TRS) compounds such as hydrogen sulphide (H_2S), methyl mercaptan (CH_3-SH), dimethyl sulphide (CH_3-S-CH_3), dimethyl di sulphide ($CH_3-S-S-CH_3$) etc. The TRS compounds along with vapours of methanol, turpentine etc. are collectively called as Non Condensable Gases (NCGs). The study has been undertaken by Central Pollution Control Board to assess the level of NCGs and to evaluate control options in pulp & paper industries. It has been observed through study that incineration is most preferred option and it should be adopted for management of TRS emissions. Odours TRS emissions may also be controlled by burning in lime kiln, boiler or dedicated incinerators and chemical scrubbing.

Emission Testing in Hazardous Waste Incinerator

Guidelines for emission testing in common hazardous waste incineration have been developed. Standards for common hazardous waste incineration include pollutants such as Hydrochloric acid (HCl), Total Organic Carbon (TOC), heavy metals, dioxins and furans. The methodologies as proposed by CPCB were presented before national and international experts. These methodologies will also be applicable to source emission monitoring other than hazardous waste incinerator.

Review of Environmental Statements (Phase-II)

The Ministry of Environment and Forests, Government of India has issued notification for submission of 'Environmental Statements' (ES) every year by the industries to the respective State Pollution Control Boards

(SPCBs). Central Pollution Control Board undertook second phase of the study to review the Environmental Statements covering Chlor-alkali, Dye & dye intermediates, Aluminium smelter, Zinc smelter, copper smelter, Fertilizer and Paints. The outcome of the exercise is being utilised for setting environmental benchmarks for attainment by the industries.

Control of Pollution from Industrial and Other Activities

Environment Surveillance Squad (ESS) Programme

Under Environment Surveillance Squad (ESS) programme one hundred fifty nine industrial units have been inspected and 37 directions under Section 5 of the Environment (Protection) Act, 1986 to industrial units and 30 directions under Section 18(1)(b) of the Water Act/ Air Act to various State Pollution Control Boards/Pollution Control Committees have been issued requiring them to take action as per the directions for prevention and control of pollution in their respective States/ UTs.

Joint Inspection of Industries with MoEF

Joint monitoring of industries have been undertaken in association with MoEF at fifteen industries in Haryana, Himachal Pradesh, Punjab, Jammu & Kashmir and Uttar Pradesh for better implementation of the conditions, while according clearances for the projects.

Pollution Control Status in Thermal Power Plants

Out of the eighty nine thermal power plants, sixty two and sixty nine plants are reported as complying with the emission and effluent standards respectively. Out of these eighty nine thermal power plants. Thirty nine plants were inspected under Environmental surveillance Programme (ESS) and directions

under Section 18 (1) (b) of Air (Prevention & Control of Pollution) Act 1981 were issued to State Pollution Control Boards (MPCB, SPCB, & APCB) to take immediate measures for control of pollution from four Thermal Power Plants.

Role of CPCB under EPCA

"Environment Pollution (Prevention & Control) Authority for the NCR" (EPCA) was constituted by the Central Government vide notification No. SO 93(E) dated January 1st 1998. Central Pollution Control Board has been providing the technical and secretarial support to the EPCA for carrying out its functions, EPCA monitors implementation of action points enlisted in the "While Paper on Pollution with an Action Plan" priority measured for vehicular pollution control and implementation of P.K. Kaul Committee recommendations as instructed by the Hon'ble Supreme Court vide order dated November 16, 1998 EPCA has prepared special reports as desired by the Hon'ble Supreme Courts from time to time. EPCA monitors progress of action plans for improving ambient air quality in eight other critically polluted cities namely Ahmedabad, Bengaluru, Chennai, Hyderabad, Kanpur, Lucknow, Pune and Sholapur. Pre-mixed oil dispensers, adulteration of fuels, fuel testing laboratory, vehicle technology, emission warranty for vehicles, setting up of CNG outlets, conversion of public transport fleet to CNG mode, construction of ISBTs, sewage treatment and common effluent treatment plants. The EPCA is pursuing various agencies to implement plan of action of white paper, priority measures for air pollution control and various orders by Hon'ble Supreme Court.

EPCA convened about seventy five meetings to persuade various issues such as progress of bus rapid transit system, issues related to

parking policy, issues related to CNG safety, reciprocal common transport agreement between NCR states to improve intercity public transport, auto CNG supply policy for critically polluted cities, review of progress of action plans for improving ambient air quality in critically polluted cities and compliance status of BS-III mass emission standards for 4-wheeled vehicles in NCR. The EPCA had examined interlocutory applications, and other matters referred by the Hon'ble Supreme Court and appropriate action was taken.

Spatial Environmental Planning

The Spatial Environmental Planning Programme aims at ensuring protection of environmental resources while meeting developmental targets. The Programme is in its fourth phase.

- State Environmental Atlas
- District Environmental Atlas
- State Level Industrial Siting Guidelines
- District Wise Zoning Atlas for siting of Industries
- District Specific Industrial Siting guidelines

Seventeen State Pollution Control Board/Executing Agencies signed the agreement for executing Spatial Environmental Planning Activities during the year. Following activities undertaken under the programme. The State Environmental Atlas (SEA) for Assam, Meghalaya, Uttarakhand, Gujarat, and Maharashtra are under preparation. The District Environmental Atlas (DEA) for thirty one District were completed. DEA for twenty five Districts have been in advance stage of completion and DEA for sixty districts are under preparation. The State level industrial siting guideline for Karnataka and Goa have been completed. The district-

level Zoning Atlas for siting of industries interrelates the sensitivity of environment with the pollution potential of industries so for eleven district level industrial siting guidelines for eleven districts have been completed by Central Pollution Control Board.

Eco-city Programme

Pilot studies were conducted for urban areas by the Centre for Spatial Environmental Planning created at the CPCB under the World Bank funded Environmental Management Capacity Building Project and supported by the GTZ-CPCB Project under the Indo-German Bilateral Programme. Towns covered under the programme are Vrindavan, Ujjain, Puri, Tirupati, Kottayam and Thanjavur. During year 2007 Chanderi, Sawai Madhopur and Darjeeling has been added as new towns under the Eco-city Programme.

Environmental Data Bank (EDB) Management

Central Pollution Control Board is providing necessary guidance to the official of Gujarat Pollution Control Board (GPCB), Gujarat Environmental Management Institute (GEMI), Pollution Control Committee of Daman-Diu & Dadra Nagar Haveli (DDPCC), Maharashtra Pollution Control Board (MPCB), other Institutes and Universities operating National Air Monitoring Programme (NAMP), National Water Monitoring Programme (NWMP) stations. Regular follow up have been made with concerned State Pollution Control Boards / Committees and other organizations for On-line entry of data generated under NAMP, NWMP stations to Environmental Data Bank.

Environmental Research Activities and Other Studies

Utilization of Distillery Effluent as a Source of Nutrients for Crop production in Different

Agro-climatic Regions

Central Pollution Control Board has undertaken a project comprising three years network study at seven centres spread over different climatic zones in association with four key Agricultural Universities/Institutes to evaluate effects on soil of the current practices for achieving zero discharges by distilleries by utilization of distillery effluent as a source of nutrients and water, including effects of chloride and fixed dissolved solids in spent wash on crop yields, salt accumulation in soil and its leaching requirements for movements of salts in the soil and possible contamination of ground water.

BOD Biosensor for Rapid Determination of Bio-Chemical Oxygen Demand

Central Pollution Control Board in collaboration with Institute of Genomics & Integrative Biology (IGIB), CSIR, Delhi has developed a BIO-SENSOR for rapid BOD test. This technique involves selection of suitable microbial composition for using Bio-sensor so as to degrade the wide range of wastes. For validation of Biosensor, a large number of drain water samples and various industrial effluent samples were tested. The study indicates that it is possible to determine the BOD load of waste water collected from various sources with the help of the developed BOD Biosensor, however, individual membranes may be used for specific wastewater.

Eco Bio Block (EBB) for Treatment of Wastewater

'Eco-Bio Block' (EBB) Treatment is a technology which use microorganism embedded in a porous concrete block to treat wastewater. It is used for cleaning polluted water sources such as wastewater drains, polluted rivers, ponds, lakes etc. The blocks





are produced by mixing effective microbes with zeolites (volcanic porous stones), and alkaline cement. The performance study of the EBB in the field reveal that after taking into account of the control (after partitioning but before placing EBB reactor) the EBB treatment efficiency with respect to critical parameters TSS, COB and BOD was 62.5%, 33.7%, and 32.4%, respectively.

Soluble Organic Fraction in Particulate Matter (PM_{10}) at Agra

Soluble Organic Fraction largely corresponds to the organic content in the particulate matter and is contributed mostly by anthropogenic activities. An investigation was undertaken at Agra to estimate Organic Soluble Fraction in Respirable Suspended Particulate Matter in which Toluene solvent was used as suggested in the proposed national ambient air quality standard). Higher concentration of Organic Soluble Fraction i.e. $48 \mu\text{g}/\text{m}^3$ was observed at Itmad-ud-daulah (October and February), while least concentration of $3 \mu\text{g}/\text{m}^3$ was observed during rainy month (July) at Tajmahal and at Itmad-ud-daula.

Suspended Particulate Matter (SPM) and Respiratory Suspended Particulate Matter (RSPM) Monitoring for Optimization of Monitoring Duration

Central Pollution Control Board has taken up a research project to assess the efficiency of filter papers, whether these can be used to collect the ambient particulate matter for an extended period of twelve hrs and twenty four hrs using RDS and HVS instead of eight hrs. The results indicate that 8 hourly average values of SPM and RSPM differ randomly, than twenty four and twelve hourly average values. The percentage differences of SPM varied from -21% to 19% and -15% to 11% for eight hours versus twenty four hours and eight hours versus twelve hours, respectively. Similarly for

RSPM, the percentage differences varied from -32% to 28% and -14% to 13% for eight hours versus twenty four hours and eight hours versus twelve hours respectively. The random differences in average value of SPM and RSPM may not be due to change in sampling duration, but attributable to factor such as variation of concentration, flow rate and voltage fluctuation.

Toxicity of sewage mixed with electroplating waste water

The industrial effluent is generally discharged into drain or sewage system which creates complication in the sewage treatment. The study was undertaken to assess the toxicity for fish when toxic industrial effluent (from Chrome & Zinc plating) get mixed with sewage. The study was conducted by taking three ratio of electroplating waste (treated, untreated and combined) mixture with sewage in ratio 20:80, 10:90 & 5:95.

The study reflects that for untreated effluent the additive toxic effects in sewage toxicity were observed in all the ratio except 5:95 where cases of uncharged toxicity were also absorbed. For treated effluent (lowest ratio 5:95) and the ratios with combined treated effluent (excluding 20:80) the cases of no effect on sewage toxicity was higher. The cases of toxicity reduction were also absorbed with treated & combined treated effluents. It may be concluded based on the study that in the absence of separate transport system, the treated Zinc & Chrome plating effluent may be mixed with sewage drain before their discharge & the rate of discharge may be kept 5% or even less of the total drain or sewerage system.

Trace Metal Characterization of Solid & Hazardous Waste using Inductively Coupled Plasma-Optical Emission Spectrophotometer (ICP-OES)

The trace metals in environmental matrices are measured by various methods such as colorimeter, polargraphic, atomic absorption spectrophotometer, inductively coupled plasma etc. but trace metals analysis using ICP-OES is relatively simple, versatile, accurate and free from interferences. Municipal solid waste and industrial solid wastes may contain various toxic and hazardous metals. In order to assess the metallic constituents of solid and hazardous wastes, trace metals detection have been undertaken on Inductively Coupled Plasma (ICP) Spectrometer. Municipal solid waste and industrial solid wastes were subjected to analysis of various toxic and hazardous metals such as As, Cd, Cr, Cu, Fe, Ni, Pb, Se, Sb, Co, V and Zn etc. to very low concentrations.

Polyaromatic Hydrocarbons (PAHs) Determination in Potable Water at Water Treatment Plants of Delhi

PAHs are affect hormonal and reproduction system and are able to depress immune function. In aquatic environment, PAHs do not generally dissolve easily, but tend to adsorb on particles. The project study on PAH has been undertaken to assess concentration of poly-aromatic hydrocarbons in raw Intake and Treated waters from Water Treatment Plants of Delhi. The total PAHs in raw water used by Water Treatment Plants of Delhi and in treated Water were found in the range of below detection limit to 830 ng/L and below detection limit to 1126 ng/L between March, 2006 to January, 2007.

Risk Assessment of Pesticides Residue in Humans with Special Reference to Adverse Reproductive Outcomes in Delhi Population

The organo-chlorine pesticides are mostly persistent toxic contaminant having long half-life and tendency to accumulate in fatty

tissues. The organo-chlorine pesticides can interfere in normal endocrine system, resulting into reproductive disorders and breast cancers. The study is being undertaken by UCMS & GTB Hospital in collaboration with CPCB to find out prenatal pesticide residue exposure, effect on adverse reproductive outcome and present status of pesticide pollution in Delhi.

The project findings indicated higher levels of organo-chlorine pesticides observed in pre-term delivery cases. Therefore, high levels of OCP may be a risk factor for pre-term birth. Significant levels of OCP were observed in cord blood samples indicating transplacental transfer of these pesticides and this may adversely effect fetal development. Higher levels of organo-chlorines were also found in infertility cases. Preliminary data analysis indicated possible correlation of organo-chlorines with reproductive defects.

Volatile Organic Compounds (VOCs) in Drinking Water by Purge & Trap Pre-Concentration followed by GC-MS Analysis

VOCs are carbon-containing compounds that readily evaporate at normal air temperature. Fuel oils, gasoline, industrial solvents, paints, and dyes are the major sources of VOCs. Currently, 68 of the most common VOCs detected in ground water are analyzed in a typical sample submitted for analysis. The project study is undertaken for standardization of methodology and assessment of levels of 68 Volatile Organic Compounds (VOCs) in Surface Water, Drinking Water and Ground Water by Purge & Trap pre-concentration followed by GC-MS analysis.

Mercury in Compact Fluorescence Lamps (CFL)

Elemental mercury is used in Compact Fluorescent Lamps (CFLs) production. In CFL



manufacturing process there is little likelihood that mercury get vaporized and released to ambient air. Monitoring of mercury in ambient air within the work zone area of CFL industries was carried out at two points and mercury levels have been found as BDL to 0.002 mg/m³. The TLV-TWA value of mercury is 0.05 mg/m³.

Groundwater Fluoride contamination in Birbhum and Purulia, West Bengal

Some districts of West Bengal are reportedly affected with chemical substances such as metals and fluoride. There is lack of awareness about groundwater quality particularly in rural areas and people are using groundwater for drinking and cooking without knowing its quality.

The study on groundwater contamination undertaken by Central Pollution Control Board indicated that fluoride is predominant in ground water in a large part of Birbhum district and few areas in Purulia. Fluoride level ranged from 0.28 mg/l to 17.8 mg/l in Birbhum and 0.43 mg/l to 3.3 mg/l in Purulia indicating mixed occurrence and wide variation in the affected area. About 50% ground water samples in Purulia and 30% at Birbhum have been found having fluoride above permissible limit (1.5 mg/l). The overall characterization of groundwater in Purulia Birbhum reveals that the Chloride concentration is also quite high in few bore wells.

Pesticide Residue Monitoring in Ground Water at National Capital Region

Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, New Delhi and the All India Network Project (AINP) on Pesticide Residues, Indian Agricultural Research Institute New Delhi sponsored a project to Central Pollution Control Board.

Under this project, monitoring of Ground Water at various locations within National Capital Region is being undertaken on monthly basis. Four groups of pesticides viz. Organo-chlorines, Organophosphates, Synthetic Pyrethroids and Herbicides (Total thirty one individual pesticides) are being analyzed.

During the year 2007, two hundred fifty five nos. of ground water samples have been analyzed under the project and data reports forwarded to Project Co-Ordination Cell at IARI, New Delhi. Most of the ground water samples have been found free from pesticide contamination.

Volatile Organic Compounds (VOCs) monitoring at Urban Areas

Volatile Organic Compounds (BTX) Samples were collected from various locations of National Capital Region and analysed using GC-FID. The mean Benzene concentration during winter season was in the NCR thus comes out to be 15.96 µg/m³. Average Toluene level recorded was 29.12 µg/m³ and the mean Xylene levels are 18.97µg / m³.

VOC monitoring was conducted at three selected location on Pre & Post and Deepawali day. Toluene concentrations were observed moderately high on Deepawali day at all the locations at East Arjun Nagar (East Delhi), Pitampura (North-West Delhi) & ITO (B.S. Z. Marg, Central Delhi) i.e. 140.44 g/m³ 143.40 g/m³ and 165.98 g/m³ respectively between 20.00 to 24.00 hrs, whereas, Benzene has been found moderately high on Deepawali day at all the locations at Pitampura & ITO in the range of 70 g / m³ during the same period

Volatile Organic Compounds (VOCs) Monitoring at Industrial Areas

VOC's monitoring was undertaken in

wastewater from CETPs inlet (at Ankleshwar & Panoli), FETP and Amlakhadi (natural drain mostly carrying domestic/industrial effluent from Ankleshwar which meets estuarine portion of Narmada River). The total concentration of VOCs at Amlakhadi, FETP Ankleshwar, CETP Ankleshwar and CETP Panoli was 1448, 9706, 18979 and 3185 µg/l respectively.

Environmental Status at various Cities

An environmental status study to assess the health of aquatic atmosphere and terrestrial environment was undertaken for Ludhiana, Lucknow, Agra, Tarapur, Singrauli (Madhya Pradesh), Manali (Chennai), Nathula Pass in Sikkim. The study was also extended around industries located in non-confirmed areas of Gujarat state, Bellary mining areas (Karnataka), oil and gas exploration and drilling areas in Assam, Arunachal Pradesh and Tripura, Western coal fields areas in Vidarbha region (Maharashtra). The assessment of extent of environmental pollution, steps undertaken by various agencies for pollution control and management and their effectiveness was undertaken during the study.

Air Quality Assessment, Emission Inventory & Source Apportionment Studies

Pollution control strategies for attainment of particulate standards must be able to provide convincing evidence that the relative importance of emission sources is understood and control programmes proposed are cost-effective and easily adopted by the community. CPCB has initiated source apportionment studies (SA) for apportionment of fine particulate PM₁₀ & PM_{2.5} at six major cities. viz. Delhi, Mumbai; Chennai; Bengaluru; Pune; and Kanpur. Status reports based on three season data analysis have been received for all six cities. An draft final

report has been prepared.

Assessment of Aldehydes, Ketones and Methane Emissions in Vehicle Exhaust

This study being undertaken by Central Pollution Control Board in association with iCAT, Manesar with objective to characterize Aldehydes, Ketones and Methane emissions in vehicle exhaust of two-wheelers, three-wheelers, four-wheeled passenger vehicles, four-wheeled Light duty commercial vehicles & four-wheeled Heavy duty commercial vehicle engines operating on different fuels i.e. Petrol, Diesel, LPG, CNG, Ethanol (5%) in Petrol (BS III) and Biodiesel (10%) in Diesel (BS III) & Hythane*.

Activities in Hazardous Waste Management

Compliance of Hon'ble Supreme Court Directives in the matter of W.P.(C) 657/1995

The Central Pollution Control Board has been updating manual on sampling, analysis and characterization of hazardous wastes Schedule 2 of the Hazardous Waste (Management & Handling) Rules, 1989 as amended. The draft national policy document has been prepared and finalized incorporating the developments that took place during the last three years. Central Pollution Control Board have finalized the emission norms for common hazardous waste incinerators and submitted for consideration of MoEF for notification under Environment (Protection) Act, 1986. With regard to the cleaner technologies, action points finalized under Corporate Responsibility for Environmental Protection (CREP) are under implementation by seventeen categories of industries.

Hazardous Waste Generation / Generating Units Inventory

As per directives of the Hon'ble Supreme





Court, all SPCBs/PCCs are required to undertake inventory under Hazardous Waste (Management & Handling) Amendment Rules, 2003. Twenty seven hazardous waste generating States and three Union Territories have submitted the preliminary inventory reports to Central Pollution Control Board. The random checks of the inventories have been undertaken in the concerned States and UTs. The observations made during random check and inventorisation, have been communicated to concerned States and UTs for updation of inventory report.

Inventory of Hazardous Waste Dumpsites

The training programme on "Assessment of Hazardous Waste Dump Sites and Preparation of the Remediation Plans" has been organized by Central Pollution Control Board in association with GTZ-ASEM to upgrade the technical capabilities of SPCB's officials and to share the experiences of the Germans in the field of management of contaminated sites. The Expert Committee constituted by Central Pollution Control Board to review the assessment as well as the remediation plans prepared and proposed by the SPCBs.

Hazardous Waste Dumpsites Status

The status of Hazardous waste dump sites has been updated & compiled by Central Pollution Control Board on the information received from the SPCBs/PCCs, fifteen SPCBs and six PCCs have reported that there are no hazardous waste dump sites in their respective States/UTs. To restore the contaminated soil and natural resources due to the illegal disposal of the wastes, the Central Pollution Control Board has suggested SPCB's to take up the task of rehabilitation of the identified hazardous waste dumpsites.

Common Hazardous Waste Treatment,

Storage and Disposal Facility (TSDF)

The Central Pollution Control Board has compiled / updated the status of common hazardous waste TSDF in association with SPCB's and PCC's, including TSDF in operation, TSDF in construction and sites identified / notified for proposed TSDF.

Hazardous Waste TSDF Monitoring

Central Pollution Control Board has taken up the assessment of Treatment, Storage and Disposal Facility (TSDF) under operation in the States of Gujarat, Maharashtra, Andhra Pradesh, Madhya Pradesh and Rajasthan and the observations have already been communicated to the concerned States for further action. SPCBs and PCCs were suggested to take-up monitoring of facilities and submit the assessment reports to CPCB periodically.

Imported Hazardous Chemicals Inventorisation

As per the Manufacture, Storage and Input of Hazardous Chemicals (MSIHC) Rules, Central Pollution Control Board has been compiling information from the industries, which are importing hazardous chemicals since May 2003. The information status on Import of Hazardous Chemicals from May 2003 to April 2008. The imported quantity of hazardous chemicals has been found increasing up to year 2006-07, but subsequently the import is reduced by 23.24%.

Inventorisation of HW Recyclers / HW Generators

The responsibility of granting registration of hazardous wastes recycling industries having environmentally sound management practices have been entrusted to Central Pollution Control Board. The industries have been

inspected jointly with respective SPCBs and assessment reports are prepared for consideration of registration. Inspections at eighty eight Nos. of actual user industries in Gujarat, Maharashtra and UT of Daman and Dadra & Nagar Haveli were carried out during the year. Thirty six industries were visited in Uttar Pradesh, Punjab, Himachal Pradesh. Thirty three Non-ferrous metals, used oil/waste oil and processing of lead bearing waste inspected in south zone during the year. The inventorisation technique of Hazardous Wastes has been demonstrated to North Eastern States SPCB's. Random Cross Checking of HW inventories submitted by the respective State Boards was also carried out.

Co-incineration of High Calorific Value Hazardous Wastes

The Central Pollution Control Board has facilitated trial runs for coincineration of high calorific value hazardous wastes such as ETP Sludge, TDI Tar waste, Paint Sludge, Refinery Sludge and Tyre Chips in cement kiln. It has been observed that there is no apparent adverse effect on the environment due to coincineration of high calorific hazardous waste in cement kiln. The use of high calorific value hazardous waste as fuel in cement kilns are to be encouraged by SPCBs/PCCs.

e-Waste Management

The e-waste inventory based on obsolescence rate and installed base in India for the year 2005 has been estimated to be 1,46,180 tonnes, which is expected to exceed 8,00,000 tonnes by 2012. The e-waste or its constituents fall under the category of "hazardous" and "non hazardous waste", therefore these shall be covered under the purview of "The Hazardous Waste Management Rules, 2003". The 'Guidelines for Environmentally sound Management of e-waste" have been finalized that will be

applicable for generators, collectors, transporters, dismantlers, recyclers and stakeholders of e-wastes irrespective of their scale of operation. These Guidelines provide the minimum practice required to be followed in the management of e-wastes and the State Governments or State Pollution Control Boards may prescribe more stringent norms as deemed necessary.

Sewage Treatment

Performance Monitoring of STPs

CPCB is regularly monitoring three STPs in Haryana, one STP in Delhi, seven Oxidation pond based STPs located at Agra, Etawah, Mathura and Vrindavan and one UASB based STP located at Agra, STPs installed along the stretch of river Ganga from Allahabad to Tarighat (Gazipur), two STPs at Rishikesh and one STP at Haridwar are also being monitored regularly to evaluate the performance of STPs under NRCD Project. Besides, performance evaluation studies / inspections of twelve STP in Gujarat, fourteen STPs in Karnataka and four STPs in Andhra Pradesh were carried out.

Common Effluent Treatment Plants

Performance Monitoring of CETP's

Performance evaluation studies / inspections of eleven common effluent treatment plants in Delhi, seventeen plants in Tamil Nadu (Tripur area), three plants in UP, two plants in Haryana, one plant in MP, four plants in Rajasthan, eight plants in Maharashtra, one plant in Punjab, one plant in West Bengal and twelve plants in Gujarat were carried out. Observing non-compliance by majority of CETPs, directions under Section 18(1)(b) of the Water Act 1974 have been issued to twelve State Pollution Control Boards / Pollution Control Committees to carry out regular monitoring at least every quarter, take

action and send report to CPCB.

Common Bio-medical Waste treatment facilities

Performance Monitoring of Common Bio-Medical Waste Treatment Facilities

Common biomedical waste treatment facilities (CBMWTF) have been set up in various cities for treatment of Bio-medical waste generated in various hospitals, nursing homes. In North Zone twenty eight CBMWTF have been established. Out of these, six common facilities were inspected. In central zone, eighteen CBMWTFs have been established. Out of these ten common facilities were inspected. In South Zone forty five CBMWTFs have been established. Out of these five CBMWTFs facilities were inspected.

Directions to defaulter Common Bio-Medical Waste Treatment Facilities

CPCB persuaded CBMWTFs to improve compliance of the provisions of the BMW Rules and the guidelines enacted by issuing direction u/s 5 of the Environment (Protection) Act, 1986. Based on the inspection / observations, five Show Cause notices, two Closure Directions & two Modified / Revoke Directions had been issued under Section 5 of the Environment (Protection) Act, 1986 to the defaulter CBMWTFs for not complying with the provisions of Bio Medical Waste Rules and guidelines.

Municipal Solid Waste

Implementation of MSW Rules

Central Pollution Control Board has sanctioned as well as monitoring various demonstration facility projects on municipal solid waste management for implementation of Municipal Solid Waste (Management & Handling) Rules, 2000 in selected towns / cities of the country. The demo-projects have

been taken up at twelve towns and are being executed through concerned Urban Local Bodies (ULBs) under the supervision of respective State Pollution Control Boards.

Utilisation of Grants by Urban Local Bodies under 12th Finance Commission

The Twelfth Finance Commission has recommended devolution of grants for Urban Local Bodies to the tune of Rs. 5000 crores for the period year 2005-2010 of which Rs. 2500 crores have to be devolved upon local bodies exclusively for setting-up of solid waste management systems in urban areas to ensure management of Municipal Solid Waste in accordance with MSW Rules. State Governments and State Pollution Control Boards have been requested by Central Pollution Control Board to participate in the process of utilizing the grants and provide assistance to local bodies in preparing DPR for cities and towns.

Ground Water Monitoring around Municipal Solid Waste Landfills

Central Pollution Control Board has taken up the scheme for monitoring of groundwater quality in and around existing landfills of Bhalswa (Delhi) and Bhandewadi (Nagpur) in association with NEERI-Nagpur. The survey and monitoring works have been initiated at both the places in accordance with the Municipal Solid Waste Rules.

Check-List for Municipal Solid Waste (MSW) Landfills

Municipal authority or an operator is required to obtain authorization from SPCBs / PCCs for setting up of waste processing and disposal facility including landfills. SPCBs/PCCs on receipt of application, along with the detailed proposal from the Municipal authority or from an operator, may grant authorization as per the procedures laid down under the Rules. The

Central Pollution Control Board has prepared check-list / guidelines for evaluation of MSW landfill projects in association with IIIT-D.

Municipal Solid Waste Management in eleven Municipalities around Ahmedabad

The financial assistance has been provided by Ministry of Environment & Forests to Ahmedabad Urban Development Authority (AUDA) for management of Municipal Solid Waste of eleven Municipalities around Ahmedabad in Gujarat. The project is executed by AUDa and funds are routed through Gujarat Pollution Control Board. The execution of the project, which involves collection, transportation and disposal at Common Landfill & Compost Site, is being monitored by a monitoring committee. The Central Pollution Control Board has been the part of monitoring committee, attended various meetings, undertook site visits to assess the progress of the project.

Municipal Solid Waste Management at Jaipur

The Central Pollution Control Board has undertaken case study of Municipal Solid Waste Management at Jaipur. M/s Grasim Industries, Jaipur has established a facility to process municipal solid waste received from Jaipur Municipal Corporation on day-to-day basis. The processing plant has been designed to handle about five hundred TPD of MSW and for generation of about one hundred twenty five TPD Refuse Derived Fuel (RDF) in the form of fluff. The RDF contains mostly cotton fiber, plastic pouches, and other light density materials. The RDF produced at Jaipur plant are transported to M/s Vikram Cement, Neemuch, M.P., where it is proposed to be used as a fuel in the kiln to substitute coal requirement.

Plastic Waste

It is estimated that approximately ten

thousand tons per day (TPD) of plastics waste is generated in the country, which is 9% of 1.20 lacs TPD of MSW. The plastics waste constitutes Thermoplastics (recyclable plastics) and Thermoset plastics. Thermoplastics constitute 80% and rest is constituted by Thermoset plastics. The Central Pollution Control Board coordinated with SPCBs and PCCs with regard to implementation of Plastics Manufacture, Sale and Usage Rules, 1999 as amended in 2003.

Plasma Pyrolysis Technology

Plasma Pyrolysis Technology has been put forth as an effective technology for plastics waste management. Central Pollution Control Board has entered into Memorandum of Understanding (MoU) with Institute of Plasma Research, to ascertain the performance of the technology and its adoption through its Facilitation Centre for Industrial Plasma Technologies.

Conversion of Plastics Waste into Fuel Oil

Central Pollution Control Board has evaluated the performance of Research-cum-Demonstrative Plant set up at Nagpur for conversion of waste plastics into liquid fuel oil. The process adopted is based on random depolymerization of waste plastics in closed reactor vessel in presence of a catalyst. Waste plastics while heating upto 270° to 300° C convert into liquid-vapour state, which is collected in condensation chamber in the form of liquid fuel. The tarry liquid waste is topped-down from the heating reactor vessel. The organic flue gas generated is presently vented due to lack of storage facilities, however, the gas can be used in dual fuel diesel-generator set for generation of electricity.

Biodegradable Plastics

The Central Pollution Control Board entrusted comprehensive study to Central Institute of

Plastics Engineering and Technology (CIPET) to establish the biodegradability and compostability (e.g. fragmentation rate, degradation rate and safety) polymeric material available in the country and abroad.

Plastics Waste Management Action Plan

Central Pollution Control Board has provided inputs to Justice Chopra Committee constituted for Plastic Waste Management in persuasion to the Hon'ble High Court of Delhi's Order dated 19.11.2007 in C.M. No. 3643 in Writ Petition (C) 6456/2004. An action plan has been suggested by the Committee for Plastic Waste Management.

Developments in Laboratories

Trace Elemental Analysis of Air Filters Through ED-XRF Spectrometer

Energy Dispersive X-Ray Fluorescence (ED-XRF) Spectrometer has been commissioned at Instrumentation Laboratory of CPCB. The highly sophisticated instrument is the first of its kind in the country with application of non-destructive analytical technique for elemental analysis in Suspended Particulate Matter (SPM) fractions of PM_{10} and $PM_{2.5}$ of ambient air for the range from Sodium (Na) to Uranium (U) (seventy eight elements) except inert gases. The trace elemental analysis of air filter was set up according to EPA method IO-3.3. The ED-XRF instrument has been calibrated with forty two air filter standards procured from Micromatter Co., USA and forty two elements could be analyzed. About one thousand forty one ambient air particulate filter samples (PM_{10} and $PM_{2.5}$) of Source Apportionment study were analyzed for multi-elements using ED-XRF.

Strengthening of VOC Monitoring

New Perkin Elmer make Gas Chromatograph-Mass Spectrometer with Head Space Sampler

has been procured, installed at Central Pollution Control Board Laboratories and calibrated to start VOC samples analysis. Rotary Evaporator was also procured and installed for Concentration of Extracted Organic Samples like PAHs.

Standardization of Measurement Technique of Organo Phosphorus Pesticides, Herbicides and Carbamates using HPLC

The project has been initiated at Central Pollution Control Board to develop methodology for the analysis of various organo-phosphorus pesticides, herbicides & carbamates using HPLC, referring USEPA methods and to undertake assessment through analysis. The methodology for analysis of pesticides including various organo-phosphorous pesticides, herbicides and carbamates have been standardized using HPLC referring USEPA method and being practiced for analysis in water samples at National Reference Trace Organics Laboratory.

Analytical Quality Control (AQC-Water) for Laboratories of Pollution Control Boards / Committees and EPA Recognised Laboratories

Central Pollution Control Board is monitoring through water quality monitoring stations under GEMS, MINARS, GAP and YAP Programmes comprising rivers, lakes, wells, and ground waters through various SPCBs. In order to obtain reliable and accurate analytical data, Central Pollution Control Board has been organizing regular Analytical Quality Control (AQC) exercise. 23rd AQC exercise covering ten physico-chemical parameters and eight metal parameters was undertaken.

Revised Guidelines for Evaluation & Recognition of Environmental Laboratories

The earlier document on Guidelines for

Evaluation & Recognition of Environmental Laboratories has been revised and circulated to all SPCBs/PCCs for inviting comments. The comments received from SPCBs/PCCs were reviewed and necessary amendments were made in the document and final document was submitted to the Ministry. The document containing guidelines for recognition of environmental laboratories under the Environment (Protection) Act, 1986 has been finalized for adoption.

National Water Quality Monitoring Programme (NWMP)

Nationwide water quality is being monitored regularly under National Water Quality Monitoring Programme (NWMP) through a network of water quality monitoring comprising one thousand three hundred sixty five stations in twenty seven States and six Union Territories by CPCB in collaboration with concerned SPCBs/PCCs. The monitoring network covers seven hundred seventy three stations on two hundred eighty two Rivers, one hundred stations on ninety two Lakes, twenty one stations on ten Canals, nine stations on Tanks, thirty four stations on Ponds, twelve stations on Creeks, nineteen Canals, eighteen stations on Drains and three hundred ninety eight stations on Ground Water. The monitoring is undertaken on monthly or quarterly basis in surface waters and on half yearly basis in case of ground water. Water samples are being analysed for nine core parameters, nineteen other physico-chemical and bacteriological parameters. Besides, nine trace metals and twenty two pesticides are also analysed in selected samples once in a year. Biomonitoring is also carried out on specific locations. The water quality data are reported in Water Quality Status Year Book. The water quality monitoring trend between 1995 to 2007 indicated that the organic and bacterial contamination are continued to be

critical in water bodies.

Water Quality at a glance

Water quality of a large number of rivers covered in major, medium and minor basins categories is observed. The water quality of selected rivers viz. Yamuna, Beas, Satluj, Brahmaputra, Godavari, Mahanadi and Narmada is analysed and depicted in Figures-44 (a-i) indicating the range as well as the mean value of BOD during the calendar year 2007.

Inter State River Water Quality Monitoring

CPCB is monitoring water quality of rivers at interstate borders. The monitoring is carried out four times in a year at seventy one locations spread over thirty six rivers. It is observed that twenty four rivers at thirty six locations are polluted with respect to Biochemical Oxygen Demand (BOD). The concerned SPCBs/PCCs were requested to take remedial measures to restore water quality of identified polluted rivers at interstate borders.

National Air Quality Monitoring Programme

Nationwide air quality is monitored regularly under National Air Quality Monitoring Programme (NAMP) through a network of air quality monitoring comprising three hundred forty two operating stations at one hundred twenty seven cities/towns in twenty six States and four Union Territories of the country. The monitoring under the NAMP is being carried out with the help of Central Pollution Control Board's Zonal Offices; State Pollution Control Boards; Pollution Control Committees; National Environmental Engineering Research Institute (NEERI), Nagpur. CPCB co-ordinates with these agencies to ensure uniformity, consistency of air quality data and provides technical and financial support to them for operating the monitoring station.



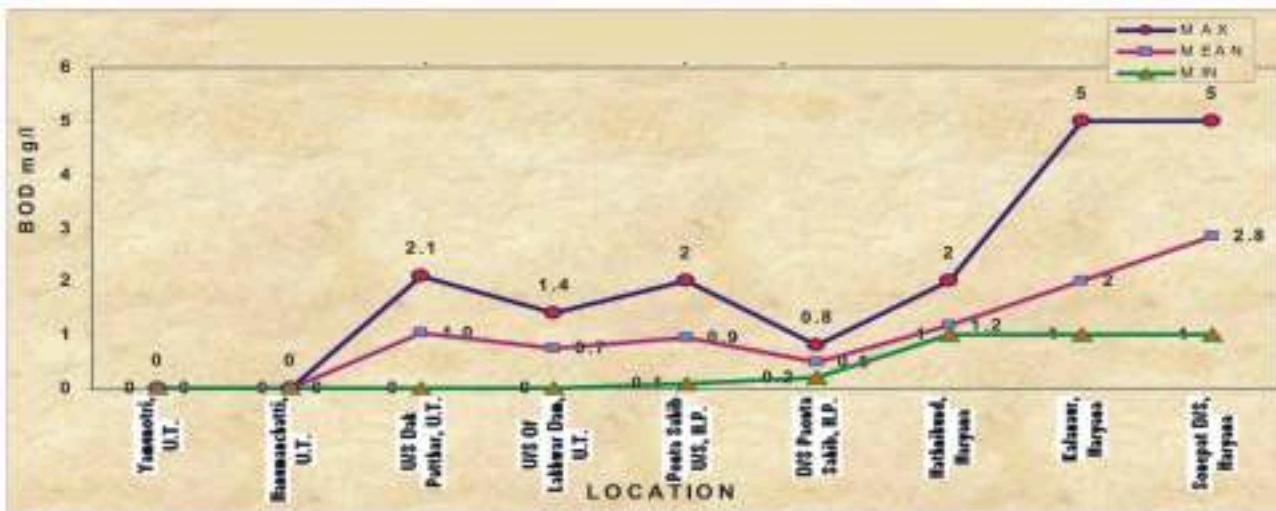


Fig-44 (a). Water Quality of River Yamuna (Upper Stretch)

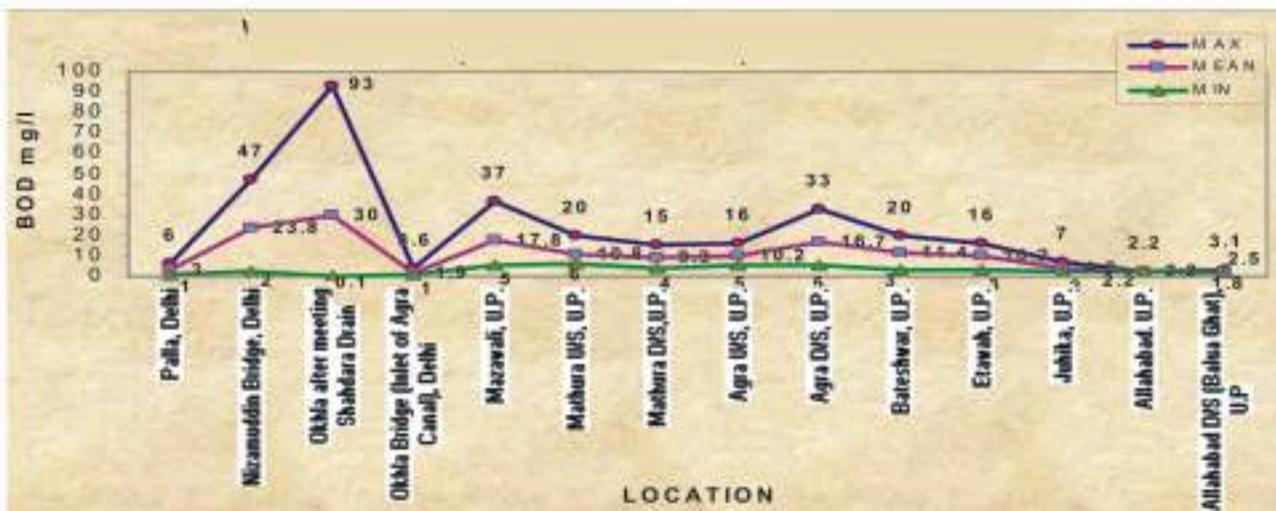


Fig-44 (b). Water Quality of River Yamuna (Lower Stretch)

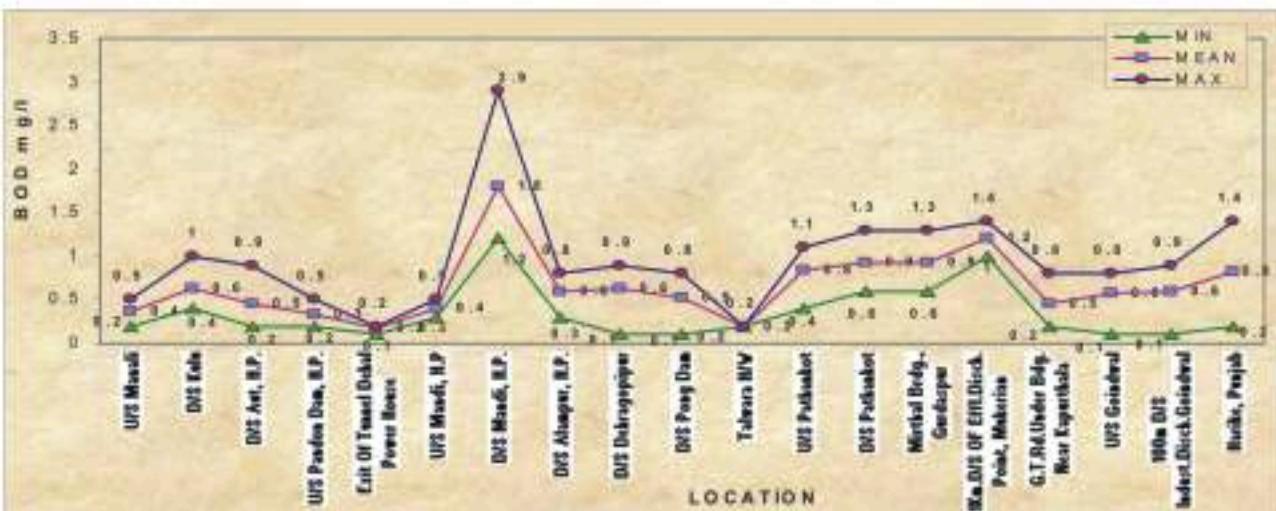


Fig-44 (c). Water Quality of River Beas

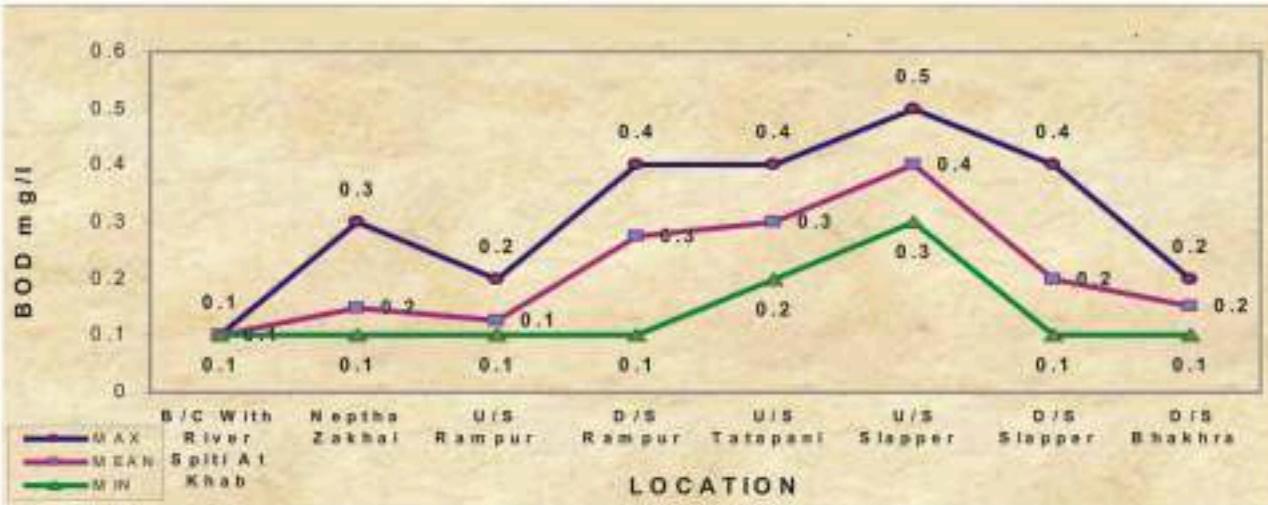


Fig-44 (d). Water Quality of River Satluj (Upper Stretch)

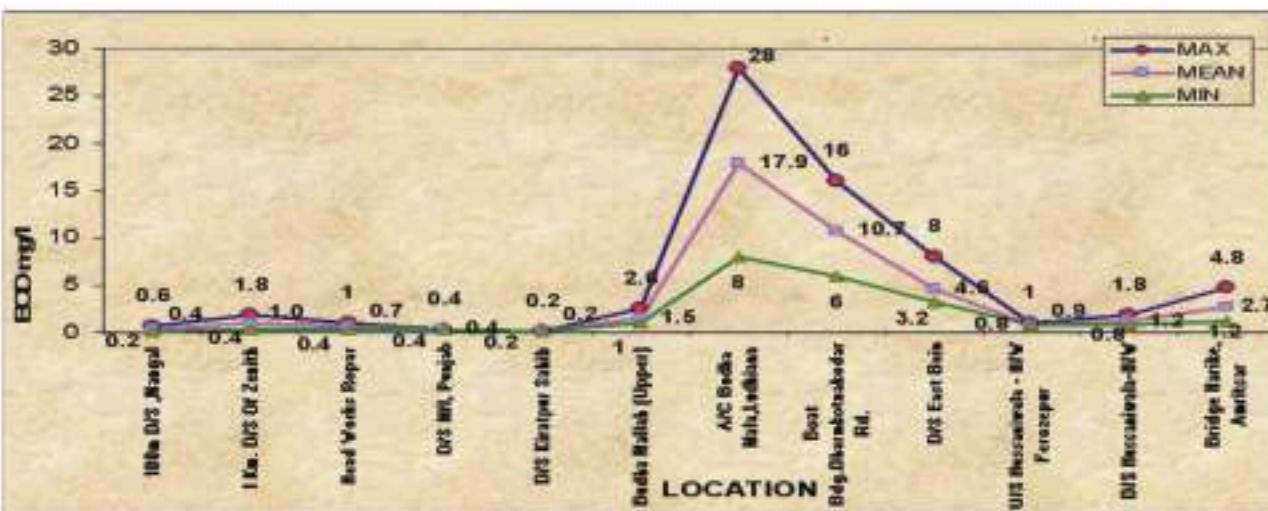


Fig-44 (e). Water Quality of River Satluj (Lower Stretch)

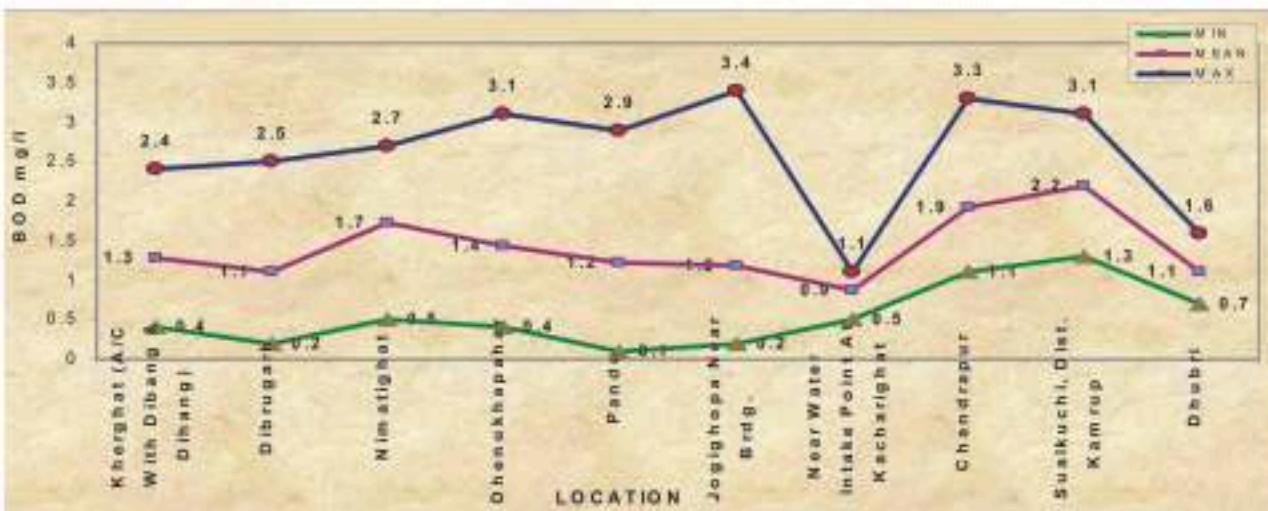


Fig-44 (f). Water Quality of River Brahmaputra

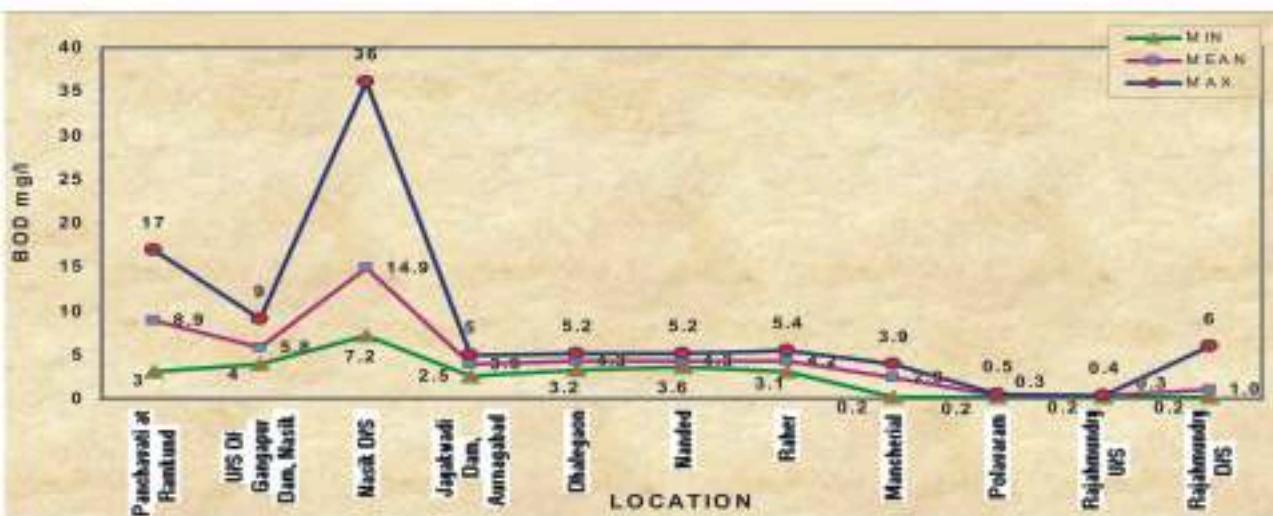


Fig-44 (g). Water Quality of River Godavari

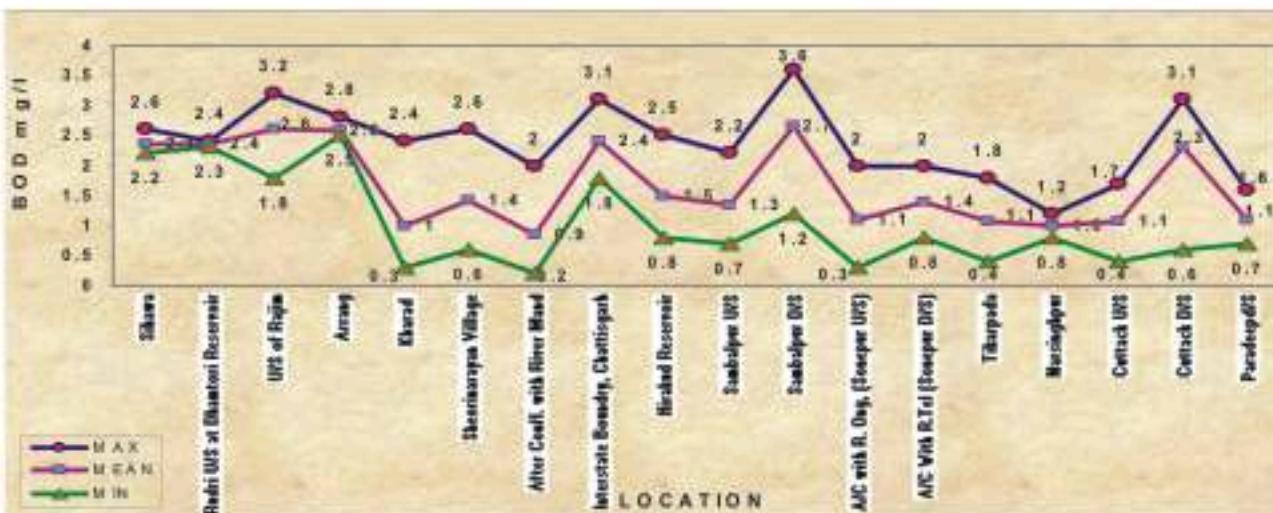


Fig-44 (h). Water Quality of River Mahanadi

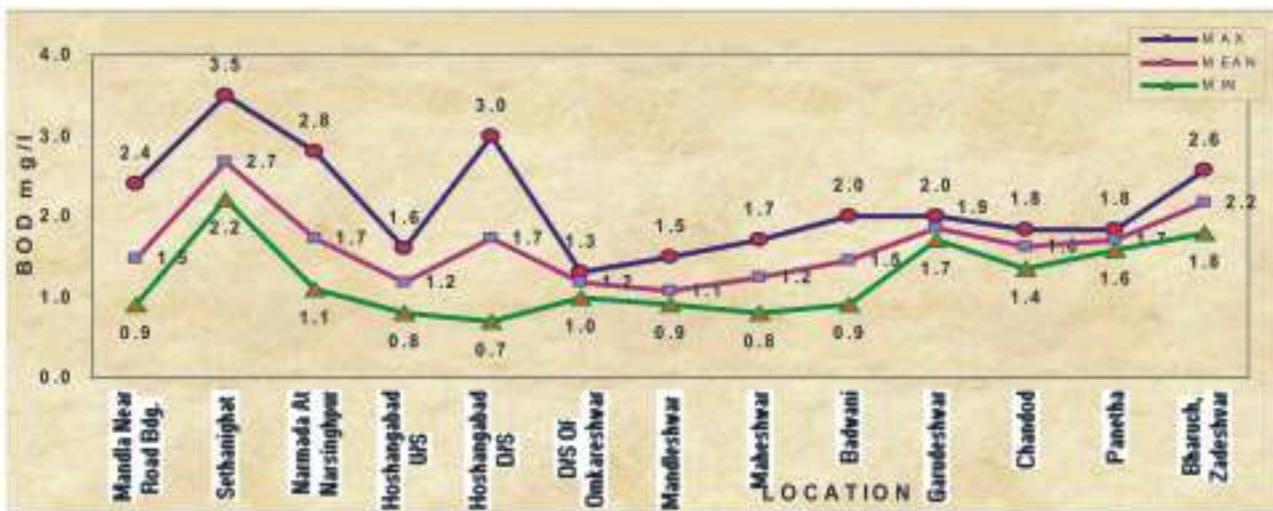


Fig-44 (i). Water Quality of River Narmada

Thirty new air quality stations were sanctioned during year 2007-08 in cities like Srinagar, Ladakh, Una, Sunder Nagar, Dharamshala, Manali Rudrapur, Kashipur, Haldwani, Rishikesh, Haridwar etc.

Under NAMP, four air pollutants viz., Sulphur Dioxide (SO_2), Oxides of Nitrogen as NO_2 , and Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM or PM_{10}), have been identified for regular monitoring at all the location along with meteorological parameters. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with frequency of twice a week, to have 104 observations in a year.

Air Quality Trend

Trend in percentage of cities with low,

moderate, high and critical levels of SO_2 , NO_2 , RSPM and SPM (residential areas) is depicted in Figures-45. The four categories low, moderate, high and critical are based on Exceedence Factor -the ratio of annual mean concentration of a pollutant with that of a respective standard. Percentage of cities with low levels of SO_2 have decreased over the years thus indicating that SO_2 pollution have reduced over the years.

National mean concentration with 90th percentile and 10th percentile for SO_2 , NO_2 , RSPM and SPM is depicted in Figure-46. National mean SO_2 concentration has decreased over the years indicating that there has been a decline in SO_2 levels. National mean concentration of NO_2 and RSPM has remained stable over the years. Although national mean concentration of SPM is slightly

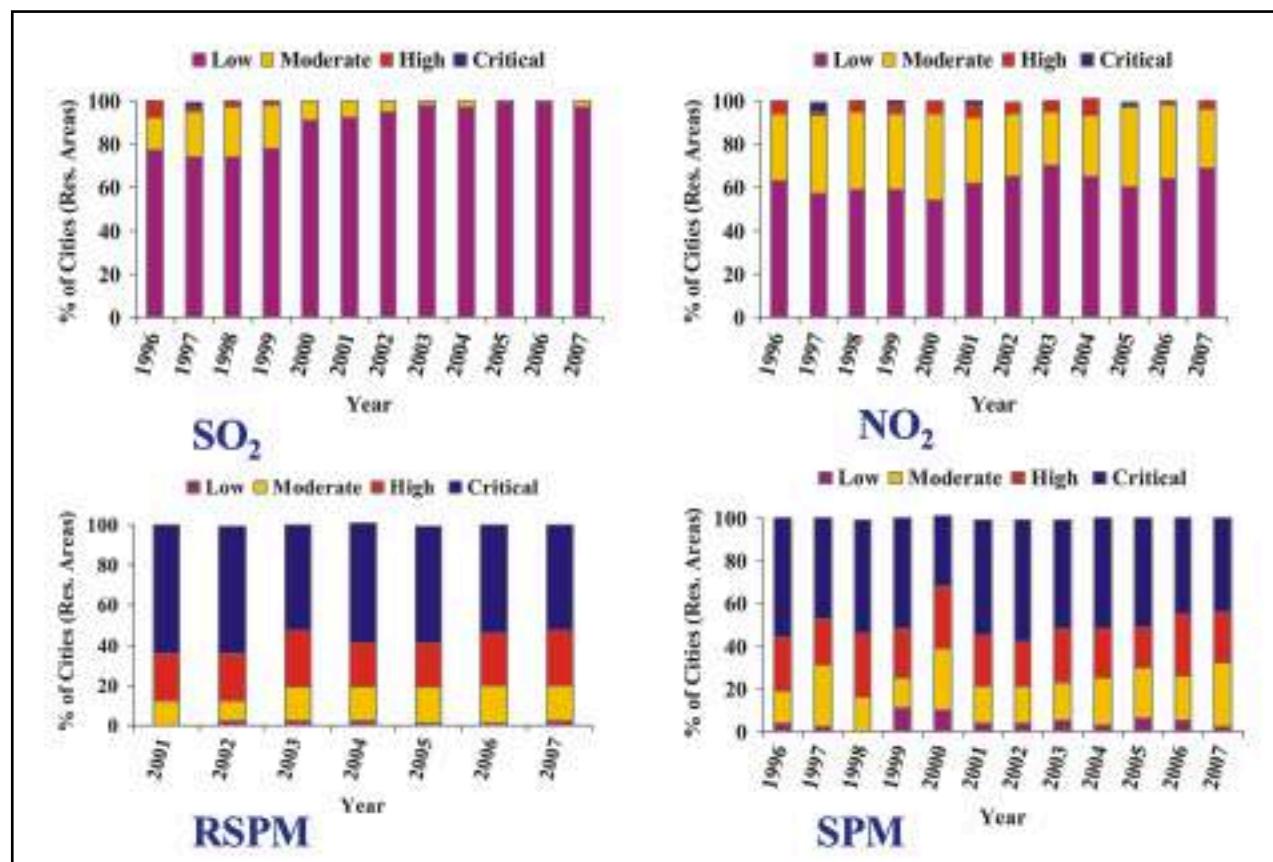
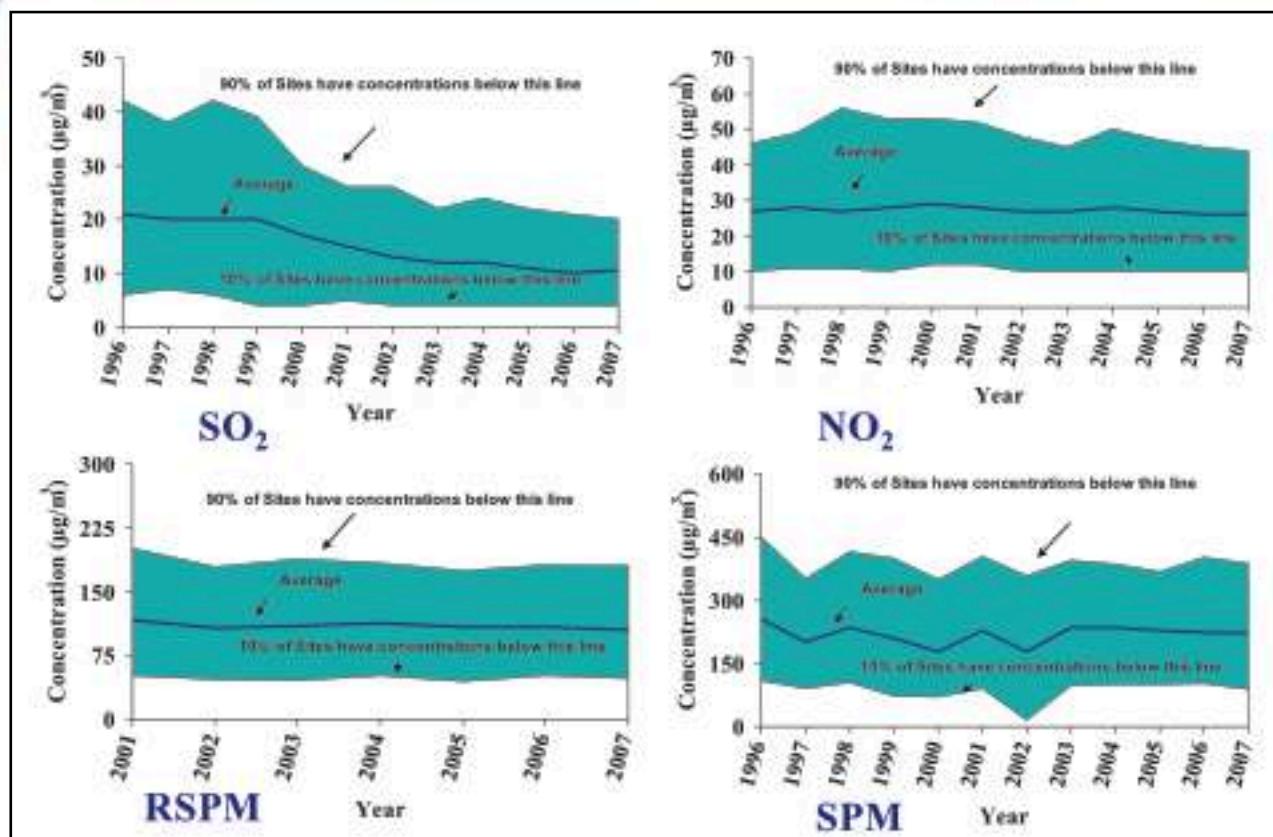


Fig.-45. Trend in Percentage of Cities with Low, Moderate, High and Critical levels of SO_2 , NO_2 , RSPM and SPM

Fig.-46. National Mean concentration of SO₂, NO₂, RSPM and SPM

high but shown fluctuating trend over the years.

Hazardous Waste Management

Hazardous Waste, a bulk of which is generated by the industries, can cause environmental pollution and adverse health effects if not handled and managed properly. Its effective management, with emphasis on minimization of its generation and recycling/reuse, taking into account economic aspects, is therefore essential. With this objective, it is felt necessary to have appropriate strategy for the regulatory bodies, generators of waste, recyclers and operators of the facilities to minimize, recycle, treat and dispose of hazardous waste in an environmentally sound manner.

Various actions have been taken to manage hazardous wastes in the country, which include establishing regulatory and

institutional framework, preparation of technical guidelines, development of individual and common facilities for recycle/recovery/reuse, treatment and disposal of hazardous wastes, inventory of hazardous wastes generation, identification and assessment of dump sites for the purpose of preparing remediation plans, and creating awareness amongst various stakeholders.

Regulatory Framework

To regulate management of Hazardous Waste generated within the country as well as export/import of such waste, the Hazardous Wastes (Management and Handling) Rules, 1989 were notified under the Environment (Protection) Act, 1986. Any waste, which by virtue of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or

environment, whether alone or when in contact with other wastes or substances has been defined as hazardous. These rules were amended further to bring greater clarity to classification of hazardous wastes by linking generation of waste streams to specific industrial processes. Simultaneously, threshold levels for concentration of specified hazardous constituents in wastes were laid down to distinguish between hazardous and other wastes. For regulating imports and exports, wastes had been classified as either 'banned' or 'restricted'. The procedure for registration of recyclers/ re-processors with environmentally sound management facilities for processing waste categories, such as used lead acid batteries, non-ferrous metals waste and used/waste oil, had also been laid down.

New Rules titled 'Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008' have been notified superseding the earlier regulation titled 'Hazardous Wastes (Management and Handling) Rules (HW Rules), 1989, as amended'. A provision for Recycling of e-waste has also been included under these Rules.

The legal instrument for management of biomedical wastes is the Biomedical Waste (Management and Handling) Rules, 1998 as amended in 2000.

As per the assessment made, the States of Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu account for the highest in hazardous waste generation in the country. A national inventory on hazardous wastes is being prepared based on the fresh inventorisation of hazardous waste generation in the States/UTs.

The Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs)/

Pollution Control Committees (PCCs) and State Departments of Environment have been entrusted with the responsibilities of implementation of the provisions laid down under these rules.

All hazardous wastes are required to be treated and disposed off in an environmentally sound manner in secured landfills as prescribed in the Hazardous Wastes Rules. Setting up of Common Treatment, Storage and Disposal Facilities (TSDFs) in different parts of the country was taken up on priority during the Tenth Plan period. Such facilities are built on Public-Private Partnership on Build Operate Own (BOO) principles. A scheme for providing financial assistance for setting up of TSDFs has been in operation for the same.

The Ministry provides a grant to the tune of Rs. two crores for each of the facilities with a matching contribution from the concerned State Government supplemented with additional contributions from the entrepreneurs and financial institutions. Financial assistance has been provided for setting up of a common facility at Trans-Thane Creek (TTC- Belapur) in Maharashtra, Visakhapatnam distt. of Andhra Pradesh, Chennai in Tamil Nadu, Bhutibori – Nagpur, Ranjangaon-Pune etc. Other States like Karnataka, Uttar Pradesh, Madhya Pradesh etc. are also in the process of setting up such facilities.

The Batteries (Management and Handling) Rules, 2001 were notified in May, 2001 to regulate the collection, channelisation and recycling of used lead acid batteries. These rules inter-alia make it mandatory for consumers to return used batteries. All manufacturers/ assemblers/ reconditioners/ importers of lead acid batteries are responsible for collecting used batteries



against new one sold as per a schedule defined in the rules. The list of registered importers of new lead acid batteries has been put up in the website of the Ministry and is updated regularly. The importers have been directed to file the returns on the collections of used batteries to the concerned SPCBs/PCCs.

The Ministry has brought out Guidelines for Environmentally Sound Management of e-waste and is placed on the website.

An Indian delegation participated in the 9th Conference of Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal held in Bali during June 23 to 27, 2008. Some of the important issues which were deliberated during the meeting are:

- Coordination and Cooperation among Basel, Rotterdam and Stockholm Conventions.
- Setting up of Basel Convention Regional Centre (BCRC) at Sri Lanka.
- The Strategic Plan for implementation of the Basel Convention.
- Legal matters on addressing the interpretation of Article 17, Paragraph 5, of the Convention and Adoption of the Ban Amendment.
- Bali declaration on waste management for human health and livelihood.

Chemical Safety

- The Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989 and the Chemical Accident (Emergency Planning, Preparedness and Response) Rules, 1996 are the main instruments for ensuring chemical safety in the country. As per the information available, there are 1949 MAH units in

twenty six States/UTs (twenty three States & three UT's) in two hundred eighty six Districts of the country.

- A Sub-Scheme entitled "Industrial Packet-wise Hazard Analysis" has been in operation since the Eighth Five Year Plan. Out of the two hundred eighty six districts having Major Accident Hazard (MAH) units, Hazard Analysis Studies have been initiated for one hundred and three districts. Out of these ninety studies have been completed. During the year, thirteen Hazard Analysis Studies have been initiated. Based on Hazard Analysis Studies three off site Emergency studies have been initiated.
- A Feasibility study on Vulnerability and Risk Assessment of Transportation of Hazardous Chemicals initiated last year for eight selected stretches, continued during the current year. The objective was to identify the major highways in the respective states where the bulk of hazardous materials get transported, identification of risk consequences, mitigation measures, assess the status of compliance of the provisions laid down in the Motor Vehicle Act, 1988 sections on hazardous materials transportation and to develop emergency response procedure for accidents during transportation of hazardous chemicals.
- Financial assistance for conducting training programmes on Emergency Preparedness, Accident Prevention has been provided to National Safety Councils, Associated Chambers of Commerce and Industry, Federation of Indian Chambers of Common Industry (FICCI) and other state run institutions. The main objective of the programme is to effectively prepare, prevent and mitigate

emergencies arising due to chemical accidents and to impress upon the concerned people the necessity of emergency preparedness and response.

- A Red Book containing duties to be performed during emergency, names, addresses and telephones numbers of key functionaries of State Governments, State Pollution Control Boards, Chief Inspectorate of Factories, Experts/ Institutions has been updated and published.
- Ministry initiated a project on developing the National Chemicals Management Profile for India by UNITAR under the Indo-Canada Environment Management Initiative. The main objective of the project is to develop a national profile to assess India's national infrastructure for managing chemicals, as an important first step to strengthen national capacities and capabilities for the sound management of chemicals. Central Pollution Control Board was entrusted to implement the project. The National Chemicals Management Profile is under printing.
- The Ministry continues to follow-up the Implementation of the Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
- The Phase-III of the project entitled "GIS based Emergency Planning and Response System with respect to chemical accidents in Major Accident Hazard (MAH) installations for the selected districts of Gujarat and Maharashtra has been initiated to further improve and incorporate the important suggestions received during the Phase-III to cover additional features- upgradation of non-spatial data by the authorities, high resolution mapping to enhance the quality of spatial features, enhanced modeling features, online modeling, cascading or Domino Effects. A workshop was organized at Vadodara to get the feed back from the concerned authorities of the two States – Gujarat and Maharashtra.
- A Web Based Online Chemical Accident Information and Reporting System (CIARS) has been initiated by the Ministry to develop an online accident reporting and analysis mechanism where authorities can log in and enter accident related information online and the data can be sorted, analyzed and reviewed, as per requirement.
- Financial assistance has been provided for establishment of three Emergency Response Centres one each at Kakinada, Vijayawada and Kurnool districts of Andhra Pradesh.
- Ministry initiated the process of developing a reference handbook with Do's and Don'ts of Highly Toxic and Flammable Chemicals. The project aims to identify about one hundred chemicals from severity, usage and transportation which require prime attention by first responders. The project has been assigned to the National Safety Council, Kerala Chapter.
- An Expert Committee has been constituted to review the draft Classification, Labeling and Packaging Rules.
- To develop the uniform structure of the Offsite Emergency Plans for the Chemical Disaster Management. Ministry initiated

- 
- a project to develop Guidelines on Off-site Emergency Plans.
- A national level workshop was organized during 30th September-1st October, 2008 on Preparedness for dealing with Chemical Accidents involving all stakeholders.
 - The Ministry initiated the process for development of National Implementation Plan of the Stockholm Convention. An inception workshop was organized on 6th May, 2008 at Delhi to create awareness about the Persistent Organic Pollutants covered under the Stockholm Convention. The project activities relating to development of National implementation plan has been assigned to premier institutes/ organizations of the country.
 - A project has been initiated to generate background environmental concentrations of pesticides/ chemicals- Aldrin, Chlordane, DDT, Dieldrin, Endrin, HCB, Heptachlor, Mirex, Toxaphene and Poly Chlorinated Bi-Phenyls and their transformation products in air.
 - India participated at the fourth meeting of the Persistent Organic Pollutants Review Committee held in Geneva during October 13-17, 2008.
- Municipal Solid Waste**
- The Ministry has notified the Municipal Solid Waste (Management & Handling) 2000 to manage the Municipal Solid Waste (MSW) generated in the country. As per these Rules, the Secretary-in-Charge of the Department of Urban Development of the concerned State or the Union Territory has the overall responsibility for the enforcement of the provisions of these Rules in the Metropolitan Cities. The District Magistrate or the Deputy Commissioner of the concerned District has the responsibility for enforcement of these Rules within the Territorial Limits of their Jurisdiction as per the criteria and the procedure and time limits laid down in Schedule-I. The authorities are required to develop necessary infrastructure for collection, storage, segregation, transportation, processing and disposal of municipal solid waste. The municipal authority or an operator of a facility has to obtain an authorization from the State Pollution Control Board or the Committee before setting up the waste processing and disposal facility including landfills. Besides, granting authorization, the State Boards or the Committees are responsible for monitoring the compliance of the Standards regarding ground water, ambient air, incineration standards, leachate quality and the compost quality, as specified under the said Schedules. The State Boards or the Committees are required to submit an Annual Report with regard to implementation of the Rules to the Central Pollution Control Board (CPCB) who in turn is required to consolidate the report and forward to the Central Government.
 - Training programmes are being conducted for various stakeholders on management of Municipal Solid Wastes (MSW).
 - Financial assistance has been provided for setting up of regional facility for management of Municipal Solid Wastes for twelve cities/towns under the Ahmedabad Urban Development Authority (AUDA), Gujarat. Financial assistance has also been provided for setting up a Solid Waste Management

facility in Kozikode, Kerala.

- An Expert Committee to evolve a roadmap for proper management of wastes in the country has been constituted to work out the action plan for management of waste in India.

Management of Plastic Wastes

- The Ministry has notified Recycled Plastics Manufacture and Usage Rules, 1999 and Recycled Plastics Manufacture and Usage (Amendment) Rules, 2003 to manage the hazards due to Plastic Carry Bags.
- Training programmes are being conducted for various stakeholders on Management of Plastic Wastes.
- An Expert Committee to evolve Protocols for degradable and bio-degradable Plastics has been constituted. At the behest of this Ministry, ten ISO Standards have been adopted and published by Bureau of Indian Standards (BIS).
- The import of Plastic Waste has been restricted by listing it in the Restricted List for imports under the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

Environment Relief Fund

As per the Section 7A of the Public Liability Insurance Act, 1991, as amended in 1992, the Central Government established an Environment Relief Fund (ERF) Scheme on 4th November, 2008. United India Insurance Company Ltd. (UIICL) has been designated as the fund manager of the ERF. The UIICL will open a separate account for ERF in a Nationalized Bank and all the insurance companies shall transfer the money pertaining to ERF deposited by various insurers towards it.

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

- The Fourth Conference of Parties for the Rotterdam Convention was held during October 27 to 31, 2008 at FAO Headquarter in Rome, Italy. A delegation led by the Additional Secretary, MoEF participated in the meeting.

Bio-Medical Waste Management

Bio-Medical Waste (BMW), which is generated by Health Care Establishments, is a source of environmental and public health problems requiring safe handling and disposal. Such waste is required to be managed by proper segregation, treatment and disposal to protect human health and environment.

The Ministry has taken a number of actions for proper management of BMW in the country, which include establishment of regulatory framework, preparation of technical guidelines and also providing financial support for conducting awareness and training programmes to the stake holders.

With the objective of proper management of BMW generated in the country, the Bio-Medical Waste (Management & Handling) Rules, 1998 were notified under the Environment (Protection) Act, 1986. These Rules were subsequently amended on 7th March 2000, 2nd June 2000 and 17th September, 2003.

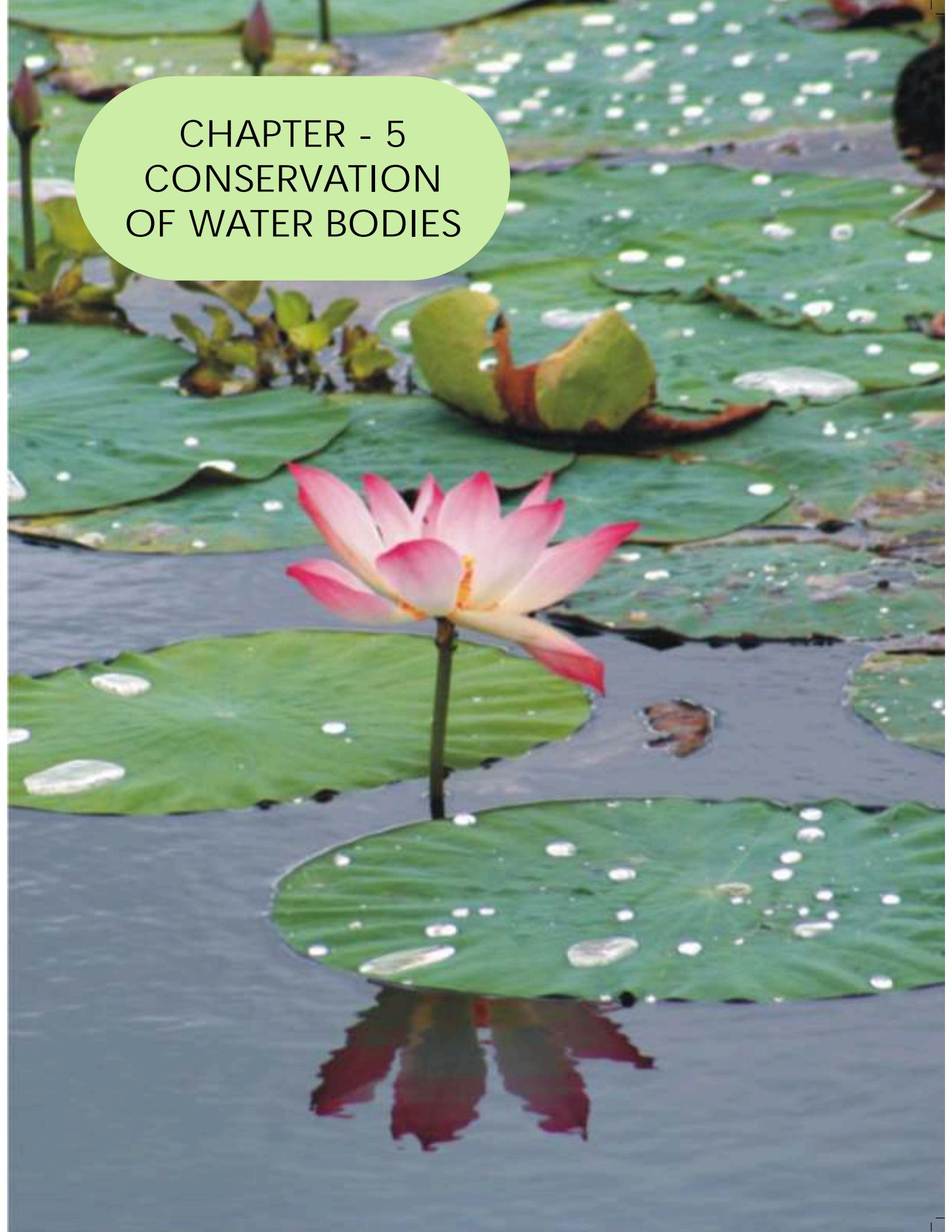
The Ministry has recently initiated a Scheme for providing financial assistance to set-up Common Bio-Medical Waste Treatment and Disposal Facilities (CBMWTDs) in the PPP mode. As per this scheme, 10% of the total cost of setting up of a CBMWDF or Rs.10 lakhs, whichever is less, is provided as Central



subsidy subject to matching contribution by the respective State Government/UT Administration. The balance 80% is required to be contributed by the private entrepreneur setting up the facility. The Ministry has requested all States/UTs to submit proposals to take advantage of this Scheme.

Awareness and training workshops for stakeholders on Bio-Medical Waste Management for effective implementation of Bio-Medical Waste (Management & Handling) Rules, 1998 as amended in 2000

and 2003, were conducted in the states of Kerala, Rajasthan, Orissa and Delhi by the National Safety Council of India, Multi Disciplinary Centre on Safety, Health and Environment, Resource Management and Development Organization and Centre for Environment Education (CEE), respectively. Training programmes were also conducted in different cities in the State of Karnataka, Tamil Nadu, Kerala, Puducherry and Andhra Pradesh by the C.P.R. Environmental Education Centre during the year.



A vibrant pink lotus flower is the central focus, standing tall on a dark stem above a large, green, textured lily pad. The water body is dotted with numerous other green lily pads of various sizes. In the background, more lily pads and a few yellowish-green flower buds are visible. A small, dark object, possibly a turtle, is partially submerged in the water to the right of the main flower.

CHAPTER - 5

CONSERVATION

OF WATER BODIES

National River Conservation Directorate

The National River Conservation Directorate (NRCD), functioning under the Ministry of Environment and Forests is engaged in implementing the River and Lake Action Plans under the National River Conservation Plan (NRCP) & National Lake Conservation Plan (NLCP) by providing financial assistance to the State Governments.

National River Conservation Plan (NRCP)

Introduction and Objectives

The objective of National River Conservation Plan (NRCP) is to improve the water quality of the rivers, which are the major water sources in the country, through the implementation of pollution abatement works, to the level of designated best use. So far, a total of thirty six rivers have been covered under the programme. The rivers are:

for treatment.

- Setting up Sewage Treatment Plants for treating the diverted sewage.
- Construction of Low Cost Sanitation toilets to prevent open defecation on river banks.
- Construction of Electric Crematoria and Improved Wood Crematoria to conserve the use of wood.
- River Front Development works such as improvement of bathing ghats.
- Afforestation on the river banks, Public Participation & Awareness and other activities.

Initiatives during 2008-09 - Setting up of National Ganga River Basin Authority (NGRBA)

The Central Government has given Ganga the status of a 'National River' and has constituted

S. No.	River	S. No.	River	S. No.	River	S. No.	River
1	Adyar	10	Dhipu & Dhansiri	19	Mahananda	28	Tapti
2	Betwa	11	Ganga	20	Musi	29	Tapi
3	Beehar	12	Godavari	21	Narmada	30	Tunga
4	Bhadra	13	Gomati	22	Pennar	31	Tungabadra
5.	Brahmani	14	Khan	23	Pamba	32	Tamrabarani
6	Cauvery	15	Krishna	24	Rani Chu	33	Vaigai
7	Cooum	16	Kshipra	25	Sabarmati	34	Vennar
8	Chambal	17	Mahanadi	26	Satluj	35	Wainganga
9	Damodar	18	Mandovi	27	Subarnarekha	36	Yamuna

The important works being taken up under the NRCP include:

- Interception and diversion works to capture the raw sewage flowing into the river through open drains and divert them

a 'National Ganga River Basin Authority' (NGRBA) on February 20, 2009. The NGRBA is set up as an empowered planning, financing, monitoring and coordinating authority for the conservation of Ganga River

with a holistic approach under Section 3(3) of the Environment (Protection) Act, 1986.

The Authority is chaired by the Prime Minister and has as its members, the Chief Ministers of the States through which Ganga flows, viz., Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. The Union Ministers of Environment & Forests, Finance, Urban Development, Water Resources, Power, Science & Technology, Deputy Chairman, Planning Commission are also the members of the Authority. Up to five experts in the fields of environmental engineering, hydrology, river conservation, social mobilization, etc can be co-opted as members. The Secretary, Ministry of Environment & Forests would be the Member Secretary of the Authority. The Ministry of Environment & Forests is the nodal Ministry for the Authority and would provide the administrative and technical support.

The Authority has both regulatory and developmental functions. The Authority will take measures for effective abatement of pollution and conservation of the river Ganga in keeping with sustainable development needs. These include:-

- Development of river basin management plan and regulation of activities aimed at the prevention, control and abatement of pollution in the river Ganga to maintain its water quality and to take measures relevant to river ecology and management in the Ganga Basin States;
- Maintenance of minimum ecological flows in the river Ganga with the aim of ensuring water quality and environmentally sustainable development;
- Measures necessary for planning, financing and execution of programmes

for abatement of pollution in the river Ganga including augmentation of sewerage infrastructure, catchment area treatment, protection of flood plains, creating public awareness and such other measures for promoting environmentally sustainable river conservation;

- Collection, analysis and dissemination of information relating to environmental pollution in the river Ganga;
- Investigations and research regarding problems of environmental pollution and conservation of the river Ganga;
- Creation of special purpose vehicles, as appropriate, for implementation of works vested with the Authority;
- Promotion of water conservation practices including recycling and reuse, rain water harvesting, and decentralised sewage treatment systems;
- Monitoring and review of the implementation of various programmes or activities taken up for prevention, control and abatement of pollution in the river Ganga; and
- Issuance of directions under section 5 of the Environment (Protection) Act, 1986 for the purpose of exercising and performing all or any of the above functions and for achievement of its objectives.

As per the notification, a corpus of funds would be provided by the Central Government for implementing projects, programmes and other activities as decided by the Authority. The Notification also provides for constitution of a State River Conservation Authority by the State Governments concerned under the

chairmanship of the Chief Minister for coordinating and implementing the river conservation activities at the State level.

[Activities/Progress under National River Conservation Project \(NRCP\)](#)

The present sanctioned cost of National River Conservation Project (NRCP) projects is Rs. 4382.27 crore covering one hundred sixty five towns along polluted stretches of thirty six rivers spread over twenty States (Annexure-V). Some of the important River Action Plan are detailed below.

[Ganga Action Plan \(GAP\)](#)

The Ganga Action Plan initiated in 1985 is the first River Action Plan. Besides other pollution abatement works, a sewage treatment capacity of 869 mld (million litres per day) was created under Phase-I and an amount of

about Rs. 452 crore was spent under the Plan. This phase was declared completed in March 2000. Since GAP Phase-I did not cover the pollution load of Ganga fully, GAP Phase-II was taken up which included, Ganga and its three tributaries. Works under Ganga Action Plan Phase-II covers fifty nine towns along the main stem of river Ganga at an approved cost of Rs. 730.09 crore.

[Yamuna Action Plan \(YAP\)](#)

Under Yamuna Action Plan Phase-I, assisted by the Japan Bank for International Cooperation (JBIC), a total of 753 mld sewage treatment capacity was created and this Phase was declared complete in March, 2003.

A loan assistance of Yen 13.33 billion has been extended by the Japan International



Fig-47. A view of Sewage Treatment Plant (Primary Clarifier) in Hardwar



Fig-48. DHS (Down Hanging Sponge) System UASB STP at Karnal, Haryana

Cooperation Agency (JICA) which has been merged with JBIC for implementation of Yamuna Action Plan (YAP) Phase II, which is part of the National River Conservation Plan (NRCP). The loan agreement between Government of Japan and Government of India has been signed on March 31, 2003.

The project has been approved at an estimated cost of Rs. 624 crore for abatement of pollution of river Yamuna in Delhi, Uttar Pradesh (eight towns) and Haryana (six towns) under YAP-II. The cost of works is to be shared between Government of India and the State Governments in the ratio of 85:15. A sewage treatment capacity of 189 mld is targeted to be created besides major rehabilitation/replacement works for sewers and other pollution abatement works. So far twenty five pollution abatement schemes have

been sanctioned with an estimated cost of Rs.333.66 crore, out of which three schemes have been completed and others are in different stages of progress.

The main components to be implemented under the project are:

Delhi -- STP (135 mld capacity new and 324 mld capacity rehabilitation)
Rehabilitation/replacement of trunk sewers (30.82 kms)

UP -- STP (54 mld capacity new) Sewer lines (70.57 kms) Rising Main (5.25 kms)

Haryana-- Sewer lines (73 kms).

Emphasis has also been given on public participation, capacity building etc. in order to ensure better utilisation of assets and

long term sustainability of the project. Implementation of various works is underway in the States.

Gomti Action Plan (GoAP)

Gomti Action Plan (GoAP) Phase-I

The total approved cost of Gomti Action Plan-I is Rs. 64.01 crore for taking up river pollution abatement works in the towns of Lucknow, Sultanpur and Jaunpur, out of which major works for about Rs.47.75 crore are for Lucknow. Under this Plan, out of thirty one sanctioned schemes, twenty eight schemes have been completed. A total of 42 mld STP capacity had been created under this Plan.

Gomti Action Plan (GoAP) Phase-II

The approved cost of Gomti Action Plan Phase-II at Lucknow is Rs.263.04 crore. The works in this phase include three sewage treatment plants with a total capacity of 375 mld (over and above the 42 mld capacity being set up in the first phase), interception and diversion works of sewage of the remaining drains and other miscellaneous items such as river front development, low cost sanitation units, public awareness and participation, etc. Out of thirty schemes sanctioned, works on six schemes have been completed so far.

Other River Action Plans

Besides the river Ganga and its tributaries covered under GAP-I and GAP-II, the NRCD has taken up the pollution abatement projects of fourteen other States covering thirty one rivers and sixty nine towns.

The schemes of GAP-II and other rivers of the country have been merged under National River Conservation Plan based on 70:30

funding pattern and river water pollution abatement works under this Head.

The sanctioned cost for the NRCP projects is Rs.4382.27 crore, out of which an amount of Rs. 2729 crore has been released by the Government of India so far. Seven hundred fifty three projects have been completed against a total of one thousand fifty five sanctioned projects. A target of 4210.48 mld sewage treatment capacity sanctioned on the basis of DPRs within the approved cost of the respective projects, a capacity to treat 2698 mld of sewage has been created till January 2009, besides 869 mld capacity already been created under the Ganga Action Plan Phase-I

Details of Projects Approved/Completed

The list of projects sanctioned between April 1, 2008 to March 31, 2009 are given in Annexure-III. Details of projects completed between April 1, 2008 to January 31, 2009 are given in Annexure-IV. It was targeted to create 355.5 mld capacity through commissioning of Sewage Treatment Plants (STP) during the year 2008-09. Against this, a total of 221 mld capacity has been completed so far and the remaining STP capacity are in different stages of completion.

Water Quality Management Plan for River Ganga

The water quality of river Ganga is being monitored since 1986 from Rishikesh in Uttarakhand to Uluberia in West Bengal by institutions such as Pollution Control Research Institute (Hardwar), CPCB Zonal Office Lucknow, Indian Institute of Technology, Kanpur, Patna University and Bidhan Chandra Krishi Vishwavidyalaya, Kalyani. As a result of the projects completed under

Ganga Action Plan, the water quality of river Ganga has shown a general improvement despite tremendous population growth along the river banks. The summer average values of two important river water quality parameters viz. Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) recorded in some of the important monitoring stations on river Ganga is given in Table-13.

The water quality monitoring has also been undertaken for rivers namely, Yamuna, Western Yamuna Canal, Gomti, Hindon, Satluj (Punjab), Cauvery (Tamil Nadu), Tunga, Bhadra, Tungabhadra in Karnataka

and Waterways of Chennai. The number of monitoring stations presently are one hundred fifty eight in ten rivers which include twenty seven stations set up in the upper reaches of Ganga and thirty two stations of Chennai Waterways.

National Lake Conservation Plan (NLCP)

Objectives

The objectives of the Scheme is to restore and conserve the polluted lakes in urban and semi-urban areas of the country degraded due to waste water discharge into the lake. The activities covered under National Lake

Table-13. Summer Average Values for Water Quality on River Ganga under Ganga Action Plan

Monitoring Station	Distance in Km	Dissolved Oxygen*		Biochemical Oxygen Demand*	
		1986 (mg/l)	2008 (mg/l)	1986 (mg/l)	2008 (mg/l)
Rishikesh	0	8.1	8.1	1.7	1.2
Hardwar D/S	30	8.1	7.9	1.8	1.4
Garhmutkeshwar	175	7.8	7.8	2.2	1.9
Kannauj U/S	430	7.2	6.5	5.5	2.9
Kannauj D/S	433	NA	6.2	NA	3.1
Kanpur U/S	530	7.2	4.9	7.2	3.4
Kanpur D/S	548	6.7	6.0	8.6	4.1
Allahabad U/S	733	6.4	8.4	11.4	4.8
Allahabad D/S	743	6.6	7.7	15.5	3.2
Varanasi U/S	908	5.6	7.5	10.1	2.2
Varanasi D/S	916	5.9	7.3	10.6	3.0
Patna U/S	1188	8.4	6.0	2.0	1.7
Patna D/S	1198	8.1	5.9	2.2	2.4
Rajmahal	1508	7.8	6.2	1.8	2.0
Palta	2050	NA	6.9	NA	2.2
Uluberia	2500	NA	5.3	NA	3.6

* Mean value for the months of March to June when the temperatures are high and flows are low.

NA — Data not available, U/S - Upstream, D/S -- Downstream, mg/l - milligram per litre

Conservation Plan (NLCP) include the following:-

- Prevention of pollution from point sources by intercepting, diverting and treating the pollution load entering the Lakes from the entire lake catchment area.
- *In-situ* measures of lake cleaning such as de-silting de-weeding, bio-remediation etc. depending upon the site conditions.
- Catchments area treatment which may include bunding, afforestation, storm water, drainage, fencing and shore line development etc.
- Public awareness and public participation
- Other activities depending upon location specific conditions including public interface.

Projects approved under NLCP

National Lake Conservation Plan (NLCP) is a Centrally Sponsored Scheme of Ministry of Environment & Forests, for conservation/ restoration of polluted and degraded lakes. The scheme of National Lake Conservation Plan was initiated with the approval of Conservation and Management Plans of three lakes namely, Powai (Maharashtra), Ooty and Kodaikanal (Tamil Nadu), in June, 2001 at a cost of Rs. 14.90 crore.

As of March 31, 2009, a total of forty projects for conservation of fifty seven lakes have been sanctioned in thirteen States at a sanctioned cost of Rs. 856.76 crore (Annexure-III). Conservation works for twelve lakes have been completed so far whereas in some cases the project implementation is in last stages of completion. Funding pattern under NLCP is on a 70:30 cost sharing basis between the Central and the State Governments.

12th World Lake Conference - Jaipur declaration

The 12th World Lake Conference (Taal 2007), a biennial event under the aegis of International Lake Environment Committee (ILEC) Foundation, was organized by the Ministry of Environment & Forests, Government of India, at Jaipur, Rajasthan from October 28 to November 02, 2007. The State Government of Rajasthan was the co-host for this mega event. The central theme of the Conference was 'Conserving Lakes & Wetlands for Future'. Other main objectives included identifying the issues concerning lakes and wetlands along with restoration approaches under different conditions adopted by different countries. The Jaipur Declaration was adopted at the valedictory session of the Conference. The declaration recognized the importance of lakes and wetlands for the goods and services they provide and expressed concern over the deteriorating state of these water bodies. It called upon the governments and international organizations to take measures for development of standards, appropriate research methodologies, guidelines, treatment technologies etc. in respect of lakes and wetlands and promote their restoration and management through various measures.

NLCP Guidelines

With the multiple experience gained in implementation of projects sanctioned under the NLCP, it was considered imperative to make successive improvements in the existing system of project formulation and implementation. In the process, many of the eminent experts in the field, concerned State Governments/Implementing Agencies and all relevant stakeholders were consulted. The

existing guidelines of NLCP have since been revised after due incorporation of responses of State Governments and experts feedback. The revised NLCP guidelines are accessible on the Ministry's website.

Names and Addresses of Implementing Agencies

The names and addresses of State Implementing Agencies under NRCP is given at Annexure-VI

National Wetland Conservation Programme

Introduction and Objectives

The scheme on conservation and management of wetlands was initiated in 1987 with the following objectives:-

- to lay down policy guidelines for implementing programme of conservation and management of wetlands in the country,
- to undertake priority wetlands for intensive conservation measures,
- to monitor implementation of the Programme of conservation, management and research,
- to prepare an inventory of Indian wetland

Activities undertaken so far

National Wetland Conservation Programme (NWCP)

- During the year, Management Action Plans of forty eight wetlands were approved and financial assistance released to the concerned State Governments.

- The total allocated amount of Rs.11.85 crores has been spent during the Financial Year 2008-09.
- The meeting of Expert Group on Wetlands (EGoW) was held on October 16, 2008 recommended twelve more wetlands and were identified under NWCP.
- The 10th Meeting of the National Wetland Committee (NWC) was held on March 16, 2009 at New Delhi under the Chairmanship of Special Secretary, Ministry of Environment and Forests, which approved the inclusion of twelve more wetlands under NWCP increasing total number of wetlands from 103 in 2007-08 to 115 in 2008-09 (Annexure-VII A).
- The Research projects to supplement Management Action Plan (MAPs) for conservation of wetland were processed for consideration by the Expert Group-B on Conservation and Sustainable Utilization of Natural Resources constituted by RE Division in the Ministry.
- Evaluation of the Scheme to assess its impact on conservation and wise use of wetlands in the State was initiated for the first time in 2008 in five Ramsar sites which have been funded for more than five years. The report of evaluation has been received by the Ministry.
- Three regional training programmes at Bhopal, Srinagar and Ahmedabad were organized during the year for providing training to wetland managers for efficient execution of Management Action Plan (MAPs) of wetlands in the State.
- Regulatory framework for conservation of

wetlands was formulated and was put up on the Ministry's website to obtain comments of all the stakeholders including State Governments, Central Ministries, research institutions, universities, NGOs, local communities, individuals etc. After incorporating all the relevant comments, the draft regulatory framework has been sent to Ministry of Law and Justice for their vetting.

- Under Prime Minister's reconstruction plan for J&K, a group of experts including officials from MoEF and State governments was constituted which will undertake field visits of the identified wetlands under this package. A meeting with J&K State Government officials was convened on October 20, 2008 under the Chairmanship of Special Secretary to

discuss MAPs of three wetlands covered under Prime Minister's package.

Ramsar Convention on Wetland

The 'Convention on Wetlands', signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently one hundred fifty eight Contracting Parties to the Convention, with one thousand seven hundred fifty eight wetland sites, totaling one hundred sixty one million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. Ramsar Convention is the only global environment treaty dealing with a particular ecosystem.



Fig-49. Ujani Wetland, Maharashtra, an ideal site for aquatic plants and certain rare migratory birds

The Ramsar Convention on Wetlands was developed as a mean to call international attention to the rate at which wetland habitats were disappearing, in part due to a lack of understanding of their important functions, values, goods and services.

Major obligations of countries which are party to the Convention are to (i) designate wetlands for inclusion in the 'List of Wetlands of International Importance'; (ii) promote as far as possible, 'the wise use of wetlands in their territory'; (iii) promote 'international cooperation' especially with regard to transboundary wetlands, shared water systems, and shared species; and create 'wetland reserves'.

In pursuance of this Ministry's obligation under the Convention, till date twenty five sites have been designated as Ramsar sites in India (Annexure-VII B) and nine more wetlands are under process of being designated as Ramsar sites.

Tenth meeting of Conference of Contracting Parties (CoP-10) to Ramsar Convention was held at Changwon city, South Korea from October 28 – November 4, 2008. The official Indian delegation under the leadership of Joint Secretary (E&F) participated in CoP-10.

India also participated in the meeting of Supervisory Council of Wetland International held during June, 2008 and November, 2008.

India is also a partner to the Himalayan initiatives along with other Himalayan countries. A Himalayan initiative was recently endorsed by the Indian Government in 2008. India participated in the meeting of

Himalayan initiative jointly organized by Ramsar Secretariat and ICIMOD held in Kathmandu during September, 2008.

Comparison of progress over the previous year

- Total number of wetlands identified under NWCP has increased from one hundred three in 2007-08 to one hundred fifteen in 2008-09 covering twenty four states and one UT.
- Budget allocation has also been increased from 10.00 crores in 2007-08 to Rs.11.90 crores during 2008-09.
- Three workshops/ training programmes have been organized during 2008-09.
- Evaluation of the NWCP to assess its impact on conservation and wise use of wetlands in the State was done for the first time in 2008 in five Ramsar sites which have been funded for more than five years.
- Regulatory framework for conservation of wetlands was formulated after incorporating comments received from various stakeholders.

State-wise Status

- One hundred fifteen wetlands covering twenty four states and one UT have been identified under the NWCP. The State wise list of identified wetlands is attached in the Annexure-VII A.

Regulatory Acts/Rules governing the programme and promulgation of new acts

- Recognizing the value of Wetlands and taking cognizance of the fact that there is no formal system of Wetland Regulation,



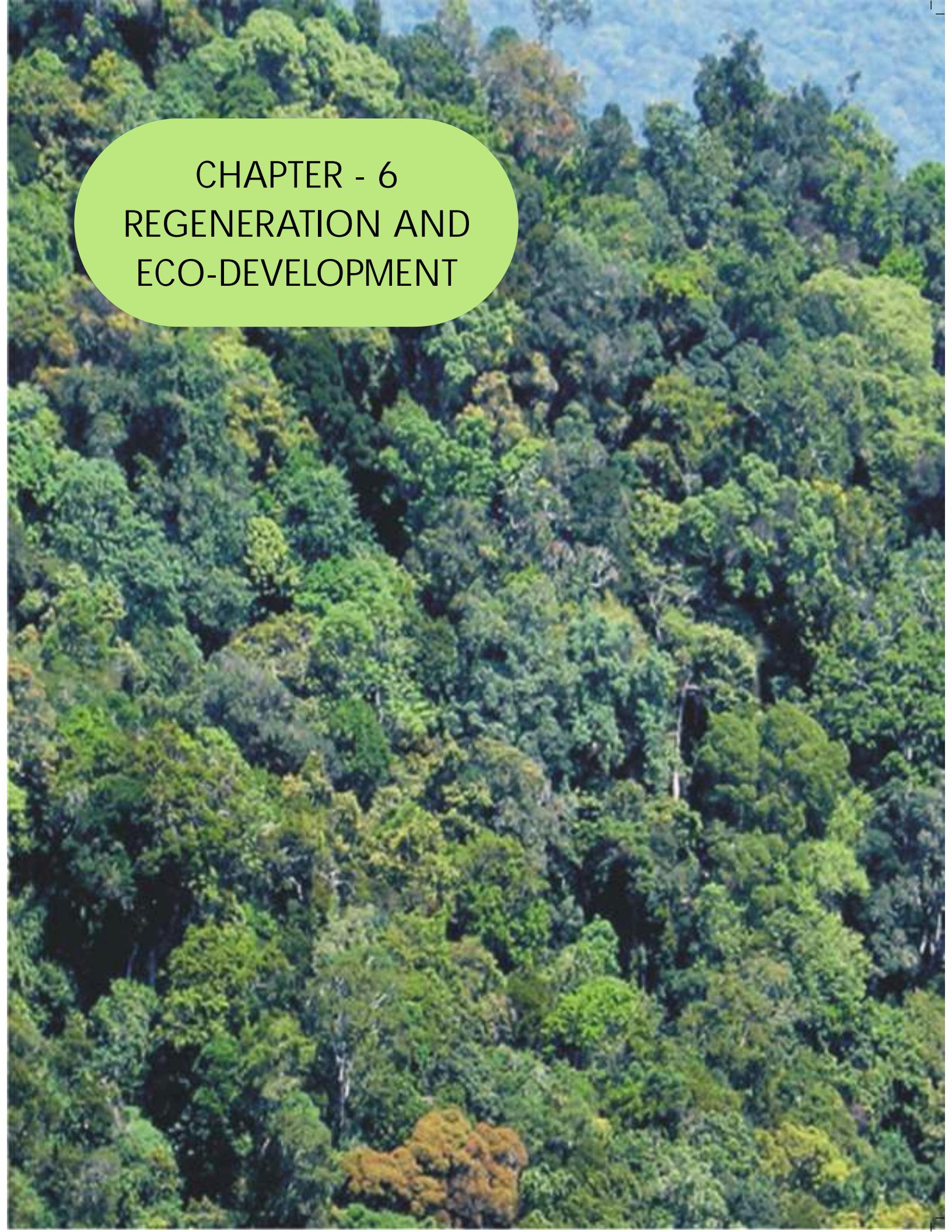
the National Environment Policy (NEP), 2006 seeks to set up a legally enforceable regulatory mechanism for Wetlands to prevent their degradation and enhance their conservation. It also undertakes to develop an inventory of such Wetlands.

- Regulatory framework for conservation of wetlands was prepared and was put up on the Ministry's website to obtain

comments of all the stakeholders. After incorporating all the relevant comments, the draft regulatory framework has been finalized and has been sent to Ministry of Law and Justice for their vetting.

Implementing organizations

- Department of Environment and Forests, Council for Science and Technology, State Wetland Authority of the concerned States.



CHAPTER - 6

REGENERATION AND

ECO-DEVELOPMENT

National Afforestation and Eco-Development Board (NAEB)

Introduction

In order to promote afforestation, tree planting, ecological restoration and eco-development activities in the country, the National Afforestation and Eco-Development Board (NAEB) was set up in August 1992. Special attention is also being given by NAEB to the regeneration of degraded forest areas and lands adjoining forest areas, national parks, sanctuaries and other protected areas as well as the ecologically fragile areas like the Western Himalayas, Aravallis, Western Ghats etc.

Objectives

The detailed objectives of the NAEB are to:

- Evolve mechanisms for ecological restoration of degraded forest areas and

adjoining lands through systematic planning and implementation, in a cost effective manner;

- Restore through natural regeneration or appropriate intervention the forest cover in the country for ecological security and to meet the fuelwood, fodder and other needs of the rural communities;
- Restore fuelwood, fodder, timber and other forest produce on the degraded forest and adjoining lands in order to meet the demands for these items;
- Sponsor research and extension of research findings to disseminate new and proper technologies for the regeneration and development of degraded forest areas and adjoining lands;
- Create general awareness and help foster



a people's movement for promoting afforestation and eco-development with the assistance of voluntary agencies, non-government organizations, Panchayati Raj institutions and others and promote participatory and sustainable management of degraded forest areas and adjoining lands;

- Coordinate and monitor the Action Plans for tree planting, ecological restoration and eco-development; and
- Undertake all other measures necessary for promoting afforestation, tree planting, ecological restoration and eco development activities in the country.

NAEB operates the following three major schemes:-

- (a) National Afforestation Programme (NAP) Scheme
- (b) NAEB Scheme: The major components of the Scheme are:-
 - i. Grants in Aid for Greening India (GIA for GI) Scheme
 - ii. Monitoring and Evaluation (M&E)
 - iii. Communication
 - iv. Support to Regional Centres (RCs)
- (c) Eco Development Forces (EDF)

National Afforestation Programme (NAP) Scheme

Introduction and Objectives

It continues to be the flagship scheme of NAEB, in so much as it provides support, both in physical and capacity building terms, to the Forest Development Agencies (FDAs) which in turn are the main organ to move forward institutionalization of Joint Forest Management. The FDA has been conceived and established as a federation of Joint Forest

Management Committees (JFMCs) at the Forest Division level to undertake holistic development in the forestry sector with people's participation. This is a paradigm shift from the earlier afforestation programmes wherein funds were routed through the State Governments. This decentralized two-tier institutional structure (FDA and JFMC) allows greater participation of the community, both in planning and implementation, to improve forests and livelihoods of the people living in and around forest areas. The village is reckoned as a unit of planning and implementation and all activities under the programme are conceptualized at the village level. The two-tier approach, apart from building capacities at the grassroots level, significantly empowers the local people to participate in the decision making process. Under Entry Point Activities, community assets are created with a 'care and share' concept. The objectives of the scheme are as follows: -

- Protection, and conservation of natural resources through active involvement of the people.
- Checking land degradation, deforestation and loss of biodiversity
- Ecological restoration and environmental conservation and eco-development
- Evolving village level people's organization which can manage the natural resources in and around villages in a sustainable manner
- Fulfillment of the broader objectives of productivity, equity, and sustainability for the general good of the people
- Improve quality of life and self-sustenance aspect of people living in and around forest areas
- Capability endowment and skill





Fig-51. Seedlings raised under National Afforestation Programme, waiting to be planted out

enhancement for improving employability of the rural people.

Progress of Activities Undertaken

- Seven hundred and ninety five FDAs have been operationalised so far, since the launch of the FDA mechanism in 2000-01, at a cost of Rs. 2,675.26 crores to treat a total area of 15.79 lakh ha. (as on March 31, 2009). Rehabilitation of shifting cultivation lands have been given specific focus under the programme, and so far thirty four jhum projects have been sanctioned in NE States and in Orissa. State-wise status of FDA Projects as on March 31, 2009 is given in Table-14.
- As on March 31, 2009, Rs. 345.62 crore was released to FDA's during the year 2008-09 for implementation of National Afforestation Programme (NAP).

Comparison of progress as compared to previous years

Year-wise progress of National Afforestation Programme in the Tenth Five Year Plan and during the current year is given in Table-15.

Implementing organization

The NAP Scheme is being implemented through two-tier decentralized mechanism of Forest Development Agency (FDA) at Forest Division Level and Joint Forest Management Committees (JFMCs) at the village level.

New Initiatives under the Scheme

A number of initiatives have been taken by the Ministry to expedite the implementation of the scheme as well improve the qualitative aspects of implementation. These include:

- Electronic transfer of funds from Government of India to the FDAs to cut-

Table-14. State-wise status of FDA Projects as on March 31, 2009

Sl. No.	Name of State/Union Territory	No. of FDA Projects/Proposals sanctioned	Total project cost (in Rs. crores)	Area (in a.)
1	Andhra Pradesh	47	115.44	68641
2	Chhattisgarh	32	185.66	98210
3	Gujarat	25	162.76	77610
4	Haryana	18	99.18	38663
5	Himachal Pradesh	30	76.79	43628
6	Jammu & Kashmir	31	97.20	61944
7	Karnataka	45	196.20	93955
8	Madhya Pradesh	55	175.05	118594
9	Maharashtra	48	176.54	112008
10	Orissa	46	145.85	121562
11	Punjab	15	33.95	17562
12	Rajasthan	33	52.93	38690
13	Tamil Nadu	32	119.80	64167
14	Uttar Pradesh	69	199.93	120463
15	Uttarakhand	38	88.97	61511
16	Goa	3	2.39	1250
17	Jharkhand	33	132.09	86520
18	Bihar	10	35.47	25006
19	Kerala	26	81.37	30886
20	West Bengal	20	63.48	37633
	Total (Other States)	656	2241.05	1318503
21	Arunachal Pradesh	22	38.06	28571
22	Assam	30	68.08	48980
23	Manipur	16	59.76	33619
24	Nagaland	18	42.99	32618
25	Sikkim	8	55.24	23778
26	Tripura	13	36.59	28090
27	Mizoram	24	104.57	47420
28	Meghalaya	8	28.93	17445
	Total (NE States)	139	434.22	260521
	TOTAL	795	2675.27	1579024

down the delays

- Stepping-up monitoring and evaluation of the FDA projects by activation of State-level Coordination Committees for NAP, increased field visit by officers, and expeditious commissioning by the States of first independent concurrent evaluation of FDA projects
- Increased number of training programmes for the frontline staff and JFM committee members
- Organising district-level inter-departmental linkage workshops for promoting linkage of NAP with other developmental programmes for enhancing the sustainability of JFM
- Initiating seven pilot projects for establishing forest-based micro-

Table-15. Year-wise progress of National Afforestation Programme

Year	No. of new FDA Projects approved	No. of New JFMCs involved	Project Area approved (ha.) *	Release (Rs.crores)**
2000-02	47	1843	71068	47.53
2002-03	237	8197	404799	151.26
2003-04	231	7902	282536	207.98
2004-05	105	3404	106743	233.00
2005-06	94	2362	54432	248.12
2006-07	15	494	0	292.75
2007-08	53	3979	493061	392.95
2008-09 (as on 31.03.09)	13	6536	170435	345.62

* Area approved for advance soil work/preparatory plantations during the year for all ongoing FDA projects.

** Total (financial assistance provided for planting, advance soil work etc.) for all ongoing FDA projects

enterprises which will provide experiential learning for scaling-up such activity with a view to consolidate the JFM during the Eleventh Plan.

- Comprehensive amendment in Guidelines of NAP scheme are proposed to promote further decentralization by delegating more responsibilities to State Forest Departments with respect to processing of the FDA project proposals, greater organic linkage of JFMCs with Gram Panchayats, increased security of the elected members of JFMCs through longer

tenure of JFMC presidency, capacity building of particular frontline staff of Forest Department and JFMC members especially with regard to local management and administrative responsibilities.

National Afforestation and Eco-development Board (NAEB) Scheme

Grants in Aid for Greening India Scheme

Introduction and Objectives

Increasing forest and tree cover (FTC) of the country to one-third of its geographical area, as envisaged in the National Forest Policy 1998, is essential for economic and ecological security of the country. Achieving the target of one-third of forest and tree cover, however, stipulates fourfold increase in current annual tree planting mostly on lands outside recorded forest area (RFA). Tree plantation on lands outside RFA, however, may be encouraged if returns to the growers are increased. This is largely attributed to the low volume and poor quality yield of tree product, mainly for the reason that the tree growers do



Fig-52. Afforestation carried out under National Afforestation Programme

not have easy access to quality planting material (QPM) due to both paucity of QPM production facilities in the rural areas of the country and low awareness about gains of using QPM. Recognizing these constraints, it was decided to restructure the existing Grants-in-Aid Scheme, providing assistance to Voluntary agencies for tree planting, by incorporating the additional components of QPM production facilities and creation of mass awareness about QPM. The restructured Scheme named "Grants in aid for Greening India" broadly focuses on three aspects of the tree planting namely:-

- Raising mass awareness about QPM and tree planting
- Enhancing the capacity for QPM production
- Tree planting with people's participation

Now, all these aspects have been wholly subsumed in a new proposed scheme, 'Gram/Panchayat Van Yojana', which is also aimed at afforestation/tree planting in non-forest land on a much larger scale. To lessen multiplicity of schemes with similar objectives, sanction of new project proposals under GIS have been discontinued w.e.f. 2008-09. The

ongoing projects, however, will continue to be supported till completion

Progress/Achievement

Financial assistance of Rs 3.95 crores has been provided to 85 agencies for ongoing tree planting projects.

Budget Allocation of the Scheme and Progress of Expenditure

The revised Budget Estimate for ongoing projects under the Scheme for 2008-09 was Rs. 4.15 crores, out of which Rs.3.95 crores was released during the year in view of the timely receipt of acceptable documents.

Comparison of progress over the years

Table-16 reflects the progress of number of projects for tree planting supported under the previous 'Grants-in-Aid to Voluntary Agencies' scheme (until 2004-05) and the present 'Grants-in-Aid for Greening India' Scheme till the current financial year 2008-09.

State-wise Status

The progress of the Scheme during 2008-09 is given in Table-17. The figures pertain only to the on-going projects as sanction of new

Table-16. Progress under the previous 'Grants-in-Aid to Voluntary Agencies' and the present 'Grants-in-Aid for Greening India' Scheme

Year	No. of tree planting projects supported*	Expenditure (Rs. in Cr.)**
2002-03	141	4.00
2003-04	251	8.49
2004-05	266	8.97
2005-06	211	11.76
2006-07	109	5.85
2007-08	129	8.48
2008-09***	85	3.95

* Includes ongoing projects, sanctioned in previous years also.

** Includes grants given for various components of the Grants in Aid for Greening India Scheme.

*** Includes only on-going projects as no new project was sanctioned.

Table-1 Progress of the 'Grants-in-Aid for Greening India' Scheme during 2008-09
(Rs. in lakhs)

SI No	State/UT	Tree Plantation Projects*		High-tech Nurseries		Awareness		Total Amount Released**
		Total Number of NGOs Assisted	Amount Released	Total Nos.	Amount Released	Total Nos.	Amount Released	
1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	4	23.47	0	0	0	0	23.47
2	Chhattisgarh	0	0	0	0	0	0	0
3	Gujarat	4	12.11	0	0	0	0	12.11
4	Haryana	0	0	0	0	0	0	0
5	Himachal Pradesh	0	0	0	0	0	0	0
6	Jammu & Kashmir	0	0	0	0	0	0	0
7	Karnataka	0	0	0	0	0	0	0
8	Madhya Pradesh	10	44.06	0	0	0	0	44.06
9	Maharashtra	0	0	0	0	0	0	0
10	Odisha	12	60.82	0	0	0	0	60.82
11	Punjab	1	3.14	0	0	0	0	3.14
12	Rajasthan	4	22.66	0	0	0	0	22.66
13	Tamil Nadu	1	6.71	0	0	0	0	6.71
14	Uttar Pradesh	12	60.97	0	0	0	0	60.97
15	Gujarat	12	55.65	0	0	0	0	55.65
17	Jharkhand	0	0	0	0	0	0	0
18	Bihar	1	3.12	0	0	0	0	3.12
19	Kerala	0	0	0	0	0	0	0
20	West Bengal	0	1	0.3	00	00	00	7.30
Total (Rest of India)		62	300.00	0	0	0	0	300.01
21	Arunachal Pradesh	6	28.57	0	0	0	0	28.57
22	Assam	4	14.93	0	0	0	0	14.93
23	Manipur	8	31.18	0	0	0	0	31.17
24	Nagaland	2	8.65	0	0	0	0	8.65
25	Sikkim	0	0	0	0	0	0	0
26	Tripura	0	0	0	0	0	0	0
27	Mizoram	2	8.65	0	0	0	0	8.65
28	Meghalaya	1	3.02	0	0	0	0	3.01
Total (NE States)		23	95.00	0	0	0	0	94.98
G. Total		85	395.00	0	0	0	0	394.99

* Includes ongoing projects, sanctioned in previous years also.

** Includes grants given for Awareness Generation, Nursery and Tree Planting components of the Grants in Aid for Greening India scheme.

projects was discontinued.

Implementing organization

The scheme is being implemented by government Departments, Urban Local Bodies, Panchayati Raj Institutions, Public Sector Undertakings, Autonomous Bodies, Registered Societies, Non-Profit Organizations, Cooperatives, Charitable Trusts, Voluntary Agencies, Registered Schools, Colleges, Universities and State Forest Departments. Voluntary Agencies are implementing majority of Tree Planting projects.

Eco-Development Forces (EDF) Scheme

Brief introduction and objective

Eco-Development Forces was established in 1980s as a scheme being implemented through Ministry of Defence (MOD) for ecological restoration of terrains, rendered difficult either due to severe degradation or remote location or difficult law and order situation. The scheme of Eco Development Force is based on twin objectives of ecological regeneration in difficult areas, and promotion of meaningful employment to ex-servicemen.

Under this scheme, the establishment and operational expenditure on the Eco Task Force (ETF) Battalions raised by Ministry of Defence is reimbursed by Ministry of Environment and Forests while the inputs like sapling, fencing, etc. as also the professional and managerial guidance is provided by the State Forest Departments. In ETF battalions, the MOD deploys its ex-servicemen, preferably from within the area of operation, whereas the nuclear core of the force is constituted of regular servicemen. Some of the ETF Battalions have undertaken successful eco-restoration of highly degraded sites, for example the limestone mining areas in the

Mussoorie Hills.

Activities undertaken so far

Six ETF battalions are being supported under the EDF Scheme in the States of Uttarakhand, Rajasthan, Jammu & Kashmir and Assam.

Progress/Achievements

All ETF Battalions have undertaken works like raising nursery and plantation and protection measures to protect the plantation area. They have also constructed stone dams as also other soil and moisture conservation works. Besides, the battalions also take up maintenance of old plantations.

The progress of ETF Battalions during the year 2008-09 is given in Table-18.

Closer monitoring of physical progress and coordination between the Ministry, Territorial Army and State Governments has witnessed for timely availability of land and other resources for planting, redeployment/disembodiment of surplus ETF personnel in order to cut down costs, and further improvement in the quality of work.

Budget Allocation of the scheme and progress of expenditure

Budget Estimate for the scheme during 2008 - 09 is Rs. 10.50 crore and the entire amount as per allocation has been released upto March 31, 2009.

Implementing Organizations along with details

Directorate of Territorial Army, Ministry of Defence, New Delhi.

New Initiatives

Four ETF Battalions are already operational. From the financial year 2007-08 two more Battalions are functional in the State of Assam.

Regional Centres of NAEB



Introduction and objectives

The Board has seven Regional Centres located in various universities/ national level institutions (Annexure-II B).

These Centres help NAEB in promoting extension of replicable technologies and for dissemination of research findings. They provide technical and extension support to the State Forest Departments in effective implementation of regeneration of degraded forests and adjoining lands with people's participation and also act as a forum for the exchange of ideas and experiences amongst the States of the region as well as across the regions. In addition, these Centres carry out problem-specific studies as well as evaluation of NAEB's programmes in the field and organize training programmes and workshops focusing on priorities set out by NAEB.

New initiatives of Regional Centres

The work programmes of the Regional Centres are being formulated to address the emerging needs of promoting sustainability of Joint

Forest Management beyond the NAP scheme funding. The new areas include training for forest-based micro-enterprises, development of Joint Forest Management Committees, Self Help Groups, district-level inter-departmental linkage workshops for synergy of JFM with other schemes of Government and studies on improved silvicultural practices for management of non-timber forest products. Seven pilot projects on capacity building for forest based micro-enterprise have been initiated by the Regional Centres across the country. It is hoped that based on the experience of these pilots, the forest-based microenterprise could be scaled-up as a means of promoting sustainable livelihoods of the forest-fringe communities. The financial assistance provided to Regional Centres during financial year 2007-08 and the 2008-09 is given in Table-19.

United Nations Convention to Combat Desertification (UNCCD)

Introduction and objectives

The United Nations Convention to Combat

Table-18. The progress of ETF Battalions during the year 2008-09

Battalion	Location	New Plantation during the year		Maintenance of old Plantation	
		No. of Plants	Area in a.	No. of Plants	Area in ha.
127 Inf Bn(TA) Eco	Dehradun (Uttarakhand)	4.30 lakh	400	0.30 lakh	1200
128 Inf Bn(TA) Eco	Shri Mohangarh (Rajasthan)	1.50 lakh	300	8.30 lakh	1360
129 Inf Bn(TA) Eco	Samba (J&K)	0.87 lakh	73	0.31 lakh	73
130 Inf Bn(TA) Eco	Pthoragarh (Uttarakhand)	5.01 lakh	500	0.50 lakh	500
134 Inf Bn(TA) Eco	Gamani (Assam)	2.77 lakh	300	2.77 lakh	300
135 Inf Bn(TA) Eco	Chirang Res. Forest (Assam)	0.31 lakh	31	0.31 lakh	31

Table-19. Financial assistance provided to Regional Centre during 2007-08 & 2008-09

S.No.	Name & Address of Regional Centre	State as per MOU	Financial Assistance (Rs. In lakh)	
			2007-08	2008-09 (upto 31.03.09)
1.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. B-1/9, Community Centre, Janakpuri, New Delhi-58	Haryana, Rajasthan, Uttar Pradesh, Uttarakhand and UT of Delhi	75.75	98.00
2.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. Dhanraj Mahal, 1st Floor, CSM Marg, Mumbai-400001	Maharashtra, Gujarat, Goa and UTs of Daman & Diu, Dadar & Nagar Haveli	53.00	111.50
3.	Regional Centre for NAEB North Eastern Hill University, Shillong – 793 014	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura	50.63	54.21
4.	Regional Centre for NAEB University of Agricultural Sciences, GKVK Campus, Bengaluru-560065	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and UTs of Pondicherry and Lakshadweep	60.45	67.75
5.	Regional Centre for NAEB Indian Institute of Forest Management, Nehru Nagar, Post Box no. 357, Bhopal-462003	Chhattisgarh, Madhya Pradesh and Orissa	36.00	78.29
6.	Regional Centre for NAEB Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan-173230	Himachal Pradesh, Jammu & Kashmir, Punjab and UT of Chandigarh	63.12	52.00
7.	Regional Centre for NAEB Jadavpur University, Kolkata-700032	Bihar, Jharkhand, Sikkim, West Bengal and UT of Andaman & Nicobar Island	74.19	113.63

Desertification with 193 Parties, is one of the three Rio Conventions focusing on desertification/land degradation and drought which have become global environmental challenges. The convention aims at arresting and reversing land degradation and can, on implementation,

significantly contribute to achieving the Millennium Development Goals (MDGs) as well as sustainable development.

India became a signatory to the convention on October 14, 1994 and ratified it on December 17, 1996. As per the



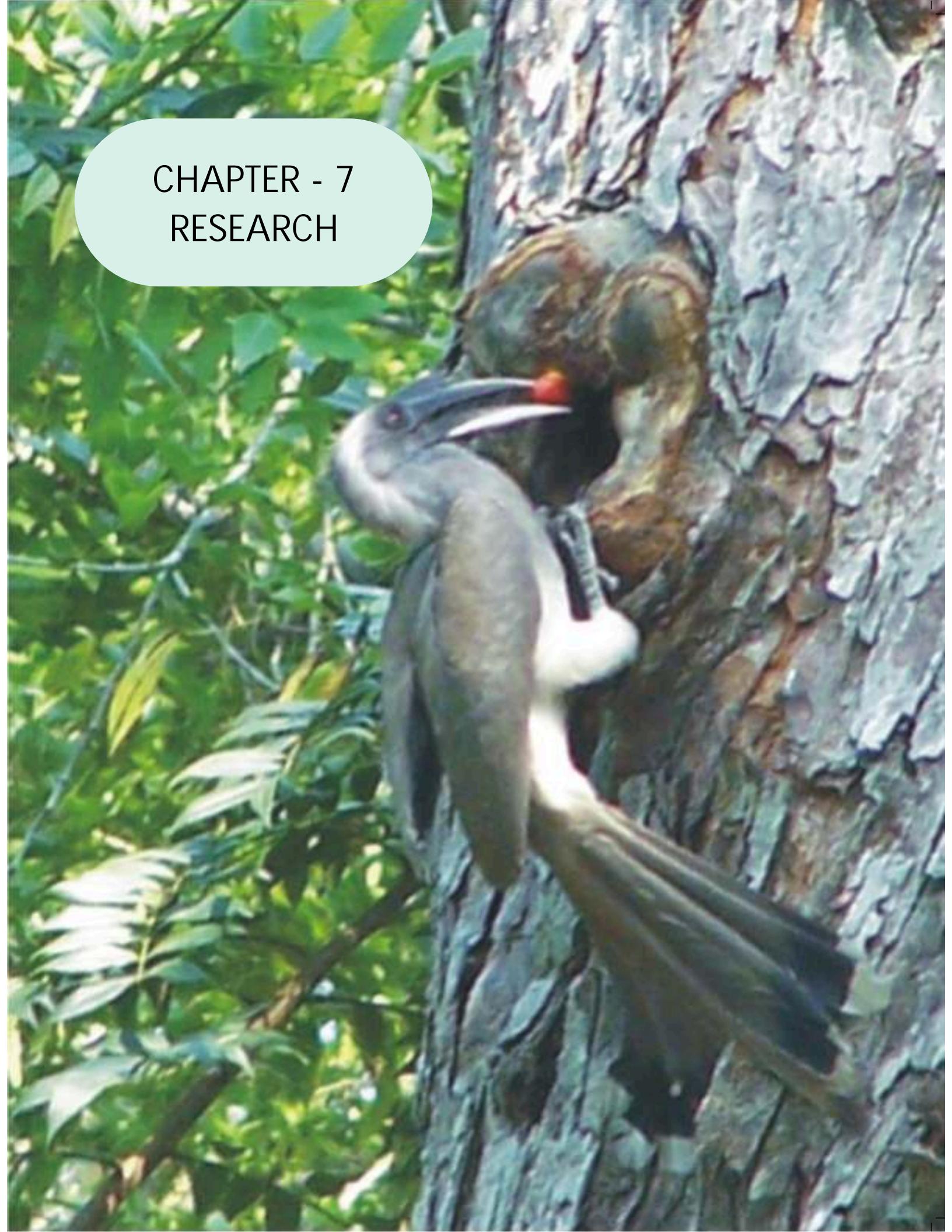
Desertification and Land Degradation Atlas of India published by the Space Application Centre in 2007, about 32.7 % of the land is undergoing various forms of degradation. India has thus high stakes and stands strongly committed to implementing it. The Ministry of Environment and Forests is the nodal Ministry in the Government of India for the UNCCD, and Desertification cell of the National Afforestation and Eco-development Board (NAEB) is the nodal point within the Ministry to co-ordinate all issues pertaining to the convention.

Progress of activities undertaken

- The UNCCD secretariat organised a High-level Policy Dialogue on the theme, "Coping with Today's Global Challenges in the Context of the UNCCD Strategy." in Bonn, Germany, on May 27, 2008, under the chairmanship of Minister of Economic Cooperation and Development of Germany. The dialogue was marked by fruitful exchanges among policy makers and decision makers representing about sixty countries on how to operationalise the UNCCD's Ten Year Strategy adopted in the 8th session of the COP in Madrid in 2007. Secretary (E&F), who represented the country in the dialogue, underscored the need to revisit the National Action programmes and align them with the Ten Year Strategy.
- The Ministry attended the International Conference on Desertification organized by the State Forestry Administration of the People's Republic of China (SFA) and the United Nations Department of Economic and Social Affairs (UN-DESA) from January 22-24, 2008, in Beijing, China. The Conference brought together senior government decision-makers, representatives of local authorities,
- As in earlier years, the world over, June 17 was celebrated as World Day to Combat Desertification. For the year 2008, the theme of the day was "Combating Land Degradation for Sustainable Agriculture". The Ministry organised the first of the series of six Inter Departmental Consultation Meets to operationalise the 10 Year Strategic Plan of the UNCCD, on this day at Chandigarh. It was attended by senior Govt officials and others representing the stakeholder ministries of the Government of India and the state Governments as well as CSOs.
- The Ministry supported by the Centre for Environmental Education Ahmedabad, organised a consultative workshop with a view to firm up the country position on relevant national and regional indicators for the operational objectives of the UNCCD's Ten Year Strategy, on July 7-8 at Ahmedabad.
- India participated in the seventh session of the Committee for Review of Implementation of the Convention (CRIC 7) and the first special session of the Committee on Science and Technology (CST S-1) held from November 3-14 at Istanbul, Turkey. The participants were apprised about the on-going re-orientation of the convention bodies and institutions as well as their proposed work plans and work programmes. India voiced the need to strengthen the scientific basis of the convention among a number of other issues.

officials from the United Nations system, researchers and experts, as well as practitioners, to share lessons learned and best practices in combating desertification.

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CHAPTER - 7
RESEARCH

Environmental Research

Introduction

Ministry of Environment & Forests has been funding research in multi-disciplinary aspects for environmental and ecosystems protection, conservation and management at various universities, institutions of higher learning, national research institutes and non-governmental organizations in identified thrust areas under its Research & Development (R&D) Programme. The Research & Development Scheme of the Ministry is a Central Plan Scheme for conservation and management of environment since 1985.

Objectives

The objectives of the scheme are to generate information required to develop strategies, technologies and methodologies for better environmental management. It also aims at attempting solutions to the practical problems of resource management, conservation of natural resources and eco-regeneration of degraded areas. Further, the scheme also seeks to strengthen infrastructure to facilitate research and scientific manpower development. In order to achieve these objectives, research grants are provided in the identified thrust areas to various organizations (universities, colleges recognized by University Grant Commission (UGC), institutions of Council of Scientific and Industrial Research (CSIR), Indian Council of Agriculture Research (ICAR), Indian Council of Medical Research (ICMR), Indian Council of Social Science Research (ICSSR) and recognized non-governmental scientific organizations) all over the country.

The Ministry has brought out revised guidelines in 2006 for supporting research in Environment which *inter-alia* include thrust

areas of research and their prioritization.

The Ministry supports research through its established research programmes. These include Environment Research Programme (ERP), Ecosystem Research Scheme (ERS), Eastern and Western Ghats Research Programme (E&WGRP) and Economic & Social Issues. Thematic Expert Groups for these research programmes have been constituted to screen evaluation and recommend new projects and also to monitor/ review the ongoing projects (Annexure-III and IV). The Ministry also promotes research in Environment through the awards of National Fellowships to the outstanding Scientists. These awards are Pitambar Pant National Environment Fellowship Award in Environmental Science and Dr. B.P. Pal National Environment Fellowship Award for Biodiversity.

Programme wise Progress and Activities

Environment Research Programme (ERP)

Environment Research Programme (ERP) deals with problems related to pollution and development of suitable cost effective technologies for abatement of pollution. Emphasis is laid on development of eco-friendly biological and other interventions for prevention, abatement of pollution and development of strategies, technologies and instruments etc. for control of pollution. Projects are also encouraged for development of biodegradable plastics, to carryout epidemiological studies, strategies to reduce impact of mining, chemical pollution of soils, and hazardous substances including pesticides, heavy metals etc. Projects related to waste recycling and resource recovery from waste along with the development of eco-friendly and cleaner technologies are given priority. The projects are supported in the

identified thrust area of environment research. Under the Thematic Group 'Prevention, Abatement and Control of Pollution', three Programmes / Schemes are covered namely i) Environment Research ii) National River Conservation and iii) Climate Change / Clean Technologies. During the year (up to March 31, 2009) ten meetings of the Thematic Group were held to consider the new / revised/ comments received on new proposals and review / monitor the ongoing / completed projects. Based on the recommendations of the Expert Group thirty two new projects have been sanctioned during the period. Progress of fifty seven ongoing projects was reviewed and monitored, thirty seven revised and one hundred six comments received for proposals were considered during the year. The Expert Group also reviewed the Final Technical Report (FTR) of forty completed projects during the period (up to March 31, 2009).

Ecosystem Research Scheme (ERS)

Ecosystem Research Scheme is an interdisciplinary programme of research which emphasizes ecological approach for studying the relationship between man and environment. The objective of the programme is to develop a basis within the field of natural and social sciences for rational use and conservation of resources for general improvement of the relationship between man and his environment. It seeks to provide a scientific basis to solve the practical problems of resource management. The programme also seeks to provide a scientific knowledge and trained personnel needed to manage the natural resources in a rational and sustainable manner. These studies become more important as the Earth's environmental ecosystems are increasingly being affected at

all levels. Ecological understanding and research in this area offer tangible hope for addressing extremely complex and potentially devastating assaults on local, regional and global ecosystems. Under the scheme, emphasis is laid on multi-disciplinary aspects of environmental conservation with emphasis on eco-system approach consistent with the identified thrust areas and orientation.

During the year under Ecosystem Research Scheme six new projects were initiated, five studies were completed and twenty projects were reviewed and monitored for their progress.

Eastern and Western Ghats Research Programme (E&WGRP)

The Eastern and Western Ghats Research Programme addresses itself to location-specific problems of resource management in the Eastern and Western Ghats regions of the country. The region is suffering from destruction of habitats of its unique plant and animal life due to floods, deforestation etc. besides shortage of food, fodder and fuel for rural population and shortage of raw material for the industries. Under this programme, studies relating to bio-diversity, land use, impact of developmental activities etc. are taken up to restore the environmental quality of the region.

During the year, under E&WGRP, two new projects were initiated, eleven studies were completed and eighteen projects were reviewed and monitored for their progress.

New Thematic Group- Economic & Social Issues

During the year 2007-08, Ministry constituted a new Thematic Group- 'Economic & Social Issues' where no specific programme will be covered under this thematic group. The group





Fig-53. The Western Ghats escarpment in the Deccan traps of Arthur's Seat, Mahabaleswar

will consider all proposals related to cost benefit analysis, socio-economic issues and other miscellaneous issues.

During the year one meeting of the Thematic Group was held to consider the new / revised proposals and review / monitor the ongoing / completed (FTR) projects. Based on the recommendations of the Expert Group one new project has been sanctioned during the period. Progress of three ongoing projects was reviewed and monitored during the year. The Expert Group also reviewed the three FTR of completed project during the period.

The total allocation for R&D Scheme during 2008-09 is Rs. 6.0 crores. The entire amount has been utilized for ongoing and new projects based on the recommendations of the Thematic Expert Groups.

[**Summaries / Research findings of some of the Projects completed during the year**](#)

Research project on "Is India tunneling through an Environmental Kuznet's Curve (EKC)" by The Energy Resources Institute (TERI), New Delhi.

The project empirically investigated the economy-environment relationship in India through estimation of EKCs for various pollutants. The results supported the EKC hypothesis that environmental degradation initially increases with economic growth and eventually declines beyond a certain income level for air pollutants – SO₂, NOx and SPM, while for the water pollutants and forests the results are mixed and no specific conclusion can be drawn. The turning points calculated for the specific pollutants also appear to be lower than those found by other studies that used cross country data. The policy variables were found to be significant for most EKC relationships in the present study implying positive impacts of policy and other

institutional changes.

Research project on "Feasibility of embodying incentive based environmental regulatory instruments in state and central taxation regimes (including VAT)" by Madras School of Economics, Chennai.

The purpose of the study was to explore the feasibility of using tax instruments, particularly at the state level. There may also be other central taxes such as customs duties which could be used as incentives/disincentives.

The study has been carried out through identification of major environmental/ecological problems of the States, review of State and local tax instruments, selecting those levies which could be used to tackle environmental problems. The following components have been studied and analyzed under the study (a) role of environmental taxes (b) carbon emissions in India (c) major environmental/ecological problems of states (d) state taxes.

The recommendations of the study include (a) eco-taxation of coal and related issues (b) environmental tax reforms in respect of petroleum products (c) environmental reforms and taxation/subsidization of fertilizers (d) eco-tax on chemical pesticides (e) plastics and eco-taxes (f) taxation of alcohol (g) eco-taxes as an integral part of the proposed goods and service tax (GST).

The study has given an insight on the taxation system and suggested improvements to cover environmental related subjects.

Research project on "Heavy metal pollution abatement using cellulose containing materials" by Dr. S.R. Shukla, Department of Chemical Technology, Mumbai.

The objective of the project was removal/recovery of certain heavy metal ions from their aqueous solutions and effluents by suitable naturally occurring cheap materials as adsorbents under different conditions and scaling up of the process for its economic feasibility.

Cheap and easily available adsorbing materials were selected. Batch type adsorption and column type adsorption studies were carried out with changing parameters to attain optimum results. The conclusions arrived at based on the studies carried out under the project are as follows:-

Coir, jute, saw dust, and groundnut shells are the easily available cheap cellulose containing materials. These materials showed fairly good metal ion adsorption for Cu(II), Ni(II), Pb(II), Fe(II) and Zn(II). The dyed materials, used as adsorbents, showed enhanced adsorption, some times reaching to 100%. The enhancement in the metal ion adsorption in the case of dyed material was due to i) the chelate formation with the azo chromophore of the dye and ii) the sulphonic acid groups of the dye, acting as an acid type ion exchanger. The adsorption was found to decrease with increase in temperature. The



Fig-54. *Rhabdophorus pseudomalabaricus*, a critically endangered parachuting frog



Fig-55. A male Indian Grey Hornbill delivering food to the female in the nest hole

lowering of pH had an adverse effect on adsorption. The presence of other heavy metal in the solution had an antagonistic effect on the adsorption of the adsorbate metal ion. Langmuir type of adsorption was observed in all the cases. It was possible to reuse and regenerate the materials used in the present study equally efficiently at least up to three cycles. The flow rate for the fixed bed column of coir was optimised at 40 ml/min. The column was eluted with dilute acid to almost fullest amount to recover the Pb (II) in the form of its soluble salt. It was observed that with an intermediate regeneration step with dilute NaOH solution, the adsorption capacity of the column was retained.

Effects of Forest use on Biodiversity Conservation Values as seen in Bird

Communities of Sariska Tiger Reserve, Rajasthan by Dr. Ghazala Shahabuddin, Council for Social Development, New Delhi.

The study was undertaken to investigate the effects of extractive activities such as fodder and firewood collection, on native bird communities and to study the relative influences of altered vegetation composition and structure on them in Sariska Tiger Reserve, Rajasthan. The highlights of the findings are as under:

- There was no significant difference in number of recorded species, bird abundance or bird diversity index between disturbed and undisturbed sites. However, bird species composition differed significantly between disturbed

and undisturbed sites.

- Canopy cover, tree basal area and height of trees were significantly lower in disturbed sites in comparison to undisturbed sites.
- Partial Mantel's tests confirmed that there were no significant residual effects of tree species composition on bird composition after the effects of vegetation structure were accounted for.
- Study indicates that rural biomass extraction can have significant effects upon bird species composition of tropical scrub forest which is caused principally by alteration of vegetation structure, rather than by changes in forest tree composition.

Evaluation of the foraging requirements of a threatened endemic passerine, the white bellied shortwing, in natural and disturbed habitats for conservation planning in the Western Ghats by Dr. Anindya Sinha, National Institute of Advanced Studies, IISc Campus, Bengaluru, Karnataka.

The study was undertaken to understand the foraging requirements of the threatened, endemic passerine, the white-bellied shortwing birds in disturbed and natural habitats in the Western Ghats. The species is now known to exist only in high elevation montane evergreen forests of Sholas. Population dynamics has been investigated and key habitats mapped with remote sensing. High disturbance areas have least survival rates and high rates of emigration. It appears that the birds are moving to higher elevations which may be an effect of climate change. Bar-coding indicates that what were considered two different sub-species are actually two different species.

Invited proposals

Bioremediation of Contaminated Sites and Reclamation of Degraded Areas

The Ministry has been supporting research in multi-disciplinary aspects of Environment in the identified thrust areas. During the year the Ministry has undertaken to identify priority research areas through the Expert Groups in the identified thematic areas. One of the identified priority areas during the year is Bioremediation of Contaminated Sites and Reclamation of Degraded Areas. The Ministry has constituted an Advisory Committee in the area to guide, review and monitor research projects in this area.

A project relating to preparation of the State of the Art Report on Bioremediation of Contaminated Sites in India has been given to Prof. MNV Prasad, Central University, Hyderabad.

The Ministry also invited proposals in the area from different institutions. The proposal on "Reclamation of copper rich malajkhand tailing dam through Bioremediation employing biconsortia of arbuscular



Fig-56. (*Indotestudo travancorica*) - Travancore Tortoise an endangered species found in Western Ghats



"mycorrhiza fungi and bacteria" by Chairman, Madhya Pradesh Pollution Control Board and "Microbe assisted Phytoremediation of red mud disposal sites submitted by Prof. Asha Juwarkar, Department of Biotechnology, NEERI, Nagpur were recommended by the Expert Group after examination. The first project has been approved with participation from the industry viz Hindustan Copper Ltd. The cost of the implementation of the project has been shared by the industry and the Ministry.

Another project relating to "Phytostabilization of hazardous waste (Aluminum smelter spent pot line) and re-vegetation of fly ash dump sites at National Aluminum Company (NALCO) Angul, Orissa" by Dr. M.N.V. Prasad, University of Hyderabad, Hyderabad-500046(AP) has been recommended by the Expert Group for implementation. The implementation details and sharing of cost etc. is being discussed with the industry.

A project relating to "Composting of refuse organic Municipal Solid Waste Employing Microbial Biotechnology" by Dr. P S Bundela, RO, Madhya Pradesh Pollution Control Board (MPPCB), Jabalpur has also been recommended by the Expert Group for implantation by the MPPCB.

National Natural Resource Management System (NNRMS)

The Scheme of National Natural Resource Management System (NNRMS) involves utilization of remote sensing technology for accurate inventory of resources such as land, water, forests, minerals, oceans, etc. and to utilize this information for monitoring changes in ecological system. A Standing Committee on Bio-resources and Environment (SC-B) has been constituted by the Planning Commission under the Chairmanship of Secy. (E&F) with

the following objectives:

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

The Standing Committee on Bio-resources and Environment (SC-B) constituted by the Planning Commission advises on the methods of using the remote sensing technology for optimal use and management of natural resources in the country. In order to streamline the projects the SC-B has constituted a Technical & Financial Sub-Committee to scrutinize/review all the proposals submitted for funding under NNRMS SC-B from the technical and financial angle. Only those proposals recommended by the Technical and Financial Sub-Committee are taken up by NNRMS SC-B for financial assistance. The Committee also oversees and monitors the progress of sanctioned projects.

During the year 2008-09 five Meetings of Technical and Financial Sub – Committee of National Natural Resource Management System on Bio-resources and Environment (NNRMS SC-B) were held to review the ongoing projects and evaluate the new projects from financial and technical angles. The Technical and Financial Sub – Committee also reviewed the recently completed projects and accepted the Final Technical Reports of eleven recently completed project (III and IV). The Standing Committee of NNRMS SC-B in its meeting held on 13th March, 2009 recommended 4 new projects for funding.

During the year 2008-09 the progress of projects entitled Forest Type Mapping of India's Forests on 1:50,000 scale (entire country), Mapping of Wildlife Sanctuaries and National Parks on 1:12,500 scale, Coastal Studies (including mangroves and coral reefs) on 1:25,000, and for selected areas on 1:5000 scale, Snow and Glaciers Studies of entire Himalayas (1:250,000/ 1:50,000 scales) and National Wetland Inventory and Assessment was monitored by the Steering Committee of the respective projects as well as the Standing committee of NNRMS SC-B in its meeting held on March 13, 2009.

G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora

Brief objectives

The three broad objectives are as follows:

- To undertake in-depth research and development studies on environmental problems of the Indian Himalayan Region;
- To identify and strengthen the local knowledge of the environment and contribute towards strengthening researches of regional relevance; and
- To evolve and demonstrate suitable technology packages and delivery systems for sustainable development of the region in harmony with local perceptions.

Progress/Achievements

Research and Development

- Glaciers are important sources of freshwater in the Indian Himalayan Region (IHR), as well as the lowlands connected with the river system, and also offer immense hydropower potential. The

glaciers vary in size, amount of snow pack and discharge characteristics. Studies in Gori Ganga, Ramganga and Pindar river basin in Kumaun Himalaya revealed that the glacier area varied from $<1 \text{ km}^2$ to $>200 \text{ km}^2$, with Gori ganga basin having the largest glaciated area. Similar studies have also been conducted in glaciers spread across various sub-basins of Tista, Sikkim Himalaya, and glacial boundary maps have been prepared from available satellite data for the year 1997.

In the recent decades fast retreat of glaciers as a result of climate change has been a major concern. This Institute has been studying Gangotri glacier system (Gangotri, Raktvarna and Thelu glaciers) for the last one decade now. Precise monitoring of Glacier snout using Kinematic GPS survey carried out for Gangotri glacier (Fig. 1) revealed a relatively lower retreat rate (11.80 m/yr) between 2005 to 2007, which is marginally lower than the rate computed during 2004-05. During 2008 average flow index (in terms of water depth) of Gangotri, Raktvarna and Thelu glaciers was estimated to be 0.35 m; 0.41 m and 0.83 m, respectively (Fig. 2). On seasonal scale, the suspended sediment load from the source of the three glaciers was recorded to be 733.60 t/km², 715.37 t/km² and 215.08 t/km² respectively.

Himalayan rivers offer immense potential for hydropower generation. Being a unique and fragile ecosystem this region requires special consideration in developing hydroelectric projects (HEPs). Often it is observed that the HEPs are closely sited and their cumulative impacts are not predicted at the planning stage. This can be achieved through Strategic





Fig-57. Brahma Kamal (*Saussurea lappa*) – an endangered species

Environmental Assessment (SEA). An exercise was therefore conducted in the influence zones of ten HEPs (operational and upcoming) in Alaknanda river valley of Garhwal Himalaya (Fig. 3). Primary surveys were conducted in sixty villages of the Alaknanda valley to determine the dependence of the inhabitants on forests for fuel wood, fodder, and NTFPs including medicinal plants. Also extensive surveys were held in other parts of the region for household energy use pattern and consumption. Perception survey on the impacts of HEPs revealed that majority of local residents (60%) was concerned about quality and availability of water. Almost 36% of the residents felt that there will be loss of aquatic flora and fauna. In case of Kashang project (H.P.), 60%

respondents considered air pollution as one of the negative impacts and minor increase in employment opportunities was acknowledged as a possible positive impact.

- Indian Himalayan Mountains are also the storehouse of rich biodiversity and valuable medicinal wealth. There is still a need for inventorying this treasury of plants. Biodiversity studies initiated in three protected areas, i.e., Nanda Devi Biosphere Reserve (Uttarakhand), Cold Desert Biosphere Reserve (CDBR) and Nargo Wildlife sanctuary in Himachal Pradesh revealed that in the CDBR, between 3,083-4,609 m altitude, three hundred sixteen species of vascular plants belonging to one hundred sixty three

genera and sixty five families were present. In Nargo Wildlife sanctuary rapid surveys between 1000-3500 m revealed a total of three hundred six species of vascular plants, i.e., Angiosperms (ninety families, one hundred ninety eight genera and two hundred seventy seven species), Gymnosperms (three families, six genera and seven species) and Pteridophytes (twelve families, seventeen genera and twenty two species). Total basal area (TBA) values for the different forest communities identified in Nargo Wildlife sanctuary is given in Fig.-4. In Himachal Pradesh, three river valleys were extensively explored for medicinal plants and their utilization by the local people, and the threat categories were identified (Fig.-5). Survey of medicinal plants utilized traditionally by the local people and *vaidyas* for medicare in nine villages (>600 households in Badrinath valley, Uttarakhand) revealed that traditional *vaidya* system is on decline.

- *Ex-situ* conservation is one of the approaches followed for biodiversity conservation. *In vitro* propagation experiments using tissue culture techniques and seedling explants of *Habenaria edgeworthii* showed maximum shooting percentage in control (95.8%). The maximum shoot number per explant (five shoots) was found in medium supplemented with benzyladenine (BA) and gibberelic acid (GA₃) (Fig. 6). Tissue culture studies were also carried out for other economically important species like *Zanthoxylum armatum*, *Rhododendron* spp. and *Olea ferruginea*. Among the other clonal methods of multiplication, air layering was found to be quite suitable for inducing roots in *Quercus glauca* shoots.

A protocol was developed for regeneration of plants of *R. maddenii* from alginate-encapsulated shoot tips. Efforts are continuing to standardize *in vitro* propagation of another Sikkim rhododendron, *R. dalhousiae*.

- Microbes are important components of soils. A detailed study based on genotypic and phenotypic characterization of thirteen thermophilic strains associated with hot springs of Uttarakhand revealed that they could tolerate temperatures up to 85 °C. Based on the oxygen requirement, the strains were defined as facultative anaerobes. The bacterial strains varied in respect of their biochemical tests conducted for various enzymes, fermentation of sugars, tolerance to antibiotics and salt. Based on the 16S rRNA analysis, eleven strains showed maximum similarity with *Geobacillus stereothermophilus*, one strain with *G. kaustophilus* and one with *Geobacillus* sp.
- Disposal of household and municipal waste left untreated in the open is a growing problem of the Himalayan townships. Such situation is also common in the pilgrimage route of Kedarnath in Garhwal Himalaya. The waste quantification and its safe disposal was worked out with the local stakeholders through a series of meetings/workshops and concept of eco-tourism was introduced in Kedarnath Valley. As a follow up, an association named KEDAR (Kedarghati ecotourism development action and research) was formed by the stakeholders. Work on similar lines was carried out in six selected townships of Himachal Pradesh where the household waste was recorded 172 – 236 g/capita/day (Fig. 7). Readily



biodegradable waste constitutes about 60% of the total, and the biodegradable and non-biodegradable components account for about 20% each. Further segregation of this waste revealed that 70-80% was compostable, 5-10% was directly reusable, another 8-10% could be used for decorative items, 5-10% was recyclable and only a minor fraction (1-2%) need safe disposal. Based on this study possible waste management options were devised and disseminated among various stakeholders mainly the local Municipal Bodies.

- Agriculture is the mainstay of mountain inhabitants. Mountain farmlands represent a unique niche and present both opportunities and constraints for practicing farming. Developing shared vision and identifying issues through appreciative participatory planning is an essential exercise before planning any intervention in the mountain farming systems. Besides, there are many indigenous practices of resource conservation and sustainable utilization that need to be understood. Thus in-depth field work was carried out to understand the structure and functioning of mountain farming systems, community forests, soil physico-chemical properties and nematode diversity in Central Himalaya, and soil and water conservation practices and villages institution, land tenure and customary laws were documented in jhum cultivation areas of NE region.

Application of R & D Outputs in Demonstration and Dissemination

- In the IHR region increasing wastelands is one of the major problems, and one of the major issues is how to revegetate them

with suitable plant material following new methodologies/approaches. One such approach of wasteland rehabilitation identified and tested successfully by the Institute is establishment of "Sacred Forest", seeking the participation of local people and other stakeholders based on socio-cultural and religious sentiments. This approach was replicated in Kolidhaik village of Champawat district (Uttarakhand), where about fourteen ha community wasteland has been taken up and planted with fuelwood, fodder (4,500 healthy saplings of Alder, Cedar, Mulberry, Oak, etc.) and fruit trees with active participation of the locals. Among the soil and water conservation measures contour trenches have been dug, plantations of *Napier* grass along the contours and construction of rain water harvesting tanks (approximate capacity 10,000 liter) has been done on this site. The survival of Oak (*Quercus leucotrichophora*) was recorded as high as (90%) after one year. Restoration of wasteland seeking people's participation was also effected in Katarmal village (near Institute HQs, Almora).

- Natural hazards such as landslides are quite frequent in the IHR. Sikkim State is one of the worst affected States due to landslide problems every rainy season. Landslide inventory of East Sikkim (IRS LISS III, SOI toposheet and field survey) was prepared and the sixty landslides thus recorded were classified according to rock types and types of movement. Bojeck landslide was taken up for implementation of various low cost engineering and vegetative measures. Through the Disaster Management Faculty at Sikkim Unit of the Institute, supported by the Ministry of

Home, Gol, Institute continue to prepare training module and impart trainings on landslides and other natural hazards to a variety of stakeholders such as Sikkim Armed Police, Govt. officials, Sashastra Seema Bal (S.S.B.) etc. (Fig. 8).

In order to enhance livelihood opportunities among the rural people and also to achieve natural resource conservation, community based approach has been adopted in Champawat and Tehri districts (Uttarakhand). As an entry point activity in Champawat district, about twenty ha land has been brought under the plantation of multipurpose tree species and medicinal plants viz., *Valeriana wallichii*, *Hedychium spicatum*, *Asparagus racemosus*, and *Cinamomum tamala*. In the Garurganga watershed, Bageshwar district (Kumaun Himalaya) eighteen demonstrations of different livelihood options were maintained with one hundred thirty five farmers of twenty six villages. Attempts are underway to find out market linkages for sale of the produce. Similarly, stakeholder's participation for natural resources management has been achieved in other parts of IHR.

- The Institute has established a Rural Technology Complex (RTC) at its HQs at Kosi-Katarmal, Almora where environment-friendly and income generating rural technologies have been demonstrated, tested and modified continually following the feedback of the stakeholders. The RTC continues to work as a centre for training and capacity building of a range of stakeholders. Similar models have been replicated by Garhwal Unit of the Institute in Triyuginarayan (Rudraprayag district) and through NE

Unit at Midpu, Arunachal Pradesh. In the reporting year a total of thirty seven training/awareness programmes were organized for different stakeholders of the region; out of them twenty four training programmes were organized in the RTC established at Institute HQs (Fig. 9) through which 1089 people (506 men and 583 women were trained). Training programmes were focused on low cost rural technologies, organic farming, bio-energy, protected cultivation, nursery raising and plantation, etc. to diverse stakeholders, including farmers, NGOs and Government officials, etc.

Other Major Activities / Achievements

Discovery

- A new species of cat fish *Erethistoides senkhiensis* was captured from Senkhi stream ($27^{\circ}04'29''N$ $93^{\circ}30'52''E$), Itanagar, Papumpare district, Arunachal Pradesh (Fig. 10). This genus had 6 species and all the taxonomic and morphometric descriptions were cross checked and it was found that it does not have overhanging snout. This property brought it close to its congener *Erethistoides infuscatus*, but it differed from *E. infuscatus* in having three black to light brown cross bars, fewer vertebrae (29-30), concave caudal fin, less serrate on posterior edge of pectoral spine short, more convex anteriorly and distantly placed, thus making it a unique from other members of the genus. All the type specimens (18 Nos) were deposited at Zoological Survey of India, Kolkata and their type specimen numbers were procured. This discovery has been published (Ichthyological Exp. Fresh Water 19:185-191, 2008).



- A new plant species, *Arnebia nandadeviensis* (Family: Boraginaceae) was reported from Pindari region (Bageshwar district, Uttarakhand) (Fig. 11). This medicinal species grows between 3800-4000 m altitude. This discovery has also been published (*J. American Science* 5 (2):105-106, 2009).

Assignments

- A Base Paper entitled, "Conservation of Himalayan Ecosystem and Adaptation/Regulatory Measures" was prepared for the Special Envoy to Prime Minister, GoI, and was coordinated by MoEF. This document also contains suggestions for the protection of the Himalayan ecosystem and its conservation in some priority areas such as Municipal waste management, Pilgrimage in sensitive areas, Ecotourism and regulation of commercial tourism, Ecologically safer roads – green roads, Water security through rejuvenation of springs, Energy options, Conservation area management through community involvement etc.
- Under the National Action Plan on Climate Change (NAPCC), the Core Committee constituted by DST, New Delhi for one of the 8 Missions (Sustaining Himalayan Ecosystems), has identified GBPIHED as a nodal agency for Task Force 3- Forest Resources, Microflora and Biodiversity.
- Under an assignment from Planning Commission entitled, "Task force to look into problems of the hill states and hill areas", first draft of the base document is under finalization.

Forestry Research

Research and Training (RT)

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

Indian Council of Forestry Research and Education (ICFRE), an apex body in the national forestry research system, has been undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating research, education and extension covering all aspects of forestry. The Council deals with the solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources. Topical research by the Council enhances public confidence in the ability of forest managers and researchers to successfully handle challenges related to natural resource management.

Objectives

- To undertake, aid, promote and coordinate forestry education, research and their applications.
- To develop and maintain a national library and information centre for forestry and allied sciences.
- To act as a clearing-house for research and general information related to forests and wildlife.
- To develop forestry extension programmes and propagate the same through mass media, audio-visual aids and extension machinery.
- To provide consultancy services in the field of forestry research, education and allied sciences.
- To undertake other jobs considered

necessary to attain these objectives.

Institutes and Centres under the Council

ICFRE has eight Regional Research Institutes and four Research Centres located in different bio-geographical regions of the country to cater to the forestry research needs of the nation. The regional research Institutes are located at Dehradun, Coimbatore, Bengaluru, Jabalpur, Jorhat, Jodhpur, Shimla and Ranchi and the centres are at Allahabad, Chhindwara, Hyderabad and Aizawl.

Research Institutes under the Council

- Forest Research Institute (FRI), Dehradun
- Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore
- Institute of Wood Science and Technology (IWST), Bengaluru
- Tropical Forest Research Institute (TFRI), Jabalpur
- Rain Forest Research Institute (RFRI), Jorhat
- Arid Forest Research Institute (AFRI), Jodhpur
- Himalayan Forest Research Institute (HFRI), Shimla
- Institute of Forest Productivity (IFP), Ranchi

Advanced Research Centres under the Council

- Centre for Social Forestry and Eco-Rehabilitation (CSFER), Allahabad
- Centre for Forestry Research and Human Resource Development (CFRHRD), Chhindwara
- Forest Research Centre (FRC), Hyderabad
- Advanced Research Centre for Bamboo and Rattans (ARCBR), Aizawl

Activities undertaken by the Council

- ICFRE participated in the 28th SBSTA/SBI Meetings of the United Nations Framework Convention on Climate Change (UNFCCC) from 2 -13 June 2008 at Bonn, Germany
- ICFRE participated in Bangkok Climate Change Talks (first meeting of the Adhoc Working Group on Long Term Cooperative Action) as part of Indian Delegation from 31st March – 4th April 2008.
- ICFRE participated in the United Nations Climate Change Conference (COP/MOP) in Poznan, Poland from December 1 to 12, 2008.
- ICFRE has taken up two externally aided project related to Climate Change on "Assessment of soil carbon stocks and dynamics in forest soil of India for the period 1995-2007" and "Measurement of forest carbon exchange using eddy covariance and CDM potential studies in India".
- ICFRE participated in UNFCCC workshop on "Methodological Issues relating to Reducing Emissions from Forest Degradation in Developing Countries" in Bonn Germany from 20–21 October 2008.
- One week refresher training course sponsored by the Ministry of Environment and Forests, Government of India, New Delhi for IFS officers on "Climate Change and Relevance to Forestry Sector" was organized at ICFRE Dehradun from November 3 to 7, 2008. Twenty Five IFS officers of different state participated in the training course.

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- ICFRE initiated the process of Quinquennial Review (QR), on pilot basis, in four ICFRE Institutes, viz. Forest Research Institute Dehradun, Arid Forest Research Institute, Jodhpur, Rain Forest Research Institute, Jorhat and Institute of Forest Genetics and Tree Breeding, Coimbatore. In addition, Quinquennial Review was also done in one of the centers of Institute of Wood Science and Technology, Bengaluru namely Forest Research Centre, Hyderabad. Quinquennial Review Teams (QRTs) of all the four institutes and the center were formed which consisted of Chairman, Member Secretary, Member Research Administration and Management, in addition to expert members.
 - ICFRE conducted a One Day Expert Consultation Meeting on finalization of "Guidelines for testing and releasing of tree varieties and clones" at ICFRE headquarters in Dehradun on September 19, 2008. The meeting was chaired by the Director General ICFRE and attended by the Chairperson, Protection of Plant Varieties and Farmers Right Authority, Govt. of India, New Delhi and eminent geneticists and plant breeders, statisticians of various R&D Organizations, universities, and representatives of industry and progressive farmers. The matter of testing and releasing of tree varieties and clones was discussed threadbare from different viewpoints on all aspects and participants offered useful suggestions to make the said guidelines as perfect as possible.
 - The National Bamboo Mission (NBM), Ministry of Agriculture, Government of India recognized Indian Council of Forestry Research and Education (ICFRE), Dehra Dun as a Bamboo Technical Support Group (BTSG) to provide guidance in policy, organizational and technical matters for conduct of Seminars/Workshops and Expert services in Bamboo Plantation; Bamboo Handicraft and Bamboo marketing. Eight five-day Training Programmes for the Farmers and Field Functionaries Chhattisgarh, Eastern Uttar Pradesh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Rajasthan and Uttarakhand were conducted during 2008-09.
 - On the basis of Institute level priorities / State priorities/ National level priorities, research projects are taken up at the Institute level. In the Research Policy Committee (RPC) conducted during February 2008, one hundred new projects were discussed threadbare and after necessary modification, 82 new projects were approved.
 - During the year, the review of four hundred fifteen (two hundred seventy five-ICFRE funded and one hundred forty externally aided) ongoing research projects of all the ICFRE institutes has been completed.
 - To ensure proper implementation for timely achieving the objectives of ongoing research projects, the progress of the research projects is being monitored on quarterly basis. A new process for evaluation of a few projects of each Institute through an independent subject matter specialist agency/ individual expert for having independent evaluation has been introduced.
 - ICFRE is implementing ITTO funded project 'Establishment of a network to facilitate collection, processing and dissemination of statistics pertaining to the forestry sector

of India'. Under the project, the outcome of eight regional workshops on forestry statistics, conducted at each ICFRE institute with the active involvement of the state forest departments mandated to the states is in the process of being integrated into a manual being prepared for data collection and processing.

Research

- Forest Research Institute (FRI), Dehradun optimized process for the isolation of ursolic acid from *Eucalyptus* hybrid leaves. Acetone extract of leaves obtained after isolation of ursolic acid exhibited antifungal activity.
- FRI, Dehradun inoculated nodal segments of *Dendrocalamus hamiltonii* on MS Medium supplemented with different concentration of cytokinin Kn – Bud break achieved.
- FRI, Dehradun developed biotechnological approaches for improvement of plant species with special reference to pulp and paper under CSIR funded New Millennium Initiative for Technology Leadership (NMITLI) project. Out of one thousand one hundred forty candidate trees of Subabul from all over India fifty two elites short listed based on higher fiber length and low lignin content. FT- NIR protocols were also developed for lignin and holo-cellulose estimation.
- FRI, Dehradun isolated natural dye on pilot scale from *Pinus roxburghii* needles.
- FRI, Dehradun isolated structures of two pure alkaloids from tubers of medicinally important plant *Dicentra paucinervia* and these were elucidated as protopine and allocypopine. Another pure compound was also isolated from ethylacetate fraction of methanol extract obtained from leaves of *Pavetta indica*.
- FRI, Dehradun isolated one pure compound from petroleum ether extract obtained from leaves of *Scindapsus officinalis*.
- FRI, Dehradun has conducted fungi adaptiveness test with tannery effluents.
- FRI, Dehradun has confirmed pathogenicity *Sclerotium rolfsii* and *Fusarium* sp. in *Stevia rebaudiana* plants.
- FRI, Dehradun has developed a new technique of vegetative propagation in improvement over conventional layering method with high success rate.
- FRI, Dehradun conducted periodical inspection of *D. strictus*, *Bambusa tulda* and *B. arundinacea* treated with 10% of five different fire retardant and preservative compositions installed with and without fly-ash at timber test yard Dehradun. After 18 months, samples installed without flyash were performing better than samples installed with flyash.
- FRI, Dehradun carried out improvement of *Lantana* and *Pine* hydrolyzates by neutralization with calcium hydroxide ($\text{Ca}(\text{OH})_2$) and treated by activated charcoal for fermentation.
- Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore produced forty families of inter provenance and inter-specific hybrids of *Casuarina equisetifolia* and *C. junghuhniana* through control pollination.
- IFGTB, Coimbatore has observed determination of appropriate lowest safe moisture content for *Jatropha curcas* seeds in order to recover maximum oil with good

physico-chemical properties showed that seeds need to be dried to 6% moisture content to obtain maximum oil percentage with desirable oil properties.

- Institute of Wood Science and Technology (IWST), Bengaluru has studied "Assessment of Impact of Forest Fire on the regeneration of Forest in Andhra Pradesh" Analysis of three indicators like Important Value Index (IVI) and Shannon Biodiversity Index and Evenness Index together expressed that though fire had no significant effect on changing the species richness i.e., total number of species in the given plant community, it has significantly alerted the abundance of the species. It is pertinent observation that on fire effected areas pioneer species of *Cyperus*, *Panicum*, *Phyllanthus* were dominating. To openness most Graminaceae species dominates the ground floor. In protected forests where the fencing or the protection from grazing was provided significant regeneration of the tree species especially *Tectona grandis*, *Lagerstroemia*, *Azadiracta*, *Anogeissus* spp., *Someida* and *Terminalis* species were observed. *Dendrocalamus* regeneration was promising in protected forests.
- Forest Research Centre (FRC), Hyderabad a centre under IWST, Bengaluru has conducted studies on "Estimation of Carbon Pool in Western Ghats – Development of Biomass Expansion Factors" sponsored by National Remote Sensing Agency, Hyderabad. The complete set of data on one hectare plot is collected and compiled and analysed for both the above ground biomass of three hundred nineteen trees and below ground biomass of live trees at 0.25 S.I. and eight hundred sixty five trees of thirty quadrates laid at random in a systematic random sampling method. The below ground biomass studies comprise a total of three hundred trees by destructive method and one hundred fifteen live trees by non-destructive method representing as far as possible all diameter classes apart from seventy six live trees of lower diameter classes.
- Arid Forest Research Institute (AFRI), Jodhpur recorded data on survival, growth and total biomass (above and below ground) of *Colophospermum mopane*. Analysis showed that there is no effect of planting technique on survival and growth. However, in case of above ground biomass, CDM was significantly superior to control. Application of Gypsum with 9g N recorded higher biomass compared to all other treatments. Root biomass by excavation showed that root penetrated the kankar pan upto the depth of more than one meter.
- Arid Forest Research Institute (AFRI), Jodhpur found *Techomela undulata*, *Ephedra foliata* and *Barleria prionitis* under endangered categories, whereas plants like *Sida tyagi*, *Pulicaria rajputani* etc. were endemic in Barmer area.
- AFRI, Jodhpur carried out collection of *Calotropis procera* flowers for determination of secondary metabolites and its biomass. Work on standardization of method for determination of sennosides was carried out. Saponin content in *Tribulus terrestris* was also determined in fruiting stage.
- AFRI, Jodhpur studied pit excavation for soil profile in *Euphorbia* scrubs types of forest indicated deep soil deposition in north-east aspect, whereas very thin layer

of compact soil deposition observed in south-west aspect. Studies indicated highest number of vegetation diversity in north-east aspect.

- AFRI, Jodhpur observed that the plants of *Acacia ampliceps* suffered slight heat damage (tip burning, leaf yellowing and leaf fall) in the summer months still recorded maximum mean growth, 103.7 cm (height) and 122.0 cm (crown diameter) as it regained its growth during monsoon thus there is negligible change in growth (height and crown diameter) between eight to twelve 8-12 months in all the treatments except T₃ (wheat husk). In case of *Acacia bivenosa*, and *Salvadora persica* there was 32.9% & 75.6% and 36.1% & 89.6% growth increment in mean height and crown diameter, respectively. So far T₅ (FYM + Urea) was the best treatment attaining maximum height 75.3 cm and crown diameter (122.1 cm) for *S. persica*. The institute also assessed the weed biomass and found that green weed-mass was dominated by halophytes and other salt tolerant species. *Chloris virgata* was the most dominant species followed by *Sueada fruticosa*.
- Rain Forest Research Institute (RFRI), Jorhat conducted field trips to Haflong, Mainbang areas of North Cachar Hills district of Assam and Mokokchung district of Nagaland to collect data on socio-economic status of the Dimasa and Ao jhumia tribes respectively. Harvest data of rice, maize and mixed crops under different treatment were analyzed and field tours were conducted for maintenance of trials under the study 'restoration of jhum land through intercropping Rhizobium inoculated

legume trees with agricultural crops'.

- Tropical Forest Research Institute (TFRI), Jabalpur noticed a localized sudden outbreak of defoliators spread in Dhamokhar range of Umria Forest Division and neighbouring few compartments of Bandhavgarh National Park during March to July 2008. Most of these compartments remained leafless for three to four months. The attack was severe in all compartments up to May and gradually slowed down from partially attacked in most of the compartments to its severity restricted up to three compartments in June. The major defoliators identified were *Ascotis selenaria*, *Ophiusa janata*, *Ophiusa tirhaca* and *Paectes subapicalis* and minor defoliators included *Althia nivea*, *Arhopala (Amblypodea) amantes*, *A. hewitsoni* and *Cryptothlelea (Clania) crameri*.
- TFRI, Jabalpur documented the traditional knowledge on use of herbal medicines prepared from herbal plants from tribal healers of tribal pockets of Jabalpur district.
- TFRI, Jabalpur conducted vegetation study at ecotone zone and three PPAs sites at Jagdalpur District of Chhattisgarh.
- Himalayan Forest Research Institute (HFRI), Shimla recorded an endangered plant *Arnebia euchroma* belonging to the family Boraginaceae, in open, drier slopes of Namgia and Hango valley at the elevation of 3700 m to 4200 m above msl in cold desert in Himachal Pradesh. The plant have rounded cluster of pale pink – purple flowers which turn blackish – purple with slender corolla tube usually longer than the subtending bracts and



calyx. The plant is already reported Critically Endangered in Himachal Pradesh as per Conservation Assessment and Management Prioritization (CAMP) workshop held at HFRI, Shimla during 2003.

Extension

- FRI, Dehradun organized patent sensitization workshop in collaboration with Patent Facilitating Centre (PFC), Technology Information, Forecasting and Assessment Council (TIFAC), Department of Science and Technology (DST), New Delhi on July 14, 2008.
- The Institute of Forest Productivity (IFP), Ranchi has been identified as a coordinating institute by the Ministry of Environment & Forests, Govt for the States of Arunanchal Pradesh, Jharkhand and Orissa for implementation of UNDP driven project on "Biodiversity Conservation through Community based Natural Resource Management". A workshop on GOI-UNDP CCF-II project titled "Biodiversity conservation through Natural Resource Management in the State of Jharkhand" was organized on 2nd August 2008 by the Institute.
- AFRI, Jodhpur celebrated Maru Prasar Rok Divas (Combating Desertification Day) on 17th June 2008. Plantation of one hundred eighty plants of Silvicultural and horticultural species of Guggul, Khejari, Nimbu, Gunda was undertaken in the Forest Ecology field of the institute under National Medicinal Plants Board (NMPB) funded project on Silva-Ayurveda. Dr. Om Kumari Gehlot, Mayor of Jodhpur city was the Chief Guest and Mr. Abdul Gani Faujdar, Deputy Mayor of Jodhpur city was the Guest of the Honour on the

occasion. A Pamphlet on Desertification, its effects and ways to arrest it, was released on this occasion.

Consultancies

- ICFRE completed Environmental Impact Assessment & Environmental Management Plan for diversion of forestland for Bauxite mining and prepared detailed Catchment Area Treatment Plan (CATP) including Microplanning and placement of suitable SMC works to prevent soil erosion for exploitation of Bauxite in Jerrila Group in Visakhapatnam for Andhra Pradesh Mineral Development Corporation Ltd.
- ICFRE also completed Environmental Management Plan (EMP) for Renuka Dam Project in Sirmour district of Himachal Pradesh-Pabbar Valley Power Corporation Limited, Himachal Pradesh State Electricity Board.
- IFP, Ranchi transported plants Chanderpura Thermal Power Station (CTPS), Chanderpura for creation of green belt as per MOU signed between IFP and DVC. The institute under NATCOM II project, conducted a tour for "Assessment of soil carbon stocks and dynamics in forest soils of India for the period 1995-2007 – NATCOM II Project".

Technology transferred

FRI, Dehradun transferred the technology titled "A process for preparation of black hair dye" to M/s Mythili's Agro and Nature Care Pvt. Ltd, No-1, Prakasam Road, T. Nagar, Chennai-600 017 on 18th July 2008.

Comparison of progress

Most of the activities are of long term duration ranging from three to five years and progress

during the year is steady. In case of extension activities change is apparent in comparison to the last year. Establishment of Van Vigyan Kendras in different states is under various stages of progress. Activities including publication of literature, training and demonstrations etc. have been started in Van Vigyan Kendras at Kadugodi in Bengaluru, Sunder Nagar in Himachal Pradesh and over a dozen locations in different states. The Demo Villages have been identified in all of the ICFRE Institutes and they are in different stage of establishment. Trainings, demonstrations and other activities are being conducted at these demo villages to assist in speedily transferring technology and research to the villagers.

[**Indian Plywood Industries Research and Training Institute, Bengaluru**](#)

The main objectives of the Indian Plywood Industries Research and Training Institute (IPIRTI) are:-

- Conservation of Natural Forests through efficient utilization of existing wood resources and development and adoption of technologies for manufacturing wood alternates and panel products from plantation timber and bamboo including renewable fibres to meet the vital needs of our developing society.
- Research on all aspects of production of sawn timber, manufacturing plywood and other allied engineered and reconstituted wood and lignocellulosic products, including improvement of materials, manufacturing processes, machines and appliances, conditions of work standard of factories.
- Training in connection with forest product utilization for plywood industry and trade

and allied industries. Imparting, technical education and/or training at undergraduate, postgraduate, and/or any other level in technology of agro and forests products, adhesives and laminates, and/or synthetic finishing, manufacturing machinery.

- Testing and evaluation of all forest products viz. plywood, wood, timber, hardboard, particleboard, chipboard, furniture, glue-lam, compreg, doors, panel doors, block board, flush doors, veneered panels, veneers, laminated panels, composite boards, and the products of allied trade and industry. Formulation of national standard, their up gradation for all above mentioned products.
- Extension includes transfer of technology for commercialization, information dissemination through research / technical reports, quarterly newsletter, participation in exhibition, seminars, conferences, workshop, and Scientists visit to the industry to assist in process and product development.

[**Progress / Achievements**](#)

Following Research Projects were completed and Reports are being prepared/finalized for publication:

Development of Compreg from Bamboo mat and veneer from plantation timber or in combination

The importance of this project was to develop high strength specialty product from bamboo mat/plantation timber

Compregs were made using three different constituents viz., only bamboo mats, veneers from plantation timbers (silver oak & eucalyptus) and combination of bamboo mats



Fig-58. Sal defoliation in Madhya Pradesh.

with veneers of plantation timbers. The panels were tested for General purpose compregs as per the relevant specification given for the wood veneer compregs. The strength properties meet the requirement of the relevant specification in all the three constructions.

The compregs developed can find application in railway coaches and for electrical grade compregs.

Development of high density shuttering grade panel using bamboo mat and veneers from plantation timbers

This project was aimed for the replacement of

high priced face veneers with bamboo mat with better performance.

The resin formulations and the process parameters have been optimized to develop high density shuttering grade panel. Bamboo mats and veneers from plantation timbers viz., eucalyptus / silver oak veneers were used in combination in the construction patterns. Since no standards have been brought for bamboo mat shuttering grade panels, the strength properties were compared with that of IS 4990-1993-Specification for shuttering grade plywood. The strength properties of the bamboo mats and veneers combination meets the requirement specified for shuttering grade plywood.

These studies ease the pressure on import of timber currently being used considering the demand of this product.

Development of Cellular Core Flush Door from Solid Bamboo Rings and Plantation Timber

Development of cellular flush door from Bamboo Rings and plantation timber used to develop with an objective to replace the common flush doors. Cellular flush door has been developed using bamboo rings and it reduces the wood consumption in the manufacture of the flush/core door to an extent of 70%. Use of bamboo mat in this product reduces the cost of the products further as the door stiles and rails are the finger jointed wood. Unlike the wood which cannot impart much strength to the product Bamboo mat can induce tremendous strength to the finger jointed sections used for the frame.

Development of low cost Phenol Formaldehyde adhesive

The objective of the project was to modify the method of Phenol Formaldehyde (PF) resin



Fig-59. Formaldehyde Emission Test Chamber in IPIRTI

preparation so as to make it cost effective. The approach consisted of three stages of resin preparation. In the first and second stage, a novolac resin was prepared and in the third stage the novolac resin converted into resol resin. By adopting the modified process it was estimated that the raw materials cost of PF resin can be reduced by about 25%. Plywood made with modified PF resin meets the requirements of IS: 848-1974 for BWR grade plywood.

To evaluate the steady level of formaldehyde emission a 1m^3 formaldehyde emission chamber has been fabricated as per the specification of EN 717-1 and ISO/DIS 12460-1 and installed at IPIRTI. Volatile organic compounds and formaldehyde for the sample drawn from building materials and interior scan be measured in this chamber. This chamber method determines the formaldehyde emission at steady state from wood based panels under defined conditions relating to average conditions in real life. This method can also be applied to estimate the formaldehyde concentrations under various conditions in practice by the use of mathematical models. Testing of particle board and plywood's of 1m^2 surface area as

per EN 717 and ISO/DIS 12460-1 is being carried out and the reports are issued as per the international requirements. No National Standard has so far been formulated to safeguard the interest of users of wood based panels. It is therefore, utmost necessary to standardize the manufacturing process and test method to determine the optimum level of formaldehyde emission in the finished products and formulate national standards.

[Indian Institute of Forest Management \(IIFM\), Bhopal](#)

The Institute, as a sectoral management institute, imparts education in forest management, which is a judicious combination of management, social, and forestry sciences. The Institute constantly endeavours to keep in touch with the problems of people, especially the forest dwellers and undertakes need-based research. The Institute tries to serve as a reservoir of knowledge in forest management and ensures proper integration of external and indigenous knowledge suitable to Indian context.

According to the IIFM Perspective Plan 2006-2016, as approved by BOG, the vision of the Institute is: Indian Institute of Forest Management to be among the leading international institutions in the area of forest, environment and development management and, be respected, both nationally as well as internationally, for its outstanding contributions in the fields of education, training, research, consultancy and thought leadership

The above vision is translated into following mission statement:

- To serve different stakeholders of forestry, environment, and development sectors, and the society in general, through



development and dissemination of knowledge, human resource development through its education and training activities, and providing assistance in formulation and advocacy of relevant policies and strategies.

- To be a national institution with international perspective and out reach.
- To build a culture of excellence, achievement, cooperation and service within a framework of strong ethical patterns of behaviour informed by universal values.

The specific objectives formulated to achieve this mission are:

Education and Training

- To meet the demand for the trained human resource with managerial and analytical skills in the areas of forest, environment and development management through regular educational courses.
- To update the knowledge and managerial skills of the serving professionals in the above areas through short-term Management Development Programs.

Research and Consultancy

- To generate information on field realities and derive meaningful interpretation through systematic research.
- To offer consultancy services to the needy client organizations based on the available expertise.

Dissemination

- To disseminate the research-based information/knowledge and meet the information needs of the forestry, environment and allied sectors through training, seminar and publications.

Databases and Information Systems

- To generate and maintain relevant databases that are essential for policy formulation, project planning and strategy development in forestry, environment and allied sectors
- To develop an Information Management System, which is compatible with and easily accessible to all levels of users, i.e. from local (community) to global level.

Policy Formulation, Analysis and Advocacy

- To function as a national 'think tank' on forestry and environment aimed at developing appropriate policies and strategies.
- To play an advocacy role in the sectors of concern to promote adoption of appropriate policies and implementation strategies and safeguard the genuine interests of the disadvantaged stakeholders whenever necessary without compromising national interests.

National Institute of Excellence with International Perspectives

- To be in constant pursuit of academic and professional excellence so as to effectively serve the national interests, while incorporating international perspectives in its academic functions.

The Institute completed 14 research projects and 16 projects are ongoing. Twenty two consultancy assignments were completed, while eight assignments are underway during 2008-09.

Centers of Excellence

International Centre for Community Forestry (ICCF)

The International Centre for Community

Forestry (ICCF) was formally inaugurated at the Institute's (IIFM) Campus on January 14, 2000. It is a "Centre of Excellence" of IIFM and it is aimed to cater the growing need and interest in Community Forestry (CF) initiatives in several parts of the world and to promote community forestry initiatives. ICCF emphasizes upon strengthening the country's community forestry policy, rural livelihoods support system and development of small scale enterprises to support millions of people who depend and care for forests and its management. The Centre has a 2 tier structure for governing its programme and academic activities i.e., (i) Executive Committee (EC) and (ii) Research and Programme Advisory Committee (RPAC). Presently, ICCF is working in about 100 villages in seven states of India.

The initial fund support for the centre's activities was provided by the Sir Dorabji Tata Trust (SDTT), Mumbai. Subsequently, it has also received many externally funded research projects from various international donor agencies, ministries, government departments and non government funding agencies, like Ministry of Environment and Forests, GoI; National Medicinal Plant Board, New Delhi; Policy Research Institute for Ministry of Agriculture Forestry and Fisheries, Japan, International Institute for Environment Development, United Kingdom etc.

[Centre for Sustainable Forest Management \(SFM\) and Forest Certification](#)

The project has been successfully developing operational mechanisms to implement C&I for SFM through community participation and has successfully developed local level systems to monitor the changes in the Forest Management Unit (FMU) based on Criteria and Indicators. The Indian Institute of Forest Management is executing the project on

behalf of Ministry of Environment and Forests, Govt. of India, in the 8 selected FMUs (Forest Management Units) i.e. Forest Divisions in the states of Madhya Pradesh and Chhattisgarh, with the participation of 40 Joint Forest Management Committees

Recognizing the need and importance of sustainable forest management and forest certification in the international arena and the increasing realization of the same in India, it is imperative to continue, rather more rigorously, the efforts on sustainable forest management. One of the immediate economic incentives for practicing sustainable forest management is preference by the consumers for the produces coming from sustainably managed forests. This is made possible through the market tool called "forest certification". Some of the governments in the western markets have made it compulsory to procure timber as well as non-timber forest produces only from sustainably managed forest resources as certified by third party independent accrediting agency. Thus there is an urgent need to further the work on this emerging area having impact on forestry trade, particularly the high value teak products and the exports of NTFPs.

[Regional Centre for National Afforestation and Ecodevelopment Board, \(RCNAEB\)](#)

The centre was established in 1989 at the Institute, which is one out of seven in the country. The centre looks after the States of Madhya Pradesh, Chhattisgarh and Orissa in pursuing the programmes of National Afforestation and Eco-development Board (NAEB), Ministry of Environment and Forests (MOEF), Govt. of India, New Delhi. Monitoring and evaluation of plantations raised by forest departments/ NGO's is done through this centre. It also provides a forum for



cross fertilisation of ideas about afforestation activities.

Wildlife Research

Research Projects

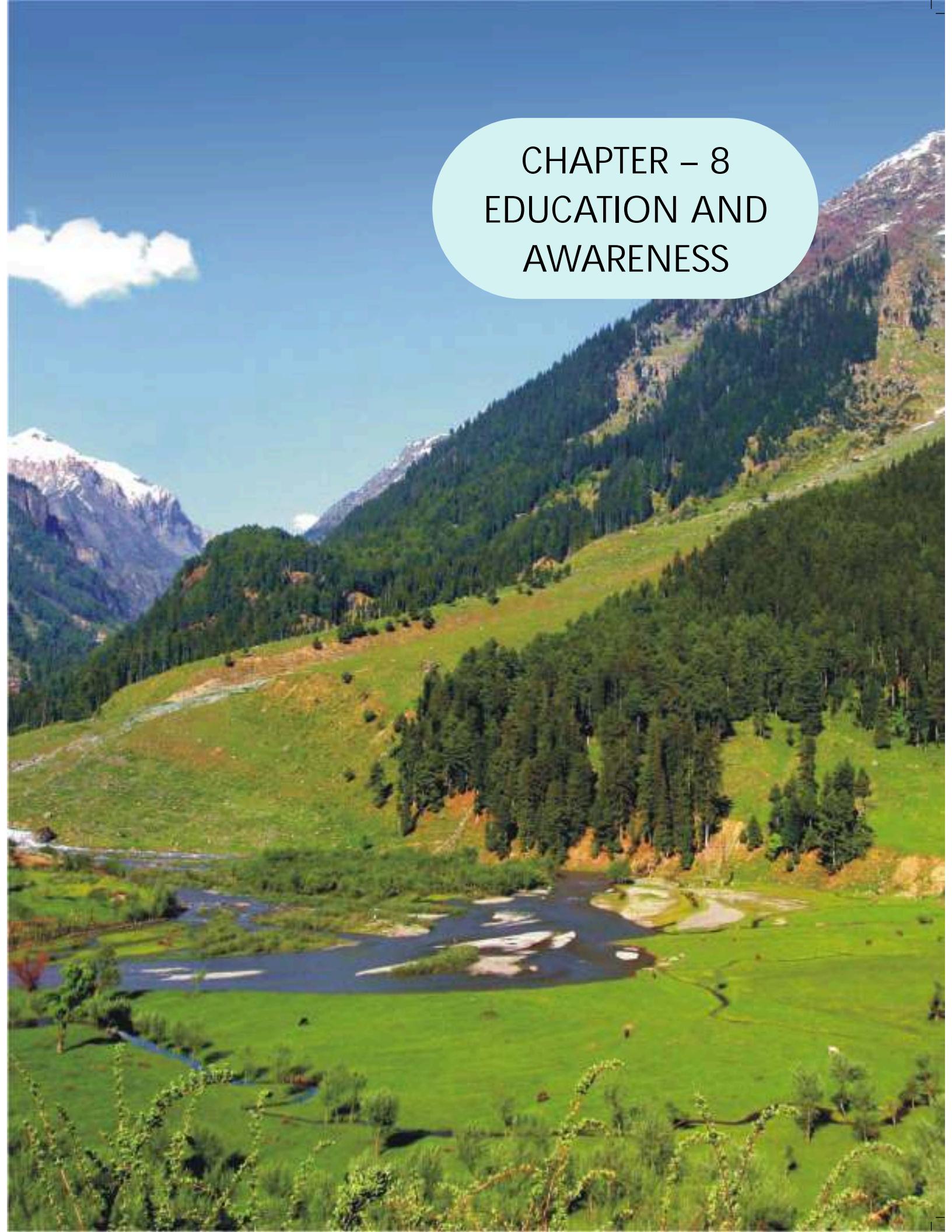
Wildlife research at the Institute covers ecological, biological, socio-economic and managerial aspects of wildlife conservation. The research projects generate valuable scientific data, help evolve study techniques relevant to the Indian ground condition, and also create a group of trained field biologists, socio-economists and wildlife managers. The scientific information generated is utilized for management of protected areas. Research also enables the institute's faculty to keep abreast of the current field situations, management needs and research trends in the field and thus constantly enhance its professional skills and update its teaching inputs. During the reporting period, forty four research projects were ongoing in the Institute.

In an effort to "Build population of tigers at Sariska Tiger Reserve", Government of India entrusted responsibility on Wildlife Institute of India and Rajasthan Forest Department for the re-introduction operation. The tiger translocation programme was a unique initiative of its kind. It was for the first time, the



Fig-60. A mating tusker

planned and scientific translocation of a big cat was undertaken in the country. A male and a female tiger, fitted with satellite radio collar and tracking system, were reintroduced in Sariska.

A wide-angle photograph of a mountainous landscape. In the foreground, a river winds its way through a valley, surrounded by lush green grass and small trees. The middle ground shows steep mountain slopes covered in dense forests of green coniferous trees. In the background, more mountains rise, some with patches of snow on their peaks. The sky is a clear, pale blue with a few wispy white clouds.

CHAPTER – 8

EDUCATION AND AWARENESS

Environmental Education, Awareness and Training

Brief Introduction and Objectives

The alarming on-going population explosion, rapid movement towards urbanisation and industrialisation, increasing needs of energy and rapid industrialization have resulted in depletion of environmental quality through degradation of Planet Earth. The environmental damage already inflicted cannot be reversed unless there is collective thinking, will and effort. These call for public awareness and participation for bringing about an attitudinal change and finally restricting further damage to the environment. Effective implementation of environmental management and conservation programmes depends on education, awareness raising and training in the relevant areas. Without an understanding of how to conserve natural resources and the compelling need to do so, few people would be motivated to participate actively in programmes on environmental conservation. Environment education and awareness thus assumes critical importance.

The 'Environmental Education, Awareness and Training' is a flagship scheme of the Ministry for enhancing the understanding of people at all levels about the relationship between human beings and the environment and to develop capabilities/skills to improve and protect the environment. This scheme was launched in 1983-84 with the following basic objectives:

- To develop educational/teaching materials and aids in the formal education sector;
- To encourage non-governmental organizations, mass media and other concerned organizations for promoting

environmental awareness among the people at all levels;

- To promote environment education through existing educational/scientific /research institutions;
- To ensure training and man-power development in environment education; and
- To mobilize people's awareness for preservation and conservation of environment.

Activities undertaken during the year

The major programmes undertaken to achieve the overall objectives of the scheme are as follows:

National Green Corps (NGC) Programme

It is a well-established and recognized fact that the children can be catalyst in promoting a mass movement about the ensemble of the environmental issues. Being future citizens, inculcation of right attitude and environmental oriented behaviour amongst them can bring about tremendous change in the society. It is in this backdrop that the Ministry of Environment and Forests has embarked upon a major initiative for creating environmental awareness among children by formation of a National Green Corps (NGC). Children are triggers for a chain reaction, making a difference at the local and community level which in due course lead to awareness at city, state, country and global level. In less than six years, that the programme has been in operation, it has been catapulted into a mass movement of children for maintaining and preserving the environment. During the year, 1,11,609 Eco-clubs were supported across the country. An amount of Rs 29.835 crores was sanctioned during the year.

The NGC programme is implemented throughout the country through State Nodal Agencies. The list of nodal agencies in States/UTs is given at Annexure-VIII. A training programme for Master Trainers & Teachers-in-charge of Eco-clubs was initiated during the last year at an estimated cost of Rs. 10.90 crores as per details given below:

a)	Number of Master Trainers (to be trained)	2476
b)	Number of teacher-in-charges of Eco-clubs	125333

Training of the Master Trainers launched in last financial year was continued during the year. So far, two thousand and sixty Master Trainers have already been trained. The training of teachers-in-charge was also started during the year and as many as 24282 teachers-in-charge of Eco-clubs were imparted training.

National Environment Awareness Campaign (NEAC)

The NEAC was launched in 1986 with the objective of creating environmental awareness at the national level. In this campaign, nominal financial assistance is provided to NGOs, schools, colleges, universities, research institutes, women and youth organizations, army units, government departments etc. from all over the country for conducting awareness raising activities. The activities could be seminars, workshops, training programmes, camps, padayatras, rallies, public meeting, exhibition,

essay/debate/painting/poster competitions, folk dances and songs, street theatre, puppet shows, preparation and distribution of environmental education resource materials etc., followed by action like plantation of trees, management of household waste etc. Diverse target groups encompassing students, youth, teachers, tribals, farmers, other rural population, professionals and the general public are covered under NEAC. The programme is implemented through designated Regional Resource Agencies (RRAs) appointed for specific States/Regions of the country.

This programme was continued during this year with the main theme as 'Climate Change'. The following sub-themes for action components were considered for financial assistance:

- (i) Plantation Programme,
- (ii) Use of wind and solar energy i.e. solar cookers and solar heaters,



Fig-61. Debate competition organised by NMNH during NEAC programme

- (iii) Restoration and maintenance of water bodies,
- (iv) Wetland conservation,
- (v) Role of community in biodiversity conservation
- (vi) Solid waste management i.e. household waste and composting/ vermi-composting,
- (vii) Municipal waste,
- (viii) Bio-medical waste and
- (ix) Plastics waste.

In this campaign, NGOs, schools, colleges, universities, research institutions, women and youth organizations, army units, government departments etc. from all over the country get associated in organizing and conducting awareness raising activities followed by action activities. Nominal financial assistance is provided for the purpose by the Government.

Thirty four Regional Resource Agencies (RRAs) (Annexure-IX) selected by the Ministry helped in conducting, supervising and monitoring the NEAC (2008-09) programme in the country. During the year, 10642 organizations associated with campaign were provided financial assistance. An amount on Rs 6.5382 crores was sanctioned during 2008-09.

Library

The Library is the documented repository of the Ministry for dissemination of information in the field of environment and its associated areas. It has a collection of over 25,000 books and Technical reports etc. Besides, the library also receives more than fifty national/international journals covering diverse areas of environment. Being the scientific Ministry, Library is one of the richest

documentary bases for scientific journals in the field of environment and its associated areas.

The library performs an important role in the planning, promotion, implementation and coordination of the Ministry's objectives by providing timely access to relevant and comprehensive information to its users-officials of the Ministry, external organizations (both governmental and non-governmental), research students and decision makers.

Apart from the technical books, journals, proceedings etc. the library also procured a wide range of journals and books both in Hindi and English during the year. Research scholars from various organizations, institutions and other professional bodies visited the library from time to time for various information required by them.

Seminars/Symposia/Workshops

This programme provides a platform to scientists/environmentalists/ university professionals/ technocrats, etc, to share their knowledge on various subjects related to environment. The Ministry provides financial assistance to the Universities/other institutions/NGOs to organize the events (seminars /symposia /workshops /conferences) and to publish the proceedings. The scheme facilitates the transfer of technical know-how to different people including local population.

Universities/Professional bodies/ Technical Institutions and other R&D organisations are very responsive to the programme as is evidenced by the increase in the number of proposals being received by the Ministry. Thrust areas as identified under the programme are under review and being expanded to include more new areas.

Proposal to enhance the monetary ceilings for events at district, state, national and international levels is under consideration to expand the outreach of the programme both geographically and demographically. During the year, fifty eight organizations were provided financial assistance for conducting seminars/symposia/workshops etc.

Mass Awareness

Media Cell of the Ministry undertakes various media campaign activities with the objective of spreading environmental awareness and facilitating better compliance with environment regulations. An Advisory Committee of Experts on Media Matters was constituted under the Chairmanship of Secretary (E&F) to guide the activities in this regard. The Committee formulated guidelines for approval of proposals relating to

publicity/ campaign on environmental issues. During the year 2008-09, as per the Media Action Plan (MAP), adopted by the Ministry, the following major activities were supported/ sponsored:

- Vatavaran Travelling Film Festival 2008 was organised in eight cities, namely, Agartala, Coimbatore, Bhopal, Hyderabad, Pune, Ranchi, Lucknow and Leh.
- The World Environment Day (WED) was celebrated on 5th June, 2008 on the theme: "CO₂: Pick Right! Towards Sustainability and Growth". The occasion was graced by the Hon'ble President of India.
- One hundred and twenty five street plays titled "Khuli Hawa Ki Talash Mein" were staged through Centre for Education and



Fig-62. The President of India, Smt. Pratibha Devisingh Patil launching the Environment Ambassador Campaign Poster, at the 'World Environment Day 2008'

Voluntary Action (CEVA) for spreading awareness on environmental degradation in Punjab, Himachal Pradesh, Harayana, Rajasthan, J & K, Uttarakhand, Chandigarh and other regions of the country.

- Fifteen episodes of "Sarokar/ Kasoti", a fifteen minutes weekly environmental television magazine covering various environmental protection, water conservation, water pollution, afforestation, wind power, herbal pesticides, bio-medical waste, bio-diesel, air pollution etc. related to Rajasthan, were telecast on Doordarshan Regional Channel.
- Production and broadcast of 13 episodes each of "Koshish Sunhare Kal Ki" and "Fantastic Four" over AIR on environmental issues.
- An Audio Visual resource Centre (AVRC) was set up at Centre for Media Studies (CMS), New Delhi for streamlining the information and formatting of 500 video films produced/ held by Ministry.
- Thirteen documentaries on environmental issues were produced and telecast through Public Service Broadcasting Trust.
- Production of Films on Man-Animal conflict and River Pollution by Surabhi Foundation, distribution of environmental films among 10,000 member schools of National Green Corps (NGC) Programme by the Centre for Media studies, production of TV Spots on Climate Change by the Centre for Science and Environment etc. were among the media activities commissioned during the year.

[Environment Appreciation Courses](#)

In order to provide interested persons an opportunity to learn in detail about specific environmental issues, the Ministry provides a course module through Indira Gandhi National Open University (IGNOU) for Environmental Appreciation Courses. Delivery of these courses is through distance education mode. The course module developed for appreciation courses is also being used by the IGNOU as compulsory component of its undergraduate courses. This is in pursuance of the directives of the Hon'ble Supreme Court of India.

[Publications](#)

The objective of this programme is to utilise expertise available with professional societies, voluntary organisations, institutions etc. for developing and publication of high quality resource material for promoting environment education and awareness by providing financial assistance. The publication material should popularise the understanding about the environment, emerging issues and out of the box solutions including innovative approaches for environmental protection. It should be relevant and of high standards and supplement the efforts of the Ministry to promote environment education and awareness. Under the programme, grant is not provided for publication of newsletters, magazines, journals, periodicals etc. or to any publisher/business house including individual. Financial support was provided for printing and distribution of three publications on biodiversity and Avi-fauna during the year.

[Global Learning and Observations to Benefit the Environment \(GLOBE\)](#)

The Global Learning and Observations to Benefit the Environment (GLOBE) Programme

- an international Science and Education programme – provides a unique opportunity to the school students to carry out various measurements so that they can learn about scientific protocols and perform environmental learning activities, which have already been introduced as theory in the textbooks. The GLOBE programme not only helps the students to appreciate the contents of the textbooks through better understanding but also assists them in gaining complete knowledge of environment.

It facilitates research through a worldwide research team comprising of students, teachers and scientists.

The process to consolidate further the activities under the GLOBE programme in all the one thousand eight hundred schools started in the financial year 2006-07 was intensified during the year. Four training programmes to train new teachers in GLOBE protocols were conducted.

Other Awareness Programmes

Even though financial assistance is provided for awareness programmes under the NEAC which are usually held within a specific time frame and are short-term projects restricted to a specific area, other proposals for creating awareness among diverse target groups are also received throughout the year from various NGOs and other agencies. These are considered on merit as and when received and

supported. Some of the major awareness activities conducted /sponsored during the year are as follows:

- Observance of Earth Day: Earth Day is an annual observance held on April 22 every year to increase public awareness on the environment. During the year, a host of activities were supported on and before Earth Day to use the occasion to involve people in making a difference towards a healthy, prosperous and sustainable future. The activities ranged from competitions (essay, painting, poster making, etc.) to rallies, runs and formation of human chain. Street plays were also organised to spread the message of environment conservation.
- Green Olympiad 2008 and Terra Quiz: The Ministry sponsored the National Written Environmental Quiz programme organised by The Energy and Resource Institute (TERI). The winners from each region participated in the televised Quiz



Fig-63. Distribution of prizes by Hon'ble Minister of State (Environment) on the Earth Day, 2008

titled "TERRAQUIZ".

- Vacation Programme on Natural Resources: A four week residential programme on Natural Resources involving children from Uttar Pradesh was sponsored.
- Perfect Health Mela-2008- An Inter Eco-club schools competition involving students from schools in Delhi and NCR was sponsored as part of Perfect Health Mela-2008.

Formal Environment Education in Schools

The Ministry of Environment & Forests has been interacting with the Ministry of Human Resources Development (MHRD), National Council of Education Research and Training (NCERT), and State Departments of Education etc. to ensure that environmental issues are adequately covered at the school level. The Ministry had also been interacting with the University Grant Commission (UGC) to ensure coverage of these issues at the college level education. On the basis of experience gained during the greening of textbooks at upper primary level classes in fifteen States, the Ministry has offered help to the State Governments in the implementation of Hon'ble Supreme Court's directives regarding compulsory teaching of Environment Education (EE) in schools. Ministry offered financial support and technical assistance to States in order to facilitate the process of making EE compulsory in schools. With the guidance of the Ministry, the proposal covering action plan for activities such as development of the EE curriculum, orientation of textbook writers, development of textbooks, development of teaching – learning materials, teachers training etc. are being prepared by the State Governments.

Progress /Achievements

- One lakh eleven thousand six hundred nine Eco-clubs supported during 2008-09.
- Training of the Master Trainers launched in the last financial year was continued during the year. Training of teachers in charge of eco-clubs started during the year.
- Ministry produced and broadcast through Directorate of Advertising and Visual Publicity, thirteen episodes of two sponsored weekly radio programmes of half an hour and fifteen minute duration over CBS stations and FM stations respectively of All India Radio
- Record level of financial assistance released under NEAC.
- Number of participating organizations in NEAC reached an all time high of 10642.

Comparison of progress during the year

Progress made in supporting National Green Corps under the Scheme since 2003-04 is shown in Fig.-64.

The number of participating organizations in NEAC rose from 5285 in 2001-02 to 10642 in 2008-09. (Fig.-65)

National Museum of Natural History

The National Museum of Natural History (NMNH), New Delhi, a subordinate organization of the Ministry, was opened to public in 1978 with the main objective of creating public awareness in preservation and conservation of environment and nature through the means of museum exhibitions, educational programmes, outreach activities, etc. Since its inception, the NMNH has been temporarily housed in the FICCI Museum premises at Bharakhamba Road in New Delhi. The Ministry has been taking active steps in getting the land allotted by the Ministry of Urban Development to the NMNH

for building its Headquarters in New Delhi.

Over the years, the Museum has extended its activities in different regions of the country and has set up three Regional Museums of Natural History (RMNH), one each at Mysore (Karnataka); Bhopal (Madhya Pradesh) and Bhubaneswar (Orissa). These museums have been established to depict flora, fauna, forests, wildlife and other environmental aspects of the respective regions.

Rajiv Gandhi Regional Museum of Natural History (RGRMNH) is being established at Sawai Madhopur (Rajasthan). Action has already commenced for construction of the RGRMNH building. A temporary office has been set up to conduct educational and other outreach activities in the region. Further, this Ministry has approved the setting up of the fifth Regional Museum of Natural History near Gangtok (Sikkim) to extend the Museum's activities to the North-Eastern region which is a hotspot of biodiversity. Necessary budgetary provision has been included in this regard in the 11th Five Year Plan. The Government of Sikkim has agreed to allot six acres of land, adjacent to the Sikkim Science Centre at Marchak, East Sikkim, which is twelve kms. from Gangtok and approachable from National Highway No. 31, for the RMNH building. Once the land is allotted by

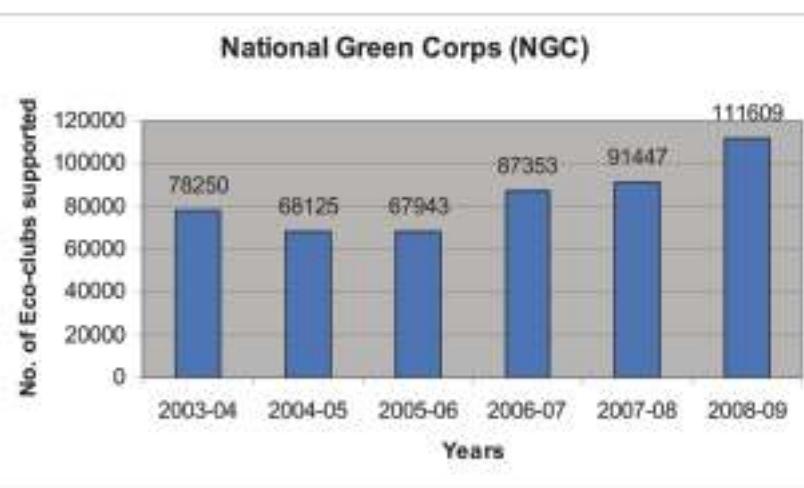


Fig-64. Progress made in support NGC

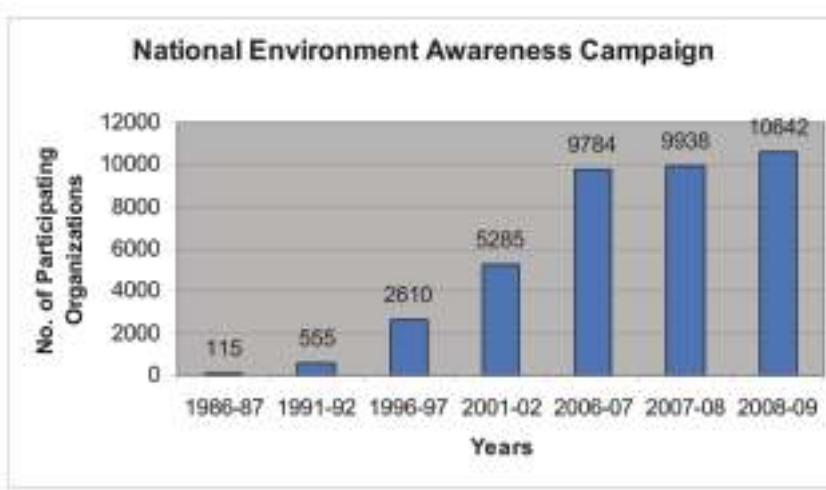


Fig-65. Participating organization in NEAC

the State Government, further necessary action would be taken by the Ministry to get necessary approvals for establishment of the RMNH near Gangtok.

Progress of activities undertaken

Educational activities: NMNH along with its Regional Museums of Natural History organised a number of in-house and outreach programmes for the benefit of school children, college students, teachers, challenged children and general public. Various national and international days of scientific relevance like the World Wetland Day, World Day for

Water, World Forestry Day, International Ozone Day, Conservation Day, Earth Day, World Environment Day, World Day to Combat Desertification, World Population Day, Braille Day, World Heritage Day, International Bio-diversity Day, World No Tobacco Day, Wildlife Week, World Habitat Day and National Environmental Awareness Campaign were observed and different programmes for school children including physically challenged children were also organised. The Museum organised different educational activities and competitions like Quiz, Declamation, On-the-spot Painting, Poster making, Essay writing, Model making, Bird Watching and Tree spotting for the participating students on these occasions.

A special programme for underprivileged children was organized by

NMNH on 28th January, 2009 at Katha-Khazana – an NGO at Govindpuri, New Delhi. The children were exposed to activities like nature painting, collage painting, mask making and were also taken for bird watching at National Zoological Park, New Delhi.

Charles Darwin's Bicentenary Anniversary Celebrations: To create awareness on Charles Darwin's theory of evolution and natural selection, and as part of his Bicentenary celebration, the NMNH organized a bulletin board preparation competition on his birth anniversary on February 12, 2009 in which students prepared a bulletin board on the theory from newspaper clippings, magazines, books etc. The bulletin boards were kept on display for public to create awareness.

Publications: NMNH and its Regional Centres published a number of publications in



Fig-66. Painting competition on International Ozone Day, 2008 organised by NMNH

English, Hindi, Kannada and Oriya on the topics related to animals, plants, bio-diversity such as Desk Calendar of NMNH & RMNH, Posters and Summer Programme Magazine.

New Gallery: A gallery on "Madagascar and Wild Africa" was opened in the RMNH, Bhubaneswar on April 7, 2008. The gallery was inaugurated by Secretary, Ministry of Environment & Forests. The exhibits of Madagascar contains precious collections of different rocks, fossils ammonites, quartz, agate, calcite and world's largest egg of extinct elephant bird donated by Shri Abasar Beuria, former Ambassador of India and Wild Africa, was depicted with a mounted Sebra and Cheetah in a picturesque background of African savanna.

A new gallery at RMNH, Mysore was inaugurated titled "Such Treasure & Rich Merchandise" – Early Plant Heritage of India on January 13, 2009 by Shri Namo Narain Meena, Hon'ble Minister of State for Environment & Forests.

Exhibitions

RMNH, Mysore

- The Museum participated in a National Exhibition on Biodiversity organized in Calicut by the Malabar Botanical Garden, Government of Kerala during February 9 to 15, 2008.
- An Exhibition on "Salim Ali: Birds' Ally" was organized and inaugurated by Dr. D.N. Mathew, Emeritus Professor at the University of Calicut, who is also the first PhD student of Dr Salim Ali, in March 2007. Dr. S.A. Hussain, a close associate of Dr Salim Ali, was the Guest of Honour. Mr. Neginal, formerly with the Forest Dept. and associated with Dr Salim Ali during his bird survey, presided over the

function. The exhibition showed the role of Dr Salim Ali, the doyen of Conservation Movement in India, in conserving nature. The Exhibition included about fifty five original birds collected by Dr Salim Ali during his "Mysore Bird Survey".

- The Museum organised a national level exhibition on "Hortus Malabaricus" in Kochi during March 14 to 16, 2008.
- A temporary exhibition on "Wildlife of India" was inaugurated on January 13, 2009 at RMNH, Mysore.
- Temporary exhibition on "Birds of Bhopal" was extended for public viewing on public demand at RMNH, Mysore.

RMNH, Bhubaneswar

- Exhibition on Wheels" was on display at Jhunjhunwala Vidyapeeth, Barang January 13, 2008 for an educative session for about 1000 students on the occasion of the golden jubilee celebration of their school.
- During the month of July 2008, the mobile exhibition van traveled to Delhi Public School, Kalinga for an exhibition held during the Science week.
- On the occasion of 4th Anniversary of the Museum, a "Photographic Exhibition on Living Heritage of Temple City" was put on display on 10th August 2008. The exhibition was based on photographs of different groups of animals and various stages of their life like life cycle of butterflies, birds, and spiders. Preserved and live specimens related to the photographs were also displayed.
- Gandhi Jayanti celebration: During the month of October, 2008, an exhibition of the paintings and posters done by





Fig-67. Painting and poster competition by students on "Gandhiji's thought on environment" organised by RMNH, Bhubaneswar

children of different groups from class 1 to 18 years and above was held.

- Mobile Exhibition on wheels depicting forest wealth was sent to "Anjali National Children Festival" at the Adivasi exhibition ground, Bhubaneswar from December 24 to 28, 2008. Same exhibition was sent to Sunderban Mela-09 organised by Bandhu Mahal, West Bengal from January 3 to 12, 2009.

[Workshops/Conferences](#)

[NMNH, New Delhi](#)

- A special workshop on Museum Activities for students of class VI to XI (science) was organized on 13th, 14th & 19th February 2008. It was arranged for Directorate of Education, Science Centre No.1, Pitampura, New Delhi-88

- An Orientation Workshop for Trainee Teachers from DIET, R. K. Puram, Delhi was organized from 20th to 23rd August, 2008. Forty Trainee Teachers from the Institute participated in the Workshop along with two faculty members. The workshop was followed by an interactive session with the participants on the theme: "How to make young minds aware of their environment".
- An Orientation Workshop for Trainee Teachers was conducted on October 17 and 18, 2008 for the students of Khazani Women's Polytechnic, Yamuna Vihar, New Delhi. Thirty three Trainee Teachers participated. On October 18, 2008 the Museum officials visited Khazani Women's Polytechnic to conduct the creative group activity which included nature interpretation through clay-

modeling & plaster of paris.

RMNH, Mysore

- RMNH and Dr. Ram Prasad Research Centre (RPRC) launched a collaborative workshop on "Indigenous Resource Management and Sustainability' on 29th November, 2008.
- The Museum organised a National Conference on Enabling Museums in Tamil Nadu Science and Technology Centre, Chennai during 14-16 February.
- South Asia Workshop on Museums & Intangible Natural Heritage organized by ICOM (International Council of Museums). The presentation on Hortus Malabaricus, the earliest documentation of INH from Asia, drew the attention of delegates from Asia especially from Sri Lanka who showed keen interest to have future collaboration in this subject with India.
- Teacher orientation workshop: A Teacher Orientation Workshop-2008 was organised for the Higher Primary Teachers of Pandavapura Taluk, Mandya District during August 18 to 20, 2008 at the premises of Shankarananda Bharathi Vidya Samsthe, Kuntibetta, Pandavapura. Thirty teachers from different schools of Pandavapura Taluk were participated in the Workshop. The teachers were exposed to both indoor and outdoor activities with lectures, power point presentations, teaching aid preparation and visit to bird sanctuary through eminent resource persons to enhance their capacity building process for teaching environmental education in the classroom.

RMNH, Bhopal

- A Workshop on 'Women and Environment' was organised on March 7, 2008 to mark the International Women's Day on 8th March. Twenty-seven participants participated in the said Workshop.
- Summer Vacation Workshop was organized during June 11 to 21, 2008. Twenty five students of various schools of Bhopal participated in this workshop. Flower making with paper, miniature model making, useful science project making, clay modeling, thermocol modeling, field visit to Van Vihar National Park and Jal Tarang was organized under this workshop.

RMNH, Bhubaneswar

- A workshop on "Access to Museums by Visually Challenged" for about twenty five teachers of blind schools was conducted from 26th February.
- A workshop for the tribal areas student & farmers in collaboration with Tapobhoomi organization for biodiversity awareness was organized in March 2008.
- A workshop on "Man and Elephant Conflict" was held on June 4, 2008 in the museum organized by Forest Department, Govt. of Orissa. There was discussion regarding many serious issues on the topic of man and animal conflict.

Professional workshops: The NMNH and its various RMNH organized a few professional programmes during the year.

- Workshop on Exhibition Techniques: A professional workshop on exhibition techniques with relevance to natural history museums was organized at the



RMNH Bhubaneswar for the staff of the NMNH and its RMNH during August 10 to 12, 2008. During the workshop various aspects of designing, display, taxidermy process and incorporation of multimedia for making the exhibits more interactive were extensively discussed.

- Project INH: This project, which was initiated at the RMNH, Mysore, is the first attempt from any Museum in India to bring attention to the forgotten publication "Hortus Malabaricus", considered to be the earliest systematic scientific documentation of intangible natural heritage from Asia.

World Environment Day: "World Environment Day" and the 30th Foundation Day of the NMNH" was observed on June 5, 2008. The main function was organised at Vigyan Bhawan, New Delhi. Hon'ble President of India, Smt. Pratibha Devisingh Patil was the Chief Guest at the function. The Minister of State for Environment and Minister of State for Forests & Wildlife, and Secretary, Ministry of Environment & Forests, besides other high dignitaries were also present on the occasion. Ms. Shefalika, a participant at the Summer Programme for Teenagers was selected as "The Young Environmentalist of the year-2008" and was decorated by the Chief Guest.

International Museums Day: A function was organised to observe the International Museums Day and 13th Anniversary Day of RMNH, Mysore on May 20, 2008 at the Museum Auditorium. Dr. N.S. Rengaraju, Chairman, Department of Studies in Ancient History & Archeology, University of Mysore was the Chief Guest. Students of Odanadi Trust, Mysore and University of Mysore Summer Camp Students attended.

International Programme: ICOM (International Council of Museums) organized an International Workshop on "Traditional Knowledge Systems, Museums and Intangible Natural Heritage in South Asia during February 3 to 7, 2008 in Hyderabad in which Dr. B. Venugopal, presently the Director of NMNH, was invited to present a paper representing India. His paper on the "Project INH" being undertaken by the NMNH, drew the attention of Sri Lankan delegates who have shown interest to send a delegation of botanists from the National Museum, Sri Lanka, to be trained at the NMNH, India.

Committee of Parliament on Official Languages: The Parliament Committee on Official Languages inspected the NMNH on 3rd December 2008, with respect to the use of Hindi.

Forestry Education, Training and Extension

Forestry education and training in India began in the early part of this century for scientific requirements especially in natural sciences and surveys. The present system of forestry education and training is well tailored to produce skilled forest managers so as to manage, protect and conserve the forests in consonance with National Forest Policy, 1988 and National Forestry Action Programme, 1999 etc. The activities related to forestry education, training and extension are performed by the different institutes of the Ministry like Indira Gandhi National Forest Academy (IGNFA), Dehradun; Directorate of Forest Education (DFE), Dehradun; Forest Survey of India, Dehradun; Indian Institute of Forest Management (IIFM), Bhopal and Indian Plywood Industries Research and Training Institute (IPIRTI), Bengaluru etc.

Indira Gandhi National Forest Academy (IGNFA), Dehradun

The erstwhile Indian Forest College was renamed as Indira Gandhi National Forest Academy in 1987. The mandate of the academy is to impart professional training to regular recruits of Indian Forest Service. The academy also conducts in-service training courses for IFS officers at various levels of seniority. In addition, workshops and seminars are also organized on emerging issues in forestry sector.

Major activities during the year

- At present two batches of IFS probationers and Foreign Trainees are undergoing training at the Academy. The 2007-2009 Batch consists of twenty five Probationers including two foreign trainees. The 2008-2009 Batch consists of thirty Probationers including two foreign trainees. These training courses include a series of lectures, practicals, case studies, panel discussions, field visits, tours, excursions, symposia, seminars, guest talks, On the Job Training and counselor group meetings on various forestry and allied subjects.
- Thirty six IFS Probationers and two Foreign Trainees of 2006-2008 Course passed out of the Academy on August 8, 2008.
- One Professional Skill Upgradation Course for Officers promoted from State Forest Service to Indian Forest Service is was conducted. Twenty Officers attended the Course.
- Eight Advanced Forest Management (AFM) courses for the IFS officers of the 1999, 1998, 1991 and 1987 batches have been organized in which two

hundred thirty one officers attended.

- Two Special Advanced Forest Management (AFM) courses for 1986, 1989 and 1990 batches were conducted for those officers who could not participate in these courses earlier in which thirty eight officers attended.
- Academy also organized three three-days Senior Foresters Workshop for the IFS officers who have completed fifty (twenty participants), thirty (fifty seven participants) and twenty five (eighty five participants) years of service.

Directorate of Forest Education (DFE), Dehradun

Introduction

The Directorate of Forest Education was a part of the Forest research Institute & Colleges, Dehradun and remained responsible for professional and technical level training/ education in the country. After the reorganization of Forest Research Institute & Colleges and creation of an autonomous Indian Council of Forestry Research & Education (ICFRE), this Directorate was de-linked from FRI & Colleges in 1991 and now functions directly under the administrative control of Ministry of Environment & Forests.

Objectives

- To cater to the training needs of State Forest Service(SFS) Officers and Forest Range Officers(FROs) of States/ Union Territories in the country.
- To ensure standard and quality of training being imparted to SFS Officers and FROs.
- To develop appropriate and relevant training contents and evaluation standards for forestry training at various

levels.

- To suggest training policy for effective Human Resource Management and Development.
- To help states assess "Training Needs" of forestry personnel for quality training.
- To supplement the efforts of State Governments in the training of Forest Frontline staff (Forest Guards/Foresters and Deputy Rangers)

Progress of Activities undertaken

- Induction training in the form of "Two years diploma course" for the newly recruited SFS Officers of various states/Union Territories has been undertaken.
- Induction training in the form "Eighteen months certificate course" for the newly recruited FRO's of various states/Union Territories has been undertaken.
- In-service Training of SFS Officers and FRO's in form of short term refresher courses has been undertaken.
- Capacity building courses (computer application etc.) for SFS Officers & FROs have been undertaken.
- Workshops on different themes of Forestry for SFS Officers and FROs like Training of Trainers, Policy and Legal Issues etc have been undertaken.
- Two batches (2007-09 and 2008-10) of newly recruited SFS Officers are undergoing training at SFS College, Dehradun.
- Two batches (2007-08 and 2006-08) of newly recruited Forest Range Officers passed out from SFSC, Burnihat &

Coimbatore respectively.

- Three batches (2008-09 and 2008-10) of newly recruited FROs are undergoing training at SFSC, Burnihat & Coimbatore.
- Five General Refresher courses and Two Computer Application courses in Forestry of two weeks duration for in-service SFS officers have been completed.
- Four Training-cum-Workshops (five days duration) on Policy & Legal Issues/ International Conventions/Biodiversity Conservation & Climate Change/ Training of Trainees have been undertaken.
- Four "General Refresher Courses" of two weeks duration for in-service FROs have been completed.
- One Theme based course on "Wildlife in Forestry" of two weeks duration for in-service Range Officers has been completed.
- One Workshop (five days duration) on Policy and legal issues for in-service FROs has been completed
- One hundred two week "Refresher Courses" for in-service Deputy Rangers, Foresters and Forest Guards and four theme based one week workshop's for FROs have been conducted through the Forestry Training Institutes of various states.
- One ten weeks training programme on "Basic Forestry" for newly recruited scientists of ICFRE conducted at SFSC, Dehradun and one other training programme of six weeks duration under progress.
- Twenty three courses of Five days duration

Status and capacity of the DFE institutes for training of SFS Officers and FROs

Under Directorate of Forest Education, Government of India	
Name	Capacity(per batch)
State Forest Service College , Dehradun	40
State Forest Service College, Coimbatore	40
State Forest Service College, Burnihat	40
Easter Forest Rangers College, Kurseong	30
Total	150
Under State Government	
Forestry Training Institute , Haldwani (UP)	40
Gujarat Forest Rangers College, Rajpipla (Gujarat)	40
Orissa Forest Rangers College, Angul (Orissa)	40
Forest Rangers College, Balaghat (MP)	40
Total	160

for members of Joint Forest Management Committees and Frontline Forest Staff under National Afforestation Programme were conducted through Forest Training Institutes of various states.

[**Indian Institute of Forest Management \(IIFM\), Bhopal**](#)

The Indian Institute of Forest Management (IIFM), Bhopal offers two academic programmes. Post Graduate Programme in Forestry Management (equivalent to Master Degree) and Postmaster's Programme in Natural Resource Management. The Institute is also recognised as Nodal Centre for Research by Forest Research Institute (FRI), Dehradun for Doctoral programmes.

Post Graduate Diploma in Forest Management (PGDFM)

The admission to this course is through CAT (Common Admissions Test) being conducted by IIMs followed by Group Discussion (GD) & Personal Interview (PI) at IIFM. The twentieth batch of the P.G. Diploma in Forestry

Management commenced with sixty students on July 02, 2007. The batch consisted of forty seven General, nine SC and nine ST candidates.

Post-Master Course in Natural Resource Management (NRM)

For the one-year Post Master level Course on Natural Resource Management (2006-07), one hundred nineteen applications were received and finally twenty participants were admitted for the programme based on written test, technical presentation, group discussion and personal interview.

Ph.D. Programme

The Institute functions as one of the research Centers of the FRI Deemed University for higher studies leading to Doctor of Philosophy. During the year 2007-08, four thesis reports were submitted for award of Ph.D.

Fellow Programme in Management (FPM)

The Institute launched its Doctoral level Fellow

Programme in Management (FPM) 2008-2012 during the academic year 2007-2008. The FPM programme aims to develop and equip students for career opportunities in management education and research (Fig-68).

Training

The Institute has been organizing short-term training courses, seminars and workshops to transfer technical and managerial skills being generated by faculty areas of the institute. The

Mechanical Wood Industries Technology got 100% placement in various wood based panel industries through campus selection and 20th batch PGD course commenced on November 3, 2008 with twenty two candidates from different states. Many short-term training courses were conducted by IPIRTI during the year. A special training course on 'Preliminary processing of bamboos, its preservation and mat weaving was conducted for international students from June 2 to 13, 2008.

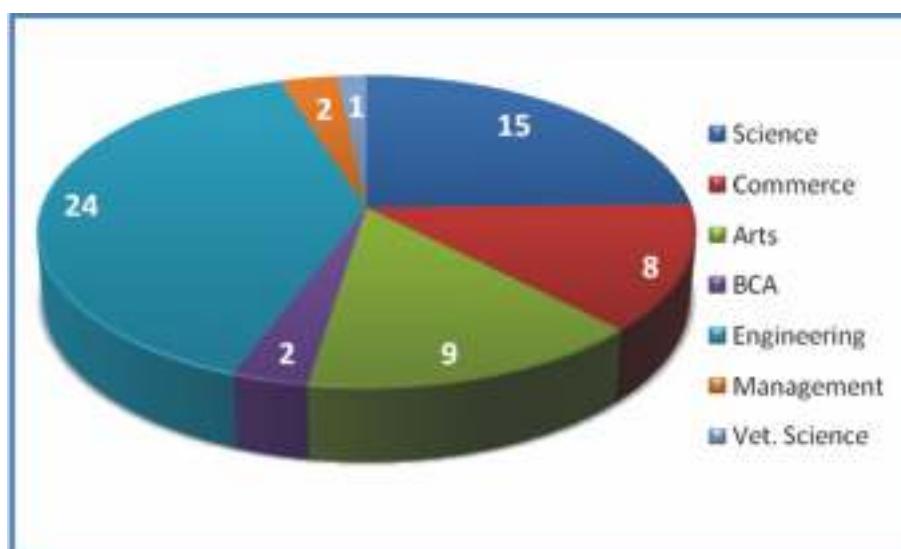


Fig-68. FPM 2007-09 Batch educational background

focus of these programmes is on evolving, analyzing and synthesizing various management techniques/ tools, ideas and concepts relevant to the forestry and allied sector. During the year, the Institute conducted thirty seven MDP programmes, twenty one workshops and three seminars.

[Indian Plywood Industries Research and Training Institute \(IPIRIT\), Bengaluru](#)

Under training programme in IPIRTI, Bengaluru; all nineteen trainees of 19th batch of Post Graduate Diploma Course (PGD) in

Training of IFS Officers

- The thrust of this scheme is on capacity building of the Indian Forest Service Officers through organizing mid-career short-term refresher courses. During the year, the Ministry sponsored forty five one-week courses in the premier training/management institutions in the country on a wide range of disciplines including management and administration of forests, wildlife, environment and general administration in the government. The topics include Application of Remote Sensing & GIS in Effective Forest Planning and Management, Application of Remote Sensing and GIS in Forestry, Bamboo Resource Development for Addressing Livelihood Concerns of Communities, Changing Scenario of Forestry and Wildlife of the Country and Management of Change, Clean Development

Mechanisms and Renewable Energy with Special Reference to Biofuels, Climate Change and Relevance to Forestry Sector, Collection, Compilation, Validation and Dissemination of Forest Statistics, Communication and Presentation Skills, Development of Clean Development Mechanism Projects under Land Use, Land Use Change and Forestry: Theory and Practice and their Relevance to Forestry Sector, Eco-tourism and Biodiversity Conservation, Eco-tourism vis-à-vis Conservation of Forests, Eco-tourism Wildlife and Habitat Management, Eco-tourism-Assessment and Development, Effective Financial Management & Audit Sensitization in Forestry Sector, Environmental Economics and Accounting, Environmental Impact Indicators and Valuation Techniques, Financial Management and Audit Sensitization, Forest Certification for Sustainable Forest Management.

- GIS: A Decision Tool for Forestry Planning & Management, GIS: Application for Effective Forestry Planning and Management, Holistic Approach for Participatory Monitoring of Joint Forest Management, Integrated Approach for Sustainable and Development of Fragile Desert System, Integrated Approach for Sustainable Development of Wastelands, International Cooperation, Laws and Conventions on Forestry and Environment, IT Management and Governance, Joint Forest Management: Challenges and Opportunities, Linking Participatory Forestry and Biodiversity Conservation with Poverty Alleviation, Livelihood Enhancement Strategies in Forest Fringe Villages, Management of Wild Animals in Captivity, Managerial Effectiveness and

Leadership, Natural Resource Management and Conflict Resolution with Special Reference to Forestry , Natural Resources Management and Conflict Resolution, Policy and Legal Issues in Forestry Sector, Prevention, Detection and Investigation of Wildlife Crime, Public Private Partnerships, Recent Advances in Forestry Research, Role of Agro forestry in Increasing Tree Cover, Role of Forestry in Conservation, Development and Management of Water Resource, Sharing of Experiences in Wildlife Management in Assam, Stress Management, Teamwork at Work, The Art of Interacting with Print and Electronic Media, Various Provisions under Right to Information Act, 2005, Wildlife Management: Issues, Concerns and Practices,

- Besides this, six IFS officers have been sponsored to pursue long-term courses offered by the Management Development Institute (MDI), Gurgaon, Indian Institute of Public Administration (IIPA), New Delhi, Indian Institute of Management (IIM), Bangalore and National Defence College (NDC), New Delhi.
- During the year, the Ministry sponsored fourteen two-day workshops on emerging topics in the field of forests, wildlife and environment conservation having regional, national and international importance. The training workshops/ seminars are sponsored in the premier institutions/organizations depending upon their expertise and strengths in a particular field/discipline. The broad themes for training workshops include Consolidating Decentralization of Forest Management through Micro Finance based Small and Medium Micro-Enterprise involving JFM Committees, Bio



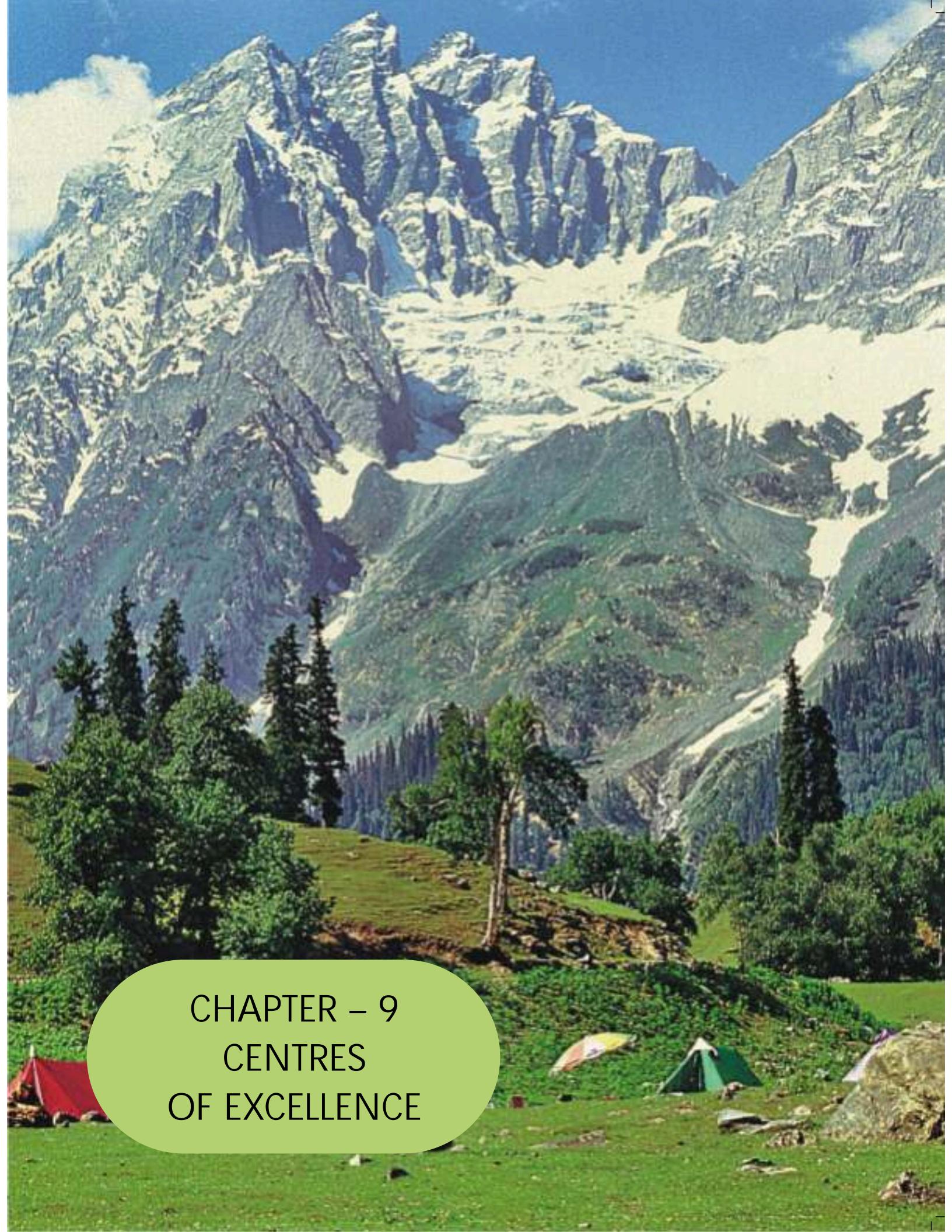


Prospecting – Role of the State Forest Department's Need to Play, EI- Emotional Intelligence, Forestland and other Related Rights of Tribals – Adequacy of Provisions of National in the Forest Policy, Change Management Bureaucracy, Carbon Markets and the Clean Development Mechanism: Implications for Indian Forestry Sector, Ecological and Environmental Awareness- Content Development and Management of Awareness Programmes, Forest Fire Monitoring and Damage Assessment, Public Private Partnership in Forestry, Forestry Scenario vis-à-vis - The Scheduled Tribes & Other Traditional Dwellers (Recognition of Forest Rights) Act 2006, Prevention, Control and Management of Forest Invasive Species- Strategies, Ecosystem Services – Valuation and Policy Issues

- Participation in the training courses/training workshop has been satisfactory.
- The Divisions has brought out a booklet on "Capacity Building in Forestry Sector Programmes for The Forest Officers during 2008-09"

Wildlife Education and Training

Wildlife education and training is primarily looked after by Wildlife Institute of India (WII), Dehradun; an autonomous institute of the Ministry for imparting training to government and non-governmental personnel to carry out research and training activities and advice on matters of conservation and management of wildlife resources. The details of educational and training programmes conducted by the Institute are given in details in Chapter-2 under Wildlife Institute of India.

The background of the image is a majestic mountain range with rugged peaks and patches of snow. In the foreground, there is a green grassy field where several tents are set up, indicating a campsite. A few tall evergreen trees stand in the middle ground. The sky is clear and blue.

CHAPTER – 9

CENTRES

OF EXCELLENCE

Introduction and Objectives

The Ministry started the scheme 'Centres of Excellence' in 1983 to strengthen awareness, research and training in priority areas of Environmental Sciences and Management.

Nine Centres of Excellence set up so far by the Ministry with a view to strengthening awareness, research and training in priority areas of environmental sciences and management are as follows:

- i) Centre for Environment Education (CEE), Ahmedabad
- ii) CPR Environmental Education Centre (CPREEC), Chennai
- iii) Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru
- iv) Centre of Mining Environment (CME), Indian School of Mines, Dhanbad
- v) Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore
- vi) Centre for Environment Management of Degraded Ecosystem (CEMDE), University of Delhi, Delhi
- vii) Madras School of Economics (MSE), Chennai
- viii) Foundation for Revitalization of Local Health Traditions (FRLHT), Bengaluru
- ix) The Tropical Botanic Garden and Research Institute (TBGRI), Thiruvananthapuram.

Centre for Environment Education (CEE), Ahmedabad

Introduction and Objective

Centre for Environment Education (CEE) was established in 1984 as a Centre of Excellence in Environmental Education, supported by the Ministry of Environment and Forests (MoEF), Government of India, in recognition of the importance of environmental education in India's overall environment and development strategy. CEE is a national institution engaged in developing programmes and material to increase awareness, leading to action, regarding environment and sustainable development. It has inherited the rich multidisciplinary resource base and varied experience of Nehru Foundation for Development (NFD), its parent organization, which has been promoting educational efforts since 1966 in the areas of science, nature study, health, development and environment.

Progress/ achievements

Strengthening Environment Education in School System (StrEES)

CEE continued facilitating implementation of the curriculum of existing Environmental Education (EE) syllabi besides orienting text book writers. CEE developed operation manual, resource material for promoting environmentally sound school campuses in New Delhi. CEE initiated discussions with various State Departments of Education (SDEs) to facilitate and help them in the compliance of the Supreme Court directives relating to environment. CEE has facilitated the development of proposals by several SDEs focusing on the action plan for various activities such as developing/ facilitating implementation of the EE curriculum, development of text books, development of teaching-learning materials, teacher training etc. CEE is providing support to Punjab School Education Board for implementation of StrEES project. A teacher's handbook on EE

is being developed. First draft of the handbook was discussed in a meeting in January at Chandigarh. Second round of review meeting on handbook held during March.

National Green Corps (NGC)

CEE has been the Resource Agency (RA) in fifteen States and two UTs and covers around 40,000 schools through this countrywide awareness programme initiated and funded by the Ministry. NGC aims at spreading environmental awareness among school children through eco-club activities and through children in society at large. Various activities including training of master trainers, developing and distributing educational material, observing environmentally significant days, conducting workshops and celebrating events like Eco-Balmela and Mowgli Utsav were undertaken. Monitoring of schools were conducted in Gujarat, Rajasthan, UP, Bihar, Assam, Arunachal Pradesh, Tripura, Meghalaya, Mizoram, Nagaland, Manipur. One hundred twenty five NGC case studies were collected of which thirty have been finalized. Paryavaran Yatra for NGC eco-clubs was organized in Gujarat.

Youth for Clean Air (YCA)

Centre for Environmental Education (CEE), South Asian Youth Environment Network (SAYEN) and United Nations Environment Programme (UNEP) have conducted 'Youth for Clean Air (YCA)', a project undertaken as part of the implementation of the Male 'Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia.' The project includes two components- a printed publication and an Interactive CD for youth in South Asia. Following the format of the YCA printed document, the CD has been divided into four modules-Understanding atmospheric

emissions, Sources of atmospheric emissions, Impacts and Measures to reduce atmospheric emissions.

Volunteering and Internships

As a part of providing capacity building opportunities for young development professionals and students from various fields of study such as social work, environmental sciences, civil engineering, development studies, international relations etc., forty nine volunteering or internship opportunities were provided in projects and activities related to sustainable development.

South Asia Youth Environment Network (SAYEN)

CEE hosts the Secretariat and the India National Focal Point for the South Asia Youth Environment Network (SAYEN), supported by UNEP—Asia and the Pacific. Activities conducted by CEE as part of this include redesigning of SAYEN website, two newsletters focusing on key SAYEN activities and organising the Fifth SAYEN Regional Meet. SAYEN National Youth Meet reports have been received from Nepal, Bangladesh and Pakistan.

Hands for Change - Teach India Campaign

CEE partners with The Times of India's Teach India campaign. CEE and its sister institutions used the approach of 'Joyful Learning' to get children in various parts of Ahmedabad to actively participate in civic issues within the immediate vicinity. Ten thematic areas were covered in the twelve week programme. Over three hundred enthusiastic volunteers took active participation in this campaign. The volunteers contributed towards nation building with their creative approach in eleven clusters.

'Pick Right' and 'Kaun Banega Bharat Ka



Paryavaran Ambassador' Campaign

The Pick Right campaign is aimed at spreading awareness about climate change, its causes and effects, and choosing the best life style options by individuals for sustainability. The Paryavaran Ambassador campaign will help choose a person to be a spokesperson on environmental issues, who can encourage people to make right lifestyle choices.

CEE in collaboration with MoEF launched the 'CO₂: Pick Right' campaign and the 'Kaun Banega Bharat Ka Paryavaran Ambassador' (KBPA) campaign on World Environment Day 2008. Under these two campaigns a 'Pick Right' educational pack has been developed in fifteen languages. It consists of a booklet, two sets of posters, two sticker-sheets, a post-card, all packed into one envelope. The campaign was conducted in two lakh schools across India. Web-based polling is being conducted through the KBPA website www.kbpa.com for the general public. These votes will also be taken into consideration during the overall counting. The voting process in schools involves each school coming to a consensus and selecting one person which is one vote (but equivalent to fifty numbers in the voting process). The Paryavaran Ambassador is scheduled to be announced later.

Sundarvan Nature Discovery Centre

Sundarvan, the Nature Discovery Centre located at an independent site in Ahmedabad, is an associated activity of CEE. Besides extension activities in different ecological regions of Gujarat, Sundarvan facilitates nature education and environmental awareness through:

- Experiencing Nature through live animal exhibits and ecosystem exhibits

- Conservation education through nature education camps
- Slide and Film shows and celebration of environment related days
- Public service: Reptile rescue and release in the wild.

Educational Experiences through Interpretation

CEE's involvement in the area of interpretation started since its inception. Over the years, it has undertaken a wide range of interpretation programmes using different media and latest technologies for protected areas, heritage sites, museums, zoos, and other important places where large number of visitors arrive. Through this on-site interpretation, these visitors get more awareness of our cultural and natural environment. Some of the interpretative projects taken up during the period are:

- Barnawapara Interpretation Programme, Forest Department, Chhattisgarh
- Meghalaya Signages and Interpretation Project
- Project Tiger Report Up-gradation
- Pench Interpretation Programme, Pench Tiger Reserve Management
- Bor Sanctuary Interpretation Centre, Pench Tiger Reserve Management
- Madhav Interpretation Programme, Madhav National Park Management
- Gautala Sanctuary Interpretation Centre – Extension, Maharashtra Forest Department
- Adalaj Vav, Interpretation Centre
- Pachmarhi Interpretation Project
- Interpreting Chipagi Education Centre

Industry Initiatives

Activities during the reporting period related to development and implementation of several need-based scoping and capacity building interventions. The Project Information Note and draft of the Project Development Document on Carbon sequestration in forestry project were also developed. Two main highlights during the year were the Climate Change Awards in collaboration with Jindal South West (JSW) Foundation and technical support for the Training Management Unit (TMU) for development and implementation of a monitoring and delivery profile for the GTZ.

Management Education Centre on Climate Change (MEC-CC)

CEE and Gujarat University initiated a step towards climate change education by setting up Management Education Centre on Climate Change (MEC-CC). Climate change education will aim not only at creating awareness about the causes, effect and concept of climate change but also motivate people to take actions towards more sustainable future. CEE would provide technical assistance and partner in various courses as a part of this initiative. Launch of MEC-CC and a three-day programme was conducted on understanding Climate Change. Also signing of tripartite proposal between Jawaharlal Nehru Port Trust (JNPT), Bombay University & CEE was accomplished.

Gram Shilpi Programme

Gram Shilpi (GS) is a long term commitment of cadre building for sustainable rural development based on Gandhian philosophy of development in partnership with Gujarat Vidyapith (GV). In a broader sense, Gram Shilpi is a devoted person, expected to serve the village without any materialistic interest and will follow the essence of Gandhian way

of working. Under GS, three orientation meetings with students at Gujarat Vidyapith were conducted. Workshop, exposure visit, village selection procedure and a month long initial village placement was completed successfully.

Sanjeevani

Sanjeevani is a School-based Medicinal Plant Education and Conservation Initiative. The project is being implemented in two major ecological regions of Gujarat viz., the sub-humid ecological region of South Gujarat's tribal belt that is extremely rich in medicinal plant diversity, and the ecologically fragile, semi-arid ecological region of Saurashtra. The project goal is to conserve and sustain medicinal plant biodiversity in Gujarat through school education and community actions in rural areas of the state. Activities like consultative workshop, demonstrative action on micro projects implementation, review and planning meets, exposure tour were undertaken.

Civil Society consultation on CSD 16 theme

CEE organised a consultation of the civil society to provide inputs in the preparation of Country Strategy/ Report for the Commission for Sustainable Development (CSD). Around forty participants representing NGOs, government, scientific and research institutions reviewed the draft reports of the UN Secretary General on the CSD themes (Agriculture, Land, Desert, Desertification, Rural Development and Water & Sanitation) and, helped in capturing the sustainable development perspectives from a diverse country like India. Case studies and examples which could be picked up as best practices were also shared.

Solid Waste Management at IFFCO (SWAMI)

CEE North is working with IFFCO's



unit based in Aonla, Bareilly on solid waste management programme since 2006. The solid waste management (SWM) system is being implemented by CEE where waste is being collected from the IFFCO, Aonla township which includes around 1100 houses, kitchen gardens, canteens, public places, etc. Awareness drive among residents is being conducted for segregating the waste. Training module is being updated and training programme for IFFCO officials and residents was organized.

Media and Publications

ENVIS Newsletter on Environmental Education

Education for Change (EFC) is the objective of ENVIS newsletter on EE and Education for Sustainable Development (ESD). It seeks to share news and views about the role of education in different aspects of development; the need for reorienting educational processes, so that they become transformative; experiences of education for sustainability in different sectors, and resources on ESD and for learning about sustainable development. EFC readers include practitioners in various development sectors and others interested in ESD.

For a larger outreach, articles are also made available on the ENVIS website for EE (www.greenteacher.org) and the website for the Decade of Education for Sustainable Development (www.desd.org/efc). A blog <http://education-for-change.blogspot.com> containing the newsletter articles has also been created.

Journal of ESD

CEE has launched the first peer-reviewed international journal on Education for Sustainable Development to serve as a professional forum for academicians and

practitioners around the world. This Journal, which is published twice a year by Sage Publications, serves as a place to present research, debate ideas, and showcase success stories. The first issue of the Journal was formally launched at the Fourth World Environmental Education Conference which was held in South Africa in July 2007.

Resource Books in EE for Teacher Educators

A set of Resource Books in EE has been developed with support from the National Council for Teacher Education, India, especially to suit the Indian teacher education system. The Resource Books in EE have been developed at three levels catering to the various levels existing within the teacher education system of the country, i.e. D.Ed or PTC, B.Ed and M.Ed. The Recourse Books are published in English and Hindi based on the EE Curriculum Framework developed by NCTE for the teacher educators. The Resource Books are designed to help teacher educators from various streams of disciplines to adequately address and effectively communicate the challenges of environmental conservation and sustainable future in the Indian context.

A Master Education Plan for Zoos of India

CEE in collaboration with Central Zoo Authority (CZA) developed a Master Education Plan for Zoo of India. This master plan creates a vision that is supported by policies, guidelines and priorities; it supports the coordinated growth of the separate facilities and functions to achieve the specific objectives. This report is result of extensive discussions and research Directors of Zoos from all over India participated in several meetings. All zoos in the country were visited and extensive secondary research was done. The report therefore reflects not only innovative ideas but also the rich experience

of educational programmes carried out in zoos across India. The plan faces these challenges, shares experiences and gives a direction for the future. An Idea Source book, a second publication developed by CEE, is a compilation of interesting examples from zoos around the world which demonstrates the variety of methodologies to attract, excite, enthuse and educate visitors to zoos.

Green Teacher Website

The Green Teacher website is the ENVIS website on Environment Education. Green Teacher is meant for formal and non-formal educators, organizations and institutions in the government, academic and NGO sectors. The website contains databases on environment education information, and is a platform for online query-response. Around 60 activities from the Joy of Learning series have been added to the Green Teacher Website. Local language text has been enabled and users can directly download Unicode font and enter text into Green Teacher (activities, projects, discussion forum inputs, etc) in Indian languages. The font to be used is a phonetic one, and it is simple to use. Local language text will be regularly carried on the website.

www.kidsrgreen.org

CEE developed and maintained the monthly e-magazine www.kidsrgreen.org. This innovative and interactive online EE programme harnesses technology to motivate, support and facilitate learning. It has been selected to be a finalist for the Stockholm Challenge Award 2008 in the category of Environment. The Stockholm Challenge (<http://www.stockholmchallenge.se/node/2686>) is an ICT for development programme of the Royal Institute of Technology (KTH). The Award is supported by Sida, City of

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- Radio as a medium for Communication

Worldspace Radio's Marathi channel Surabhi invited CEE Urban for short talks featured on their special two-minute environmental feature 'Sugandh Hirava' in October 2008. Sugandha Hirava has about 1.8 lakh urban subscribers. The talks focused on urban environmental management like electricity and water conservation, solid waste management issues biodiversity conservation, traffic and transport practices etc. at individual, family or community level.

- TV Films in Hindi

Video Resource Centre (VRC) has brought out the Hindi version of "Light and Shadow of Pesticides", a thirty minute film on Japanese experience of pesticides and five minute films espousing sustainable practices. The films have been produced by Television Trust for the Environment with support from Japan Fund for Global Environment. The English and Hindi versions would be useful for initiating discussions in communities, schools and higher education institutes, in training programmes etc.



C.P.R. Environmental Education Centre (CPREEC), Chennai

C.P.R. Environmental Education Centre (CPREEC) is a Centre of Excellence of the Ministry of Environment and Forests, Government of India, jointly set up by the Ministry and the C.P. Ramaswami Aiyar Foundation in the area of Environmental Education.

Objectives

The chief mandate of CPREEC is to create awareness among various stakeholders about current environmental issues. The programmes are conducted in the states of Andhra Pradesh, Goa, Karnataka, Kerala, Orissa, Maharashtra and Tamil Nadu and the Union Territories of Andaman and Nicobar Islands and Pudhucherry.

Progress / Achievements

Green School Initiative

The Green School Initiative (GSI) launched during 2007-08 in the cities of Chennai, Bangalore, Hyderabad and Ooty has been very successful in involving students in environmental management. Schools were graded based on their performance and rated by a team of experts. GSI was re-launched in the above cities, with additional schools included. Workshops were organised for teachers of all the participating schools, who have shown great enthusiasm in achieving the GSI parameters.

Training programmes

Teachers

Training teachers is the chief mandate of CPREEC. A committed teacher ensures a new generation of committed environmentalists. The programmes were organised in close coordination with the state education

departments. The district educational officers selected and deputed teachers, who had not attended a similar programme earlier, to participate. The Environmental Education syllabus and its activity-based application was supplemented by CPREEC's specially developed resource materials. Totally one hundred and forty programmes were conducted.

Law Students

Training programmes on Environmental Law were conducted in collaboration with local law colleges for law students in the states of Andhra Pradesh, Karnataka and Tamilnadu. The participants were provided with a copy of CPREEC's publication 'Environmental Laws of India – An Introduction'.

Waste and Disaster Management

Ten programmes on Waste Management were organised for rural sanitary workers and the staff of municipalities on handling, segregation and composting of waste. The employees of Primary Health Centres were taught how to handle and dispose of biomedical waste. The programmes also threw light on the various laws in India pertaining to biomedical waste management.

Another ten training programmes were organised on Disaster Management for coastal communities. The programmes dealt with disaster preparedness and shelter belt development, including planting techniques and mitigating the impact of cyclones and floods.

Environmental Education for Sustainable Development

This year, CPREEC organised ten special workshops on Environmental Education for Sustainable Development exclusively for textbook writers and curriculum developers of

the SCERT in Hyderabad, Madurai and Puducherry.

Biodiversity Conservation Education

India is one of the mega diverse nations with rich biodiversity wealth, whose conservation is very important. Twenty training programmes were organised for teachers, students and women in the states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Puducherry. A species approach was taken and the programmes were organised around Project Tiger, Project Elephant and wetlands. The participants were taken around reserved forests on field visits to understand the importance of biodiversity conservation.

CPREEC imparted training to NGOs and villagers on the preparation of People's Biodiversity Registers. The use of Quadrat survey method was imparted in the training programme. The Biodiversity Register of each village is maintained by the local NGO and villagers.

Sacred groves help in conserving local floral and faunal biodiversity. CPREEC has been conserving and restoring sacred groves since 1993-94. CPREEC withdrew from two restored sites and added two new sites, totaling eight groves currently taken up for restoration. Village meetings and school visits are regularly organised in all the sites. Plantation activities are carried out with the close coordination of the villagers. Saplings were distributed to local students to encourage tree plantation. Forty five groves have been restored since 1993.

Environmental Education for Women's Empowerment

Women are the protectors of the environment, as well as major sufferers of environmental degradation. CPREEC conducted thirty training programmes on health and nutrition,

vermicomposting, waste management, paper bag making, kitchen/ herbal gardening and nursery raising for increasing their earning capacity and manage the environment. Saplings and seeds were distributed to the participants. Training programmes were conducted for SHG members in cooperation with NGOs in the states of Andhra Pradesh, Karnataka, Tamil Nadu and Puducherry.

Nilgiri Biosphere Reserve Conservation Education

CPREEC's Field Office set up at Ooty has been playing a critical role in protecting the Nilgiri Biosphere Reserve. A total of thirty training programmes were organised for the teaching fraternity and elected representatives of local Panchayat and Municipalities on the importance of the biosphere reserve, spread over the states of Tamil Nadu, Karnataka and Kerala. Student camps were organised to expose them to nature and wildlife. The gene pool maintained at Thambatti herbal garden serves as a model plot for researchers and farmers.

Andaman & Nicobar Islands Conservation Education

Island ecology is unique and fragile. Teachers, women and students were trained in disaster preparedness and mitigation. A total of twenty five programmes were conducted. Several eminent scientists were honoured during Biodiversity Day for their contribution to biodiversity conservation in the islands. CPREEC's exhibition on Climate Change was put up at the Islands.

Exhibitions

The exhibition on Tiger!! Tiger!! was organized at Chennai. A Poster Designing Competition was organised for Chennai school students and prizes were distributed by Dr. M.S. Swaminathan, Chairman of





CPREEC. A booklet entitled "Tiger!! Tiger!!" was released and distributed to the visiting students and public. The exhibition then traveled Ooty for Wildlife Week, to Bangalore and later to Hyderabad.

An exhibition of paintings by eminent artists of Chennai on Nature and Wildlife was inaugurated in December 2008 and prizes were distributed to the winners of the inter-school painting competition on Nature and Wildlife. The prize winning entries were displayed along with the paintings by the senior artists.

An exhibition on Climate Change, based on the theme of the National Environment Awareness Campaign (NEAC) of the Ministry of Environment and Forests, was put up at Chennai in February 2009. A booklet in English and Tamil was distributed to all the visitors. A painting competition on the subject was organized for city school students.

Generation and production of resource materials

CPREEC's publications are regularly updated and reprinted. Four issues of the quarterly newsletter ECONEWS and one annual issue of the Indian Journal of Environmental Education were brought out during this year.

Apart from reprints of existing publications, a booklet on Tiger! Tiger! in English and a booklet and poster on Climate Change (NEAC theme) in English and Tamil were also published.

The proceedings of the Seminars on Ecological Traditions of Goa were brought out by compiling the papers presented by eminent ecologists and environmentalists.

Papers presented at the National Conference on Environment and Indian History held in January 2008 was published as a book.

Appropriate resource materials produced by CPREEC were distributed to the participants of the various training programmes organised in the states of Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and the Union Territories of Andaman & Nicobar Islands and Puducherry.

Laboratory (Research and Surveys)

CPREEC carried out ambient air quality, noise level and vehicular flow surveys in Chennai and Madurai in Tamilnadu. Water and soil samples collected from Tiruchirapalli in Tamilnadu, Tumkur in Karnataka and Anantapur in Andhra Pradesh were analysed for heavy metals and pesticides at our Environmental Laboratory. Water samples collected from Thanneermukhom village in Alleppey district in Kerala was also analysed. Besides, water and soil samples received from several residents of Chennai were also analysed. Training programmes on water testing for students were conducted in Kerala. One hundred water samples collected along the Chennai coast were analysed for salt water intrusion.

ENVIS Centre

CPREEC's ENVIS Centre on Conservation of Ecological Heritage and Sacred Sites of India organised a seminar on Ecological Traditions of Goa in November 2008 and on Ecological Traditions of Orissa in January 2009. Several eminent speakers presented their papers and the proceedings were published. CPREEC has expanded the existing database on various aspects of Indian ecological heritage with primary and secondary sources. The existing database includes information on six thousand eight hundred twenty five Sacred Groves & Gardens; forty one Sacred Waterbodies; two hundred eight five Sacred Tanks; eighty four Sacred Plants; forty five Sacred Animals; twenty five Sacred

Mountains and Hills; Press reports, important events and the abstracts of recent research papers have been uploaded.

Biodiversity Day Celebrations

The theme for this year was Biodiversity and Agriculture. Training programmes were organised by CPREEC for two hundred Lambada tribals in Medak District in Andhra Pradesh. Women and farmers attended a similar programme organised at Belur in Hassan District in Karnataka. CPREEC's Field Office in the Nilgiris organised a workshop for seventy small farmers at Sakkatha village, near Aravenu, Kotagiri Taluk. In the Union Territory of Andaman & Nicobar Islands, two lectures were organised by CPREEC in collaboration with Central Agricultural Research Institute (CARI), Port Blair and ten scientists were honoured for their contribution to Biodiversity Conservation.

World Environment Day celebrations

CPREEC organised a "Presentation and Discussion on Combating Climate Change and Local Responses" at Chennai.

CPREEC's Field Office at Ooty, organised an exhibition on Wildlife at the District Institute of Education and Training (DIET), Kotagiri.

Environmental Awareness Education programmes in schools and villages

CPREEC conducted one hundred and twenty one Environmental Awareness Education field programmes in schools and villages in Ramanathapuram and Tuticorin districts covering 22,757 participants on behalf of the Gulf of Mannar Biosphere Reserve Trust (GOMBR Trust), Ramanathapuram, during July, August and September 2008.

Three hundred sixty awareness programmes for students and villagers in eight districts of Tamilnadu were conducted on behalf of the

Tamilnadu Pollution Control Board (TNPCB), Chennai.

C. P. R. Environmental Education Centre's Award for Environmental Education

The C. P. R. Environmental Education Centre Award for Environmental Education for 2008 was given to Ms. R. Shoba, Headmistress, Panchayat Union Primary School, Thalaikundha, Ooty, Nilgiris District. Dr. M.S. Swaminathan, Chairman of CPREEC, gave away the award at a function organised at Chennai.

National Green Corps (NGC)

CPREEC organized workshops for NGC teacher coordinators in the states of Andhra Pradesh, Karnataka, Kerala, Orissa, Tamil Nadu and Union Territories of Puducherry and Andaman & Nicobar Islands.

GLOBE Training programme

The CPREEC organised GLOBE Training Workshop for teachers of Puducherry Union Territory in collaboration with the State Training Centre, Government of Puducherry on February 19 and 20, 2009 at Puducherry. Sixty teachers participated in the workshop. The teachers were trained on Atmosphere, Land Cover, Soil and Hydrology Protocols.

National Environment Awareness Campaign (NEAC)

CPREEC helped the Ministry in the implementation of the National Environment Awareness Campaign (NEAC) in 2008 – 2009. CPREEC developed a poster and booklet on Climate Change for distributing to NGOs and educational institutions implementing NEAC in selected districts in Tamil Nadu, Andaman & Nicobar Islands and Puducherry. A pre-NEAC meeting was organised in Puducherry on December 11, 2008. Tree planting was launched in





Chennai city involving school students. Tree saplings were also distributed to schools in Kanchipuram and Villupuram districts.

Centre for Ecological Sciences, Indian Institute of Science, Bengaluru

Brief Introduction and Objectives

The Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru was established in 1983. The CES, IISc conducts research and undertakes education and training in the broad area of ecology with special emphasis on the western ghats. The Ministry of Environment and Forests recognized the Centre of Ecological Science, Indian Institute of science, Bengaluru as a Centre of Excellence in the year 1983. The CES, IISc conduct research with practical application in conservation and sustainable development of natural areas and organizes extension and training programmes particularly for field managers with emphasis on western ghats. The centre is functioning under the administrative control of Indian Institute of Science, Bengaluru.

Activities Undertaken

The Centre for Ecological Sciences carried out thirty research projects in the fields of ecology of tropical forests, climate change, community ecology, behavioural ecology and evolutionary biology. The Centre has also contributed to several initiatives of the MoEF including the Expert Panel on Climate Change and wildlife conservation programmes such as the National Tiger Conservation Authority and the Committee on Rationalization of Boundaries of National Parks and Sanctuaries.

Progress and achievements

Tropical forests and climate change

Research in this field includes an assessment of carbon stock and vegetation dynamics in tropical forests of Western Ghats through long-term inventory in the Nilgiri and Uttara Kannada districts. Natural vegetation, plantations and soils have been known as major carbon sinks. Currently, there is a limited understanding of the status of carbon stocks in the tropical forests, especially in the light of human impacts. The indications from the monitoring of permanent plots on a long-term basis are that the dry and moist deciduous forests continue to act as carbon sinks in spite of disturbances such as fire and drought.

Community ecology and biogeography of select vertebrate taxa in the Western Ghats

The biogeography of herpetofauna in the Western Ghats is of particular interest given the high endemism and ancient origin of several families. While amphibians in the Western Ghats have their closest relatives in Africa due to the ancient connection between the two landmasses, many reptiles are of Indo Malayan origin and dispersed into India after the subcontinent collided into Asia about 40 million years ago. The Centre is studying the biogeography of these groups using a combination of primary data, landscape ecology, habitat modelling and molecular genetic tools to recreate phylogenies which provide clues about routes of dispersal and other mechanisms that result in current distribution patterns. The preliminary results of the work done so far provide important insights into the degree of sampling effort needed to adequately address the research questions proposed in this work. The species richness and composition of the groups like tree frogs (Family: Rhacophoridae) and endemic stream dwelling species groups like wrinkled frogs (Genus: Nyctibatrachus) in the

collection indicates the possibility of considerable spatial turnover, suggesting the potential to find many undescribed species in other hill ranges. The study has, for the first time, photographed and recorded mating calls of many species of frogs including some possible novelties. A tissue and specimen archive has also been initiated to facilitate future reference to these specimens and tissues. Work has also been initiated on the community ecology of birds, on mixed species foraging flocks, and on distribution patterns.

Behaviour and ecology of mammals

The centre is carrying out several studies on ecology and evolution of behaviour and life histories, and applying evolutionary principles to the conservation of species. A long-term study of elephant population dynamics in the Nilgiris has shown that the adult male:female ratio, that had been progressively becoming very unequal, has now stabilised at about 1:25; however, there now seems to be a reduction in the birth rate of the population which may help stabilise population growth rate. Another study is examining how ecological conditions influence individual behaviour and thereby the dynamics of populations of the blackbuck antelope. Principles from behavioural ecology towards conservation problems also affected. In an ongoing project, crop damage by blackbuck by taking a behavioural ecological approach to understanding their foraging and movement strategies. This research investigates ecological explanations for blackbuck foraging and movement behaviour across a mosaic of natural grassland and agricultural landscapes to develop a predictive framework for crop use by blackbuck and to develop measures to minimise damage.

Social behaviour of insects

Work on the social behaviour of insects has focused on *Ropalidia marginata* whose colonies unlike other primitively eusocial wasps are usually headed by remarkably docile and behaviourally non-dominant queens. As in other species, loss of the queen results in one of the workers taking over as the next queen. But unlike in other species, here the queen's successor cannot be predicted on the basis of dominance rank, other behaviours, age, body size or even ovarian development, in the presence of the former queen. But the swiftness with which one and only one individual becomes evident as the potential queen led us to suspect that there might be a designated successor to the queen known to the wasps, even though the same could not be identified in the queen's presence. Results of the experiments support such a "cryptic successor" hypothesis, and thereby lend credence to the idea that queen (and potential queen) pheromones act as honest signals of their fertility, in *R. marginata*.

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

Brief Introduction and Objective

The Centre was established in 1990. The main objectives of the Centre are to design and conduct research in ornithology covering all aspects of biodiversity and natural history.

Activities Undertaken

During the year, SACON has undertaken nineteen research projects which deals with a variety of specialized topics related with ecosystems in general and with different biological components in particular. Species specific studies on birds and reptiles, and studies relating to ecosystems/





Fig-69. Treefrog (*Philautus bobingeri*) – an endemic stream dwelling species

community ecology, impact assessment, environmental contamination and environmental chemistry were the broad categories of studies. SACON also continued ENVIS programme on wetlands and pursued its nature education programme intensively during the period.

Progress / Achievements

Species specific studies were conducted on certain bird species namely, Andaman Crake, Edible-nest Swiftlet, Indian Grey Hornbill, Spot-billed Pelican and House Sparrow. Study on Andaman Crake focused on the population status, breeding and feeding ecology and recommendation to revise the status of this species from data deficient to the vulnerable category have been made. The conservation programme of Edible-nest Swiftlet showed successful growth of the

population in the in-situ conditions (cave) and commencement of breeding in ex-situ. Recommendation for review of its status in the Wildlife (Protection) Act, 1972 have been made. The study on Indian Grey Hornbill focused on the role of this species in seed dispersal and regeneration of its food plants. The study on House Sparrow examined the impact of urbanization on the species. The study on Spot-billed Pelican assessed their ecological requirements in Uppalappadu, Andhra Pradesh.

- A project funded by the Tamil Nadu forest department identified forty bird attracting tree species for afforestation of degraded sites in Eastern Ghats.
- Herpetological projects included a study on the ecology of the endangered Indian Rock Python in Keoladeo National Park

and an investigation on herpetofaunal community in the Upper Vaigai Plateau, Western Ghats.

- A Multilevel and Multiscalar analysis of wetland systems to evaluate balance in ecosystem services and sustainability concerns in a Ramsar site, Kolleru Wildlife Sanctuary was undertaken in collaboration with the International Water Management Association.
- As a part of environmental assessment, SACON undertook studies on India-based Neutrino observatory project in Nilgiris, development of a management plan for the ecorestoration of Pallikaranai Reserve forest, Chennai, Blewitt's owl habitats in Arakku valley and Mumbai Trans Harbour Sea Link project. The scopes of the projects were mostly limited to impacts on birds, other fauna and flora.
- Monitoring environmental contaminants in Indian Avifauna continued. The project on impact of agricultural pesticides on fish eating birds in Tamil Nadu detected organochlorine pesticides in bird tissues. Training Programme on Instrumentation and Analytical Techniques were conducted.
- An interesting project, "Strengthening community conservation efforts in Nagaland" was initiated to impart technical support on biodiversity conservation and livelihood options to communities, in collaboration with the Nagaland Empowerment of People through Economic Development (NEPED), Kohima.
- The ENVIS Centre on Wetland Ecosystem continued to disseminate information on wetland systems to various stakeholders.
- During the year, SACON continued with

its Nature Education Programmes intensively. Thirty five nature camps were conducted in SACON campus for students from a wide variety of educational institutions. Salim Ali Trophy Nature Awareness Competitions, Young Bird watcher of the year contest, Salim Ali Birth Anniversary Celebrations, World Wetlands Day Programme and Training programme for monitoring wetland biodiversity were important activities undertaken during the year. SACON conducted a Brain storming Session on 'Planet Earth' in commemoration of the year of planet Earth.

- SACON published thirty six research articles in peer reviewed journals, thirty eight papers in conferences/ seminars, five edited books, ten project reports and four popular articles.
- SACON was selected by the Residents Awareness Association of Coimbatore as "Eco-friendly Office 2008".

[Centre for Environmental Management of Degraded Ecosystems \(CEMDE\), University of Delhi, Delhi](#)

[Introduction and objectives](#)

The Centre for Environmental Management of Degraded Ecosystems (CEMDE) was established in 1990 under the aegis of the School of Environmental Sciences, University of Delhi and has been functioning as one of the Centres of Excellence of the Ministry of Environment and Forests since 1997.

The major objectives of the Centre are as follows:

- Develop ecological restoration technologies useful in the ecological rehabilitation of mined out areas and desertified lands.



- Design cost effective technology packages for eco-regeneration of degraded forest lands and polluted habitats;
- Inventorisation of biodiversity for credible assessment of ecosystems;
- Evolve strategies for the conservation, sustainable utilization and valuation of biodiversity;
- Organize ecological surveys and analyze ecosystem functions and
- Conduct training programmes in areas linked to conservation and sustainable development;
- Weed control in protected areas through habitat restoration;
- Formulate strategies for combating desertification.



Fig-70. Baya Weaver

Activities Undertaken

Ecological restoration of abandoned mined out sites

The Centre consolidated the ecological restoration work taken up in Fine Ore Dump of Bailadilla Iron Ore Project, where twenty species of grasses and herbaceous legumes had been planted in the previous two years after inoculating the plant propagules with microbial inoculants for enhancement of their growth rates. Five hundred saplings of woody species such as Albizia, Xylia, Dalbergia latifolia, Pterocarpus, and Cliestnathus have now been introduced on the site. The ecologically restored fine iron ore dump now harbours a community of grasses, legumes and treelets of native tree species which have not only stabilized the dump slope but also controlled the pollution of streams caused by leaching of fine particulate matter of the dump. The technology package developed can be put to use for the stabilization of fine iron ore dumps and control of leaching of fine particulate matter from these dumps.

Ecological restoration of degraded forest ecosystems of Aravallis

A ten acre degraded forest site in the "Beed" area of Vidya Bhavan Society (Udaipur) was chosen two years ago by the Centre to restore it to mixed dry deciduous community. Native grasses interspersed with woody species were planted on the site. The site has been further enriched by addition of native tree species such as Madhuca latifolia, Cordia and Sterculia. The site has been successfully restored and is now being used by Vidya Bhavan Society, and Krishi Vigyan Kendra, Udaipur, as a model for demonstration of field based ecological restoration technologies amongst the local village communities and Panchayats.



Fig-71. Indian Silverbill

Management of Lantana invasion in Protected Areas

Field Biology of Lantana

Taxonomic studies were carried out to understand the variability in the species. It is believed that the findings of these studies will be useful in devising strategies for effective eradication of Lantana species.

Management strategy

The cut rootstock method developed by the Centre is a simple and cost effective method for the removal of Lantana as compared to other physical control methods. The eradication of Lantana involves not only its removal but also removal of seedlings beneath the perching trees of generalist birds, from open surface drainage channels and near the mother plant, and then followed by site-specific restoration of weed free

landscapes by native species.

The management strategy developed using the innovative cut rootstock method has been put to work for the last three years at three demonstration plots (thirty five acres) at Corbett Tiger Reserve (Uttarakhand), one ten acre plot at Kalesar National Park (Haryana) and one ten acre at Satpura Tiger Reserve (Madhya Pradesh). All the demonstration plots are now free from Lantana and support rich wildlife.

The Authorities of the three protected areas have further eradicated Lantana using the management strategy developed. In the Corbett Tiger Reserve alone Lantana was eradicated from more than one thousand seven hundred acres and the state Forest Department of Uttarakhand has also eradicated Lantana from acres of forests using the strategy developed by the Centre. Further,

a series of field nurseries have been developed in the protected areas to multiply grass and legume species in collaboration with the park authorities.

New Flora of Delhi

An illustrated flora with taxonomic keys and concise descriptions of plants of Delhi is being prepared. A total of five hundred species were collected, described and photographed. Keys to taxa were also prepared.

Interface Programme and Outreach/Extension Activities

A workshop was organized on the "Eradication of Lantana from forest ecosystems and habitat restoration" on 5th to 7th January 2008, at Corbett Tiger Reserve. The workshop was attended by 40 officers of different State Forest Departments.

The Scientists of the Centre of Excellence programme gave lecture-cum-demonstration on the management strategy of Lantana in protected areas to Senior Forest Department Officials who participated in the in-service IFS training Programme at Corbett Tiger Reserve from 3rd to 6th November 2008.

Management of Grasslands in Protected Areas

Permanent plots have been set up at Dhikala in Corbett Tiger Reserve to understand the role of management practices such as annual fire regime, clipping of grasses and natural floods on the structure and composition of grassland communities, nutrient dynamics and soil characteristics and nutritive value of herbage. Burning of grasslands has an adverse effect on the soil microbiota, especially the Arbuscular Mycorrhizal Fungi.

Foundation for Revitalization of Local Health Tradition (FRLHT), Bengaluru

In view of the imminent needs for pursuing



Fig-72. Two year old restored fine ore dump site of the Bailadilla Iron Ore project showing grassland developed

research and development on the conservation biology, and training local people on medicinal plants; a Centre of Excellence on Medicinal Plants & Traditional Knowledge was established by the Ministry at Foundation for Revitalization of Local Health Tradition (FRLHT), Bangalore during 2002-2003.

Around six thousand five hundred plant species are used by the different systems of medicine in India. While the demand for medicinal plants is increasing, their survival in their natural habitats is under growing threat. Conservation of the country's medicinal flora will not only serve national interests but also serve global needs, since there is a growing worldwide demand for natural medicine.

This Centre is envisaged to create awareness about India's rich medical heritage, develop a comprehensive database and repository of natural resources used in India's health care traditions, initiate programs for conservation of medicinal plants and act as a nodal agency for dissemination of information on medicinal

plants.

The FRLHT as a Centre of Excellence broadly concentrates in six thematic areas which are Project Coordination, Herbarium of Medicinal Plants used in Indian Systems of Medicine (ISM), Establishment of Ethno-medicinal Plants Demonstration Garden, Pharmacognosy Studies, Distribution Mapping of Medicinal Plants using GIS and Outreach (Training & Educational Material on Plants of ISM)

The progress achieved during the year under each of the above mentioned thematic areas is as follows:

- Towards development of a unique bio-cultural herbarium of Indian medicinal plants, 169 species were added as a result of collections made from different geographic regions in the country. With these additions the total accessions of medicinal plant species in the herbarium have gone up to 2827.
- Ethno Medicinal Garden for demonstration and education was further strengthened with four thematic layouts and addition of educational signages for 200 species growing in the garden.
- Pharmacognosy studies were undertaken in respect of 5 medicinal plant species currently in use as sources of "Daruharidra", a popular ingredient of many Ayurvedic formulations.
- Generation of distribution maps for prioritized medicinal plant species, using GIS, has been consolidated in the form of a digital geographical distribution atlas incorporating geo-distribution maps of 800 prioritized species and eco-distribution maps for 100 species.
- Outreach (Training & Educational Material on Plants of ISM) involved development

and updating the training module for village botanists and release of 3 CD-ROMs covering the medicinal plants used in Siddha, Unani & Homeopathy respectively.

Madras School of Economics, Chennai

Introduction and Objectives

The Centre of Excellence in Environmental Economics was set up on the basis of a MoU in 2002 between the Ministry of Environment & Forests and the Madras School of Economics. The MoU was extended in 2008 for the duration of 11th Five Year Plan. The objectives of the Centre are to carry out research projects, operate a website, conduct training programmes and provide policy assistance on environmental economics in India. During the 10th five year plan, four research projects were completed, the website was designed, made operational, and regularly updated with relevant information for a wide range of stakeholders such as policy makers, academicians, research scholars and students, two training programme for Ministry officials were conducted, and five dissemination papers were brought out. Policy assistance was provided through suitable policy notes and also through membership in several committees set up by the Ministry.

Environmental Economics Website

The Centre's website <http://coe.mse.ac.in> is regularly updated in terms of research studies in the field of environmental economics, particularly in the Indian context. It has served as a major instrument for dissemination. Research reports, dissemination papers, news briefs, useful links and newsletter etc. have also been uploaded in the website. The website was redesigned in 2008, with the new state-of-the-art website providing a one



-step source of information for researchers, Policy makers and other stake-holders.

Studies/Projects completed

Study on 'Economic Analysis of Environmental Impact assessment Environmental Impact assessment (EIA) in India: Costs of Delays, Impacts and Mitigation Measures' completed. The study aimed to develop a methodology for incorporation of economic analysis of environmental costs and costs of mitigation in current EIA procedure in India and also to asses costs of delays in EIA procedure to help streamline the approval process.

New Projects/Scheme approved

Trade and Environment

- 'Trade and Environment with focus on Textile Sector in India': The project aims to identify appropriate policy responses to the twin objectives of promoting the textile exports and tackling the associated environmental problems.
- Eco-Tax on 'Coping with Pollution in India with Eco-Taxes: Integrated Approach Consistent with GST Regime': The study will prepare a policy paper that will provide a framework in which the central and state governments can develop a coordinated inter-governmental approach to tackling issues of pollution in the light of India's growth requirement while keeping pollution within acceptable limits.
- The Centre has also started a new scheme-'Visiting Researchers Fellowship' to strengthen the linkages of the Centre with other leading institutes in India. Under the fellowship, researchers can spend a maximum period two months at the Centre.

- Three dissemination papers were brought out by the Centre during the year:

- (i) Contingent Valuation
- (ii) Precautionary Principle
- (iii) Environmental health

- News Letter Launched: A biannual News Letter of the Centre of Excellence "Green Thoughts" was launched to update readers on the work being carried out at the Centre.

Programme on Trade and Environment

The Ministry has sanctioned a three-year consultancy Project, 'Programme on Trade and Environment' from December 1, 2006. As a part of the Programme, the website dedicated for 'Trade and Environment' has already been launched. The addressed is <http://www.mse.as.in/Trade/index.asp>.

Tropical Botanic Garden and Research Institute (TBGRI) - Thiruvananthapuram

Tropical Botanic Garden and Research Institute (TBGRI) was established by Government of Kerala as an autonomous R&D organization in 1979 to facilitate conservation and research on tropical plant resources in general and of the country and the Kerala state in particular. The Institute was brought under the society established by the State Government namely "Kerala State Council for Science, Technology and Environment" (KSCSTE) in 2003. The institute is located at about forty km northeast to Thiruvananthapuram city and maintains a three hundred acre conservatory garden for the wild tropical plant genetic resources of the country, besides a well integrated multidisciplinary R&D system dealing with conservation, management and sustainable utilization of tropical plant resources.

Activities undertaken

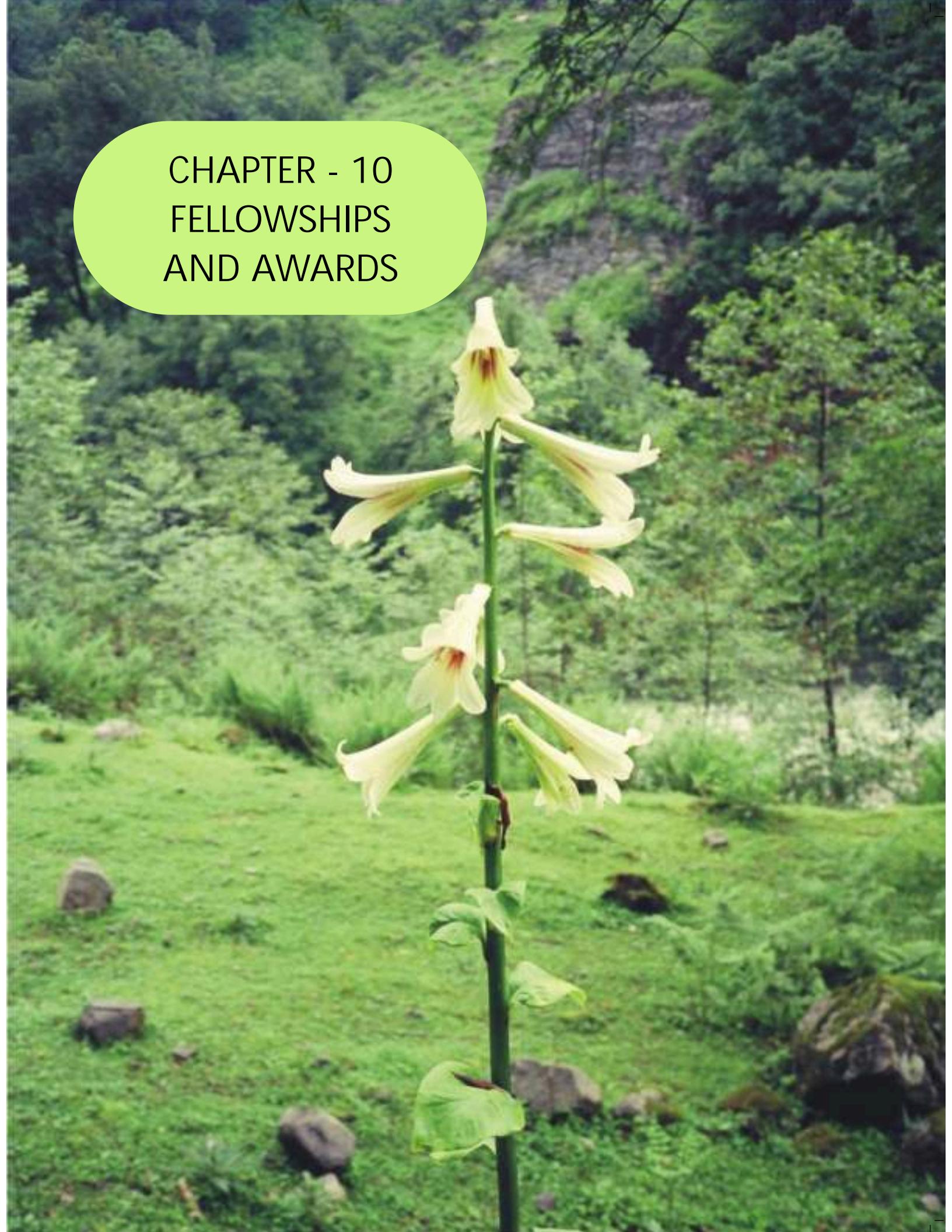
The Institute was recognized as a National Centre of Excellence in ex-situ conservation of tropical plants and a number of research projects as referred below were successfully implemented by the institutes.

Progress / Achievements

- Introduced over one hundred thirty accessions including trees, medicinal plants, bamboos, palms etc to the living plant collection. Twenty five species of palms and twenty species of ferns introduced from highlight of this collection.
- Database on two hundred twenty Plant species of the Western Ghats developed and a manuscript in Ethnobotany was revised.
- More than one thousand two hundred collections of lower Fungi organized, common fungal pathogens of twenty two *Vanilla* Plantations were collected from different parts of Kerala.
- About one hundred forty macro - lichens and one hundred micro lichens were collected, thirty seven species were found to be new records.
- Pollination and seed cryobanking of two horticulturally important orchids was developed.
- Hairy root cultures of *Rauwolfia micrantha* were found to contain significant quantities of the anti-hypertensive agent, Ajmalicin.
- Partial c-DNA of tyrosin carboxylase gene involved in L-DOPA synthesis was isolated and characterized.
- Genetic diversity was estimated in thirteen accessions of *Mucuna pruriens* (L.) DC.
- Insect repellent property of certain plants of the Andaman Islands was analysed and development of Bee and Mosquito repellent formulation is in progress.
- Potential molecules having flavouring, fragrant and anti-oxidant properties isolated from selected plants. At least four international publications were made out of these.
- As part of chemical prospective of plants, biological molecules of *Curcuma*, *Thottea* and *Pittosporum* species were characterized.
- An active coumarino – lignoid compound involved in stimulating water and electrolyte absorption in intestine was identified.
- Proteins isolated from an active fraction, involved in anti-stress activity of *Trichopus zeylanicus* were isolated and are being characterized.
- Analgesic and anti-inflammatory studies on the plant extract (*Justicia genderossa*) is completed.
- The antidiabetic property of *Pilea microphylla* and the wound healing property of *Glycosmis pentaphylla* has been confirmed in animal models.
- One thousand six hundred herbarium specimens were processed and ninety species of plants were collected and taxonomically identified.
- Reproductive biology of *Impatiens dassysperma* was critically studied.
- Nine hundred thirty two collections were added to mushroom herbarium.
- Draft of the Children's Handbook on Medicinal and Food Plants (1st volume) prepared.



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- Herbs for all and Health for all: awareness and training programmes completed in the Vithura Gramapanchayath. A trainer's manual (98 pages) prepared is under print.
 - Remote village collections of banana germplasm organized through people support.
 - Multiplied high value medicinal plants, distributed to beneficiaries and imparted training in nursery practices and cultivation at Kanjukuzhy Panchayath, Alappuzha district (One year project).
 - A biodiversity awareness workshop organized for thirty delegates from Kollam Corporation; training on plant propagation imparted to seventy five Plus Two students during National Technology Day.
 - Three popular varieties of banana (Nenthran, Robusta, Grand Naine) and ornamentals multiplied and distributed to the public to generate about Rs. 1.5 lakhs as income.
 - Over 25,000 students and visitors visited TBGRI during the year and the message of conservation was effectively disseminated.



CHAPTER - 10 FELLOWSHIPS AND AWARDS

Indira Gandhi Paryavaran Puraskar (IGPP)

Introduction and Objectives

In reverential memory of late Prime Minister Smt. Indira Gandhi, the Ministry of Environment and Forests, in the year 1987, instituted an award called "Indira Gandhi Paryavaran Puraskar (IGPP)" to give recognition to those having made or have the potential to make the measurable and major impact in the protection of environment. In the beginning, a cash prize of Rs.1,00,000/- was awarded to deserving individual/organization of India. Since 1991, the prize of Rs. 1,00,000/- each were awarded separately to individual and organizational category. From the year 2002, the prize money was enhanced to Rs. 5,00,000/- in each category. Subsequently, the regulation governing the IGPP has been revised from the year 2005 onwards. As per the revised

regulations, one prize of Rs.5,00,000/- under the organization category and two prizes of Rs.3,00,000/- and Rs.2,00,000/- each to individuals in the Individual category shall be given annually. Along with the cash prize, each awardee is given a silver lotus trophy and a citation. Any citizen of India or organization working in India for the cause of environment is eligible for the award. The environmental Prize Committee constituted under the Chairmanship of Hon'ble Vice President of India select the awardees. The nomination for the award can be recommended by any citizen of India. Self nominations are not considered. There is no age limit for the nomination. Shortlisting of the nomination is carried out by three Expert Members selected by the Prime Minister's Office.

While selecting the awardees the term



Fig-73. Awardees of IGPP – 2005 with the President of India in the Award giving ceremony on 5th June, 2008

"environment' is interpreted in the broadest sense possible and comprising of following areas of work:

- Prevention of Pollution.
- Conservation of Natural Resources.
- Rational use of depletable resources.
- Environmental Planning and Management.
- Environmental Impact Assessment.
- Outstanding field work (innovative research work) for enrichment of environment e.g. afforestation, land reclamation, water treatment, air purification etc.
- Environmental Education.
- Creating awareness of environmental issues.

Present Status

The awardees for the Indira Gandhi Paryavarjan Puraskar for the year 2005 were selected by the Prize committee under the Chairmanship of Hon'ble Vice President of India. The awards were given away by Her Excellency Smt. Prathiba Devisingh Patil, President of India in the award ceremony held at Vigyan Bhawan, New Delhi on 5th June, 2008 on the occasion of World Environment Day.

The nominations received for IGPP-2006 were processed. Short-listing of the nomination has been carried out by the three experts selected by PMO. The ground truth verification of the short-listed nominations was carried out by the Regional Offices of the Ministry. Similarly short-listing of the nomination received for IGPP-2007 have also been done by the three Expert members selected by PMO separately and ground truth verification for the same was

carried out by Regional Offices of the Ministry. The short-listed nominations incorporating the ground truth verification for IGPP -2006 and IGPP-2007 were placed before the Prize Committee under the Chairmanship of Hon'ble Vice President of India on 24th October, 2008 and 19th March, 2009 respectively for selection of awardees. The selection of awardees for IGPP-2006 and IGPP-2007 has been done by the Prize Committee, and the awards are proposed to be given away to the awardees on 5th June, 2009. The nominations received for IGPP-2008 are being processed for consideration of the Prize Committee.

[Indira Priyadarshini Vriksha Mitra \(IPVM\) Awards](#)

The Indira Priyadarshini Vriksha Mitra (IPVM) Awards were instituted in 1986 to recognize the pioneering and innovative contribution made by the individuals and institutions in the field of afforestation/wasteland development every year.

Till the year 2005, the awards were given under twelve categories but from 2006 onwards the awards were restructured to enhance their response and prestige and now awards under four categories are given which are given below:

1. Individuals including Government Servants
 2. Joint Forest Management Committee (JFMC)
 3. Institutions / Organizations under Government
 4. Non-Governmental Institutions / Organizations
- Only one award is given in each category.
 - Cash prize of Rs. 2.5 lakhs along with Medallion and Citation is given for each

category.

- Nominations of Government servants/ Govt. Institutions/Organizations are forwarded through the Head of the Department/Organization concerned and those from JFMCs may be forwarded by the PCCF concerned.

The Awards upto the year 2005 have been conferred and the same for the calendar year 2006 and 2007 are under process.

IPVM Awards for States and Union Territories

IPVM Awards for States and Union Territories commencing from the year 2008 are under consideration. These awards are to be given to States/UTs for enhancing the percentage of Forest and Tree Cover in their respective States/UTs. The awards are divided into three categories and only one award is to be given in each category as under:-

a)	Big States having geographical area of 80,000 Sq.Km. and above.	Rs.8.00 lakhs (One)
b)	Small States having geographical area below 80,000 Sq.Km.	Rs.5.00 lakhs (One)
c)	Union Territories	Rs.5.00 lakhs (One)

Pitamber Pant National Environment Fellowship

Pitamber Pant National Environment Fellowship instituted in 1978 is awarded every year to encourage and recognize excellence in any branch of research related to the environmental sciences. The fellowship

is awarded every year and is in recognition of significant important research/development contributions and is also intended to encourage talented individuals to devote themselves to Research and Development (R&D) pursuits in the field of environmental sciences. The duration of the fellowship is two years. So far, twenty seven fellowship Awards have been given to various Scientists throughout the country. Fellowship for the year 2007 and 2008 is under process.

During the year, guidelines and norms for award of fellowship were revised, restricting the age of the applicant to 60 years. The application should also be supported by at least two Fellows of the National Academy of Science/ Engineering/Agriculture.

B.P.Pal National Environment Fellowship for Biodiversity

B.P.Pal National Environment Fellowship Award for bio-diversity was instituted during 1993 and is awarded annually with a view to further develop, deepen and strengthen the expertise on Bio-diversity available in the country.

The fellowship is in recognition of significant important research and development contributions and is also intended to encourage talented individual to devote themselves whole-time to R&D pursuits in the field of bio-diversity. Duration of the fellowship is two years. So far, ten Fellowship Awards have been awarded to various scientists throughout the country. Fellowship for the years 2007 and 2008 is under process.

During the year the guidelines & norms for award of fellowship were revised, restricting the age of applicants to sixty years. The application should be supported by at least two Fellows of the National Academy of Science / Engineering / Agriculture.

E.K. Janaki Ammal National Award on Taxonomy

The nominations for E.K. Janaki Ammal National Award on Taxonomy for the year 2007 were duly invited through advertisements in print and electronic media and by writing letters to all concerned. A Meeting of the Selection Committee for the Janaki Ammal National Award on Taxonomy for 2007 was held on October 17, 2008 under the Chairmanship of Secretary (E&F). The Committee carefully went through the particulars of twenty one nominees.

Taking various relevant factors into consideration, the Committee unanimously resolved to confer the Janaki Ammal National Award on Plant Taxonomy for the year 2007 to Dr.M.Sanjappa, Director, Botanical Survey of India, Kolkata and the Janaki Ammal National Award on Animal Taxonomy for the year 2007 to Dr. Y.Ranga Reddy, Department of Zoology, Acharya Nagarjuna University, Nagarjunanagar, Andhra Pradesh.

Dr. M.Sanjappa has done outstanding work on the flowering plant families of Leguminosae, Ericaceae, Aritolochiaceae, Iridaceae and Lamiaceae. His contributions have significantly enriched our understanding of these important plant groups. Dr. Sanjappa's pioneering work has formed the basis of the World Legume Database for India and South Asia. As a field biologist, he has explored various ecosystems of India and other countries and discovered thirty six new species and twenty three records of potential economic value.

Dr. Y. Ranga Reddy has meticulously revised as many as twenty crustacean genera besides discovering about fifty new species, establishing four new genera, two new families and reporting about twenty new records for India. Considering the fact that the

diversity of crustaceans is far less than that of insects, Dr. Reddy's discovery of new crustacean taxa from India is very impressive. He has also resolved several previously intransigent taxonomic problems, particularly concerning diaptomid copepods. His outstanding contributions to the taxonomy of these aquatic organisms are well known throughout the world and have rendered his name synonymous with the Indian copepods and bathynellaceans.

Amrita Devi Bishnoi Wildlife Protection Award

The "Amrita Devi Bishnoi Wildlife Protection Award" is a national award instituted by the Ministry for protecting wildlife, which carries a cash award of Rs.One lakh, apart from citation and medallion. This annual award is given to an individual/institution pertaining to rural communities for significant contribution in the field of wildlife protection, which is recognized as having shown exemplary courage and valor or having done some exemplary work for the protection of wildlife in the country. During October 2008, in the institutional category, the award (for the year 2006) was given to Manas Maozigendri Eco tourism Society (MMES).

Rajiv Gandhi Wildlife Conservation Award

The Rajiv Gandhi Wildlife Conservation Award is given for significant contribution in the field of wildlife which is recognized as having made or has the potential to make measurable and major impact on the protection and conservation of wildlife in the country. Two awards of Rs. One lakh each, along with medallions, and citations, are given to:

- Education and research institutions and organizations, and
- Forests and Wildlife Officers/research



scholars or scientists / wildlife conservationists.

During October 2008, in the institutional category, the award (for the year 2006) was given to Gujarat Ecological Education and Research (GEER) Foundation, Gujarat. In the individual category, the awards (for the year 2006) were jointly given to Dr.Prakash Baba Amte and Shri. Aseem Srivatava. .

In addition, the Ministry also awards two fellowships viz. a) Dr. Salim Ali National Wildlife Fellowship and b) Shri Kailash Sankhla National Wildlife Fellowship. The fellowships are awarded to inspire and promote, particularly the younger generation of wildlife managers and scientists, for taking up research/experimental projects aimed at conservation of the rich wildlife heritage of this country. Dr. Salim Ali National Wildlife Fellowship and Shri Kailash Sankhla National Wildlife Fellowship Awards are awarded for Research/experimental projects on avian wildlife and on mammalian wildlife respectively.

Pollution Awards

To encourage various industries/ operations to take significant steps for prevention of pollution this Ministry has instituted two national level Awards. These are:

National Awards for Prevention of Pollution : These awards are given each year in the form of a cash award of Rupees One lakh in

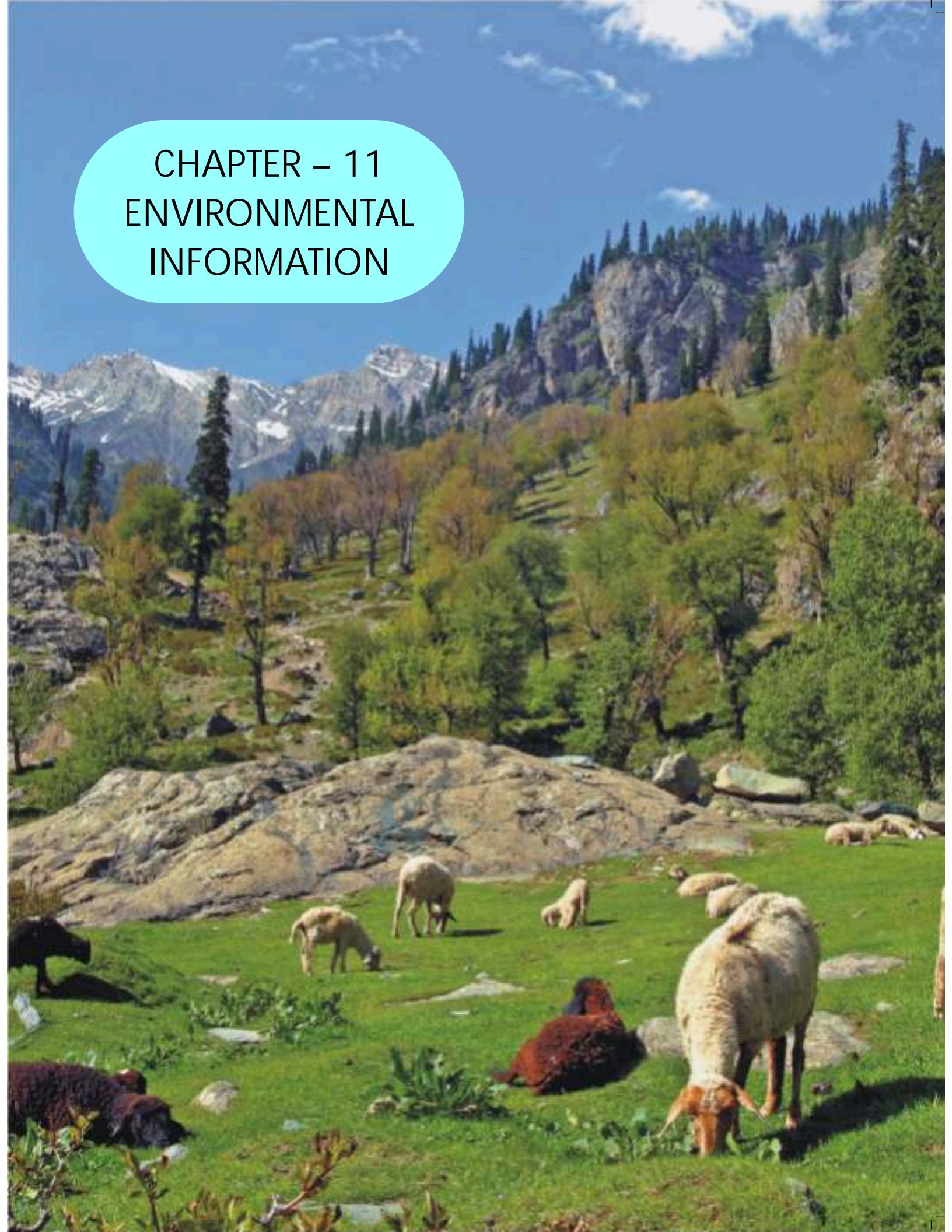
addition to a silver trophy and a citation to twenty three industrial units (eighteen large scale and five small scale units) belonging to eighteen categories of highly polluting industries which make a significant and measurable contribution towards development or use of clean technologies, product or practices that prevent pollution and find innovative solution to environmental problems.

Rajiv Gandhi Environment for Clean Technologies: This award is also given annually in the form of a cash award of Rupees one lakh along with a silver trophy and a citation to one of the best among the industrial units, particularly from the angle of adoption of clean technology, identified by the Selection Committee while reviewing the nominations for National Awards for Prevention of Pollution.

The nominations for these Awards for the year 2007-08 have been received and are under process for selection of awardees. The Awards will be given on June 5, 2009, the World Environment Day.

"Medini Puraskar" for writing original books in Hindi

With a view to encourage writing of original books in Hindi on the subjects related to environment, five writers were awarded Medini Puraskar on the occasion of Ozone Day, the September 16, 2008 by the Hon'ble MoS (Environment).

A scenic mountain landscape featuring a rocky foreground with sheep grazing on green grass. In the middle ground, there's a mix of green and yellow autumn-colored trees on a hillside. The background consists of majestic, snow-capped mountain peaks under a clear blue sky.

CHAPTER – 11

ENVIRONMENTAL INFORMATION

Environmental Information System (ENVIS)

Introduction

The Ministry set up an Environmental Information System (ENVIS) in 1983 as a plan programme and as a comprehensive network in environmental information collection, collation, storage, retrieval and dissemination to varying users, which include decision-makers, researchers, academicians, policy planners, research scientists, etc. ENVIS was conceived as a distributed information network with the subject-specific centres to carryout the mandates and to provide the relevant and timely information to all concerned. Association of the various State Governments/UTs was also felt necessary in promoting the ENVIS network to cover a wide range of disciplines of subjects and the cooperation of the various State/UT Governments. Keeping this in view, the network was expanded gradually with the involvement of thematic subject-areas and State Government departments to make it a more comprehensive environmental information network.

ENVIS network at present consists of a chain of 76 network partners out of which 46 are on subject-specific and 30 are on State related issues. These network partners are called ENVIS Centres and are located in the notable organizations/ institutions/State/UT Government Departments/Universities throughout the country. The Focal Point of ENVIS is located in the Ministry and coordinates the activities of all the ENVIS network partners to make ENVIS a web-enabled comprehensive information system. The list of ENVIS network partners is given at Annexure-X.

Objectives

There are two objectives one is "Long term"

and the other is "Short term objectives". These are as follows:

Long Term Objectives

- To build up a repository and dissemination centre in Environmental Science and Engineering;
- To gear up the modern technologies of information acquisition, processing, storage, retrieval and dissemination of environmental nature;
- To support and promote research, development and innovation in environmental information technology.

Short Term Objectives

- To provide national environmental information service relevant to present needs and capable of development to meet the future needs of the users, originators, processors and disseminators of information.
- To build up storage, retrieval and dissemination capabilities, with the ultimate objective of disseminating information speedily to the users.
- To promote national and international cooperation and liaison for exchange of environment related information.
- To promote, support and assist education and personnel training programmes designed to enhance environmental information processing and utilizing capabilities.
- To promote and exchange of information amongst developing countries.

Progress of activities undertaken

The ENVIS network continued its information-related activities, database development, publication of requisite information packages

through newsletters, abstracting services, etc. and also the query-response services during the year. Details of these activities are as follows:

- The Scientific Advisory Committee of ENVIS was re-constituted by including Experts from different Research, Academic Organizations related to various thematic areas and representatives of Central Ministries dealing with different aspects. Meeting of the re-constituted Scientific Advisory Committee was held and initiatives to streamline the working of ENVIS Centres and to constitute Technical Committees to evaluate the performance in thematic groups and to consider new proposals for setting up new ENVIS Centres were recommended.
- Five Thematic and three Regional Technical Committees have been constituted with independent experts as chairpersons from the concerned fields and representatives of the concerned technical divisions of the Ministry to evaluate the performance of the ENVIS Centres and also to examine the applications for the new ENVIS Centres on the topics not yet covered. The advertisement for this purpose was put on the website of the Ministry for giving wide publicity and ensuring transparency.
- As per the recommendations of the Scientific Advisory Committee to hold technical seminars in all thematic and regional groups on topics of common contemporary interest along with the evaluation workshops so as to guide the ENVIS Centres to focus their work in the priority areas, four seminars have been organized on the following topics:
- Changing Energy Scenario and its impact on Developments;
- Sustainable Consumption;
- Changing Himalayan Environment and its Impact on Development; and
- Coastal Eco-system Management.
- MOU for setting up new ENVIS Centres in Arunachal Pradesh, Meghalaya and Lakshadweep were sent to the concerned States/Union Territory for signing on the Agreement and Terms of Contract for setting up ENVIS Centre. Further action would be taken after receipt of the signed MOU from the concerned State/Union Territory.
- Activities of ENVIS is being augmented by web enabled information on research and development, awareness related to technical aspects for the help of stakeholders on the website as well as in print form.
- ENVIS Focal Point continued to publish "Annual Report" of the Ministry.
- The Virtual Public Network (VPN) is being strengthened to assist the ENVIS network partners to upload the updated information at source.
- The quarterly newsletter namely, "ENVIRONNEWS" and the quarterly journal namely, "Paryavaran Abstracts" continued to be published.
- ENVIS Focal Point in the Ministry is responsible for maintenance and updation of the website of the Ministry (URL: <http://envfor.nic.in>) and disseminating information through the website to all concerned. Information in the Ministry's website was continuously updated by ENVIS throughout the year. The website (Fig.-74) has also been linked



with the various Divisions of the Ministry in order to have up-to-date information on the subject concerned. Besides, the website is also regularly providing information on the new updates of the Ministry, response to media reports and other important issues of the Ministry from time to time with the objective of disseminating such information to all concerned. Information has also been arranged in various heads which include current events, clearances, legislation, Parliament matters, Treaties/Conventions, Publications, etc. The website recorded a huge number of hits per month reflecting the usage of website by various national and international users.

- A portal of ENVIS at URL: <http://www.envis.nic.in> was connected to all the ENVIS network partners and updated regularly by the focal point (Fig.- 75). The portal acts as a catalyst for inter-Centre interaction and for information on several broad categories of subject related to environment under which the Centres have been grouped. The websites of all the ENVIS network partners could be directly accessed from the homepage of the portal information on major events, activities and current updates of the entire network.
- ENVIS Centre located at World Wide Fund – India continued the periodical publishing of the NGO Directories. The 9th edition of the NGO Directory was published during the year.
- Two workshops to review the working of Indian State Level Basic Environmental Information Database (ISBEID) and to get the feedback so as to improve the working of ISBEID to support preparation of SoE

Reports were held at Gangtok and Mumbai. While the States in the North Eastern Region, Orissa, Jharkhand and West Bengal participated in the Sikkim Workshop, the States of Kerala, Tamil Nadu, Madhya Pradesh, Maharashtra and Andhra Pradesh participated in the workshop at Mumbai. Based on the report of these workshops, ISBEID scheme would be reviewed and it would be extended for all the States after making necessary modifications and improvements in the scheme.

- The ENVIS has been representing the Ministry in various Committees of the Government, especially those constituted by Ministry of Programme Implementation and Statistics. It also provided necessary information for publication of Compendium of Environmental Statistics, report on Millennium Development Goal, Statistical Abstracts, etc., periodically. ENVIS also provided necessary information to Ministry of Information and Broadcasting to publish their annual document namely, "India-a Reference Annual, 2008".

State of Environment Reporting Scheme

- During the Xth Plan period Ministry launched a scheme for preparation of State Environment Report with the objective of highlighting the upstream and downstream linkages with environmental issues besides creating a baseline document in the form of SoE Report in which each State/UTs has to prepare the state of environment in their respective states. Under the scheme 100% central assistance was provided to the States/UTs to prepare their SoER. At the end of the Xth Five Year Plan almost all the States/UTs except Arunachal Pradesh, J&K,

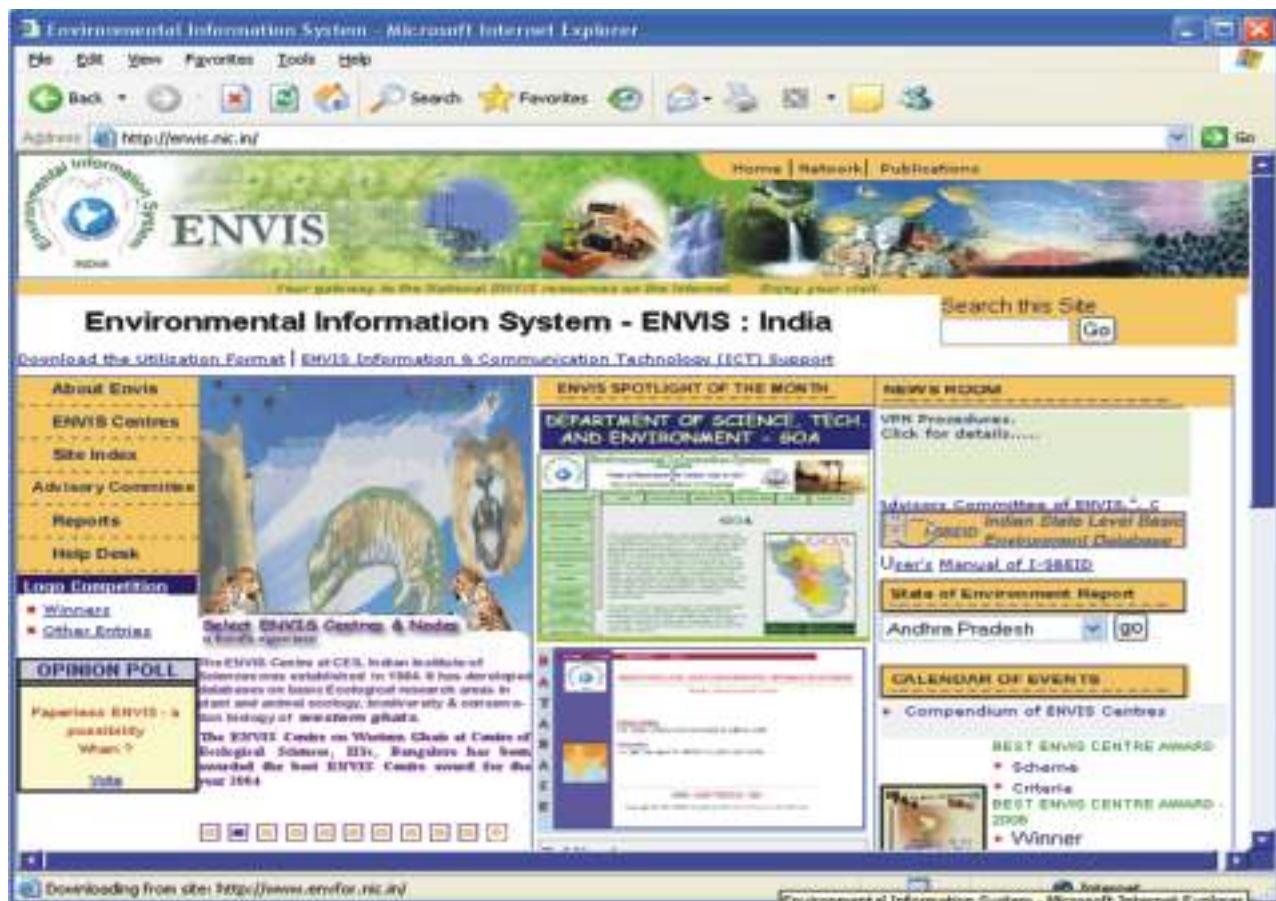
Fig.-74. Snapshot of Ministry's website (<http://envfor.nic.in>)

Lakshadweep, Goa, Tripura, Delhi, Karnataka and Uttar Pradesh have completed their Reports.

- The scheme was extended to the XIth Five Year Plan and the Ministry initiated the job of preparation of the State of Environment Report in a phased manner with some additional features like SoE Atlas, video photo catalogue, SoE CD and SoE website etc. for each State/UTs including those left out in the previous Plan.
- Among the initiatives taken in this regard during the current financial year, the Report of Uttar Pradesh and Lakshadweep is nearing completion. The draft report will be placed for comments/suggestions during the stake

holder workshop. The preparation of the Report in the states of Karnataka, Arunachal Pradesh, Tripura, and Andhra Pradesh are in progress. Along with the preparation of the SoE Report for the state of Andhra Pradesh, the city of Hyderabad was also taken up for preparation of its SoE Report with a view to bring the metro cities under the SoE Scheme.

- The Ministry has also initiated to prepare fresh SoE Report including SoE plus along with other features in a web based interface during the current financial year for the states of Assam, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab and Sikkim. Advertisement for inviting Expression of Interests for undertaking the job has already been uploaded in the Ministry's website.

Fig.-75. Snapshot of ENVIS website (<http://www.envis.nic.in>)

State of Environment Atlas – India

The status of environment and the contribution of conventional development strategies to achieve sustainable development have been a matter of increasing concern over the last few decades. Recognizing the need for a systematic database as a planning pre-requisite, the Ministry has developed an "State of Environment Atlas – India" in collaboration with Development Alternatives, New Delhi. The dossier and CD of the SoE Atlas was released by Shri Namo Narain Meena, Hon'ble MoS (E&F) and Ms. Meena Gupta, Secretary (E&F) on the Earth Day i.e. 22nd April, 2008 at a function organized by the Ministry in collaboration with The Energy Resources Institute (TERI) in New Delhi.

The Atlas provides information on all aspects

of green (forests), blue (water) and brown (pollution) environmental issues in the forms of maps, data, tables, photographs and bibliographic materials in an easy to use format so that it can be shared easily and quickly amongst the stake holders. It is also having interactive maps on specific themes and an interactive geo spatial website on Environment Atlas status, trend PSIR framework analysis with tools of interactivity.

The Interactive Atlas will be regularly updated on a quarterly basis on the website and update CD will be made for publication on an annual basis.

State of Environment Report – India, 2009

- During the year, Ministry initiated the preparation of the 'State of Environment Report India, 2009' in collaboration with

Development Alternatives, New Delhi. The SoER India, 2009 provides information in the forms of map, charts, data tables, photographs on various facets of green, blue and brown environmental issues and analyses following on the Pressure – State – Impact – Response (PSIR) analytical frame work. It outlines the state and trend of the environment (land, air, water, biodiversity) and five key environmental issues identified for India as (i) Climate Change, (ii) Food Security, (iii) Water Security, (iv) Energy Security and (v) Managing Urbanization. Some policy suggestions and recommendations have also been outlined at the end of the chapter.

- The SoE Report was discussed in the Senior Officers Meeting and the suggestions were duly incorporated in the

Report. Two Sensitization and Stakeholder Meetings for preparation of State of Environment Report – India were held, one at the initial stage and the other in the final stage, and the suggestions were taken into account for incorporation. Related Ministries in the Government of India were consulted and their comments have been included in the report. The Report is in the final stage of completion.

Statistical Cell

The role of Statistical Cell in the Ministry *inter alia* includes to assist different Divisions of the Ministry in providing Statistical inputs and also to liaison with other Central Ministries/ Organizations/ other agencies national and international in the matter of environment and forestry statistics.

- A paper on Status of Environment Statistics its Scope and Uses" was prepared and



Fig-76. Release of State of Environment Altas – India by Hon'ble Minister of Environment & Forests

presented at 16th Central and State Statisticians' Conference at Shimla in December, 2008.

- A paper on 'Status of Forestry Statistics' in India was included in publication of ICFRE on the topic dealing with Forest Statistics.

Information and Facilitation Counter (IFC)

The Information & Facilitation Counter at Paryavaran Bhavan has been functioning for over three years. Its operations have been outsourced to Centre for Environment Education, a Centre of Excellence supported under this Ministry. The IFC is equipped with a helpdesk, touchscreen computer and open display area to guide the visitors. The priced publications of the Ministry are available from the IFC against payment.

- IFC continued to disseminate the Ministry's publications such as Annual Reports, Brochures, Journals, Newsletters, Research Guidelines, Awards Guidelines, Funding Schemes etc. It is also providing guidance regarding application procedure for various schemes of the Ministry along with the information about

the status of various applications submitted to the Ministry.

- IFC also helps in receiving the RTI applications from applicants under the "in-person" option.

NGO Cell

- A Non-Governmental Organisation Cell (NGO Cell) has been set up in the Ministry to handle various matters relating to NGO's working in diverse field of environment. The basic functions of the Cell are:

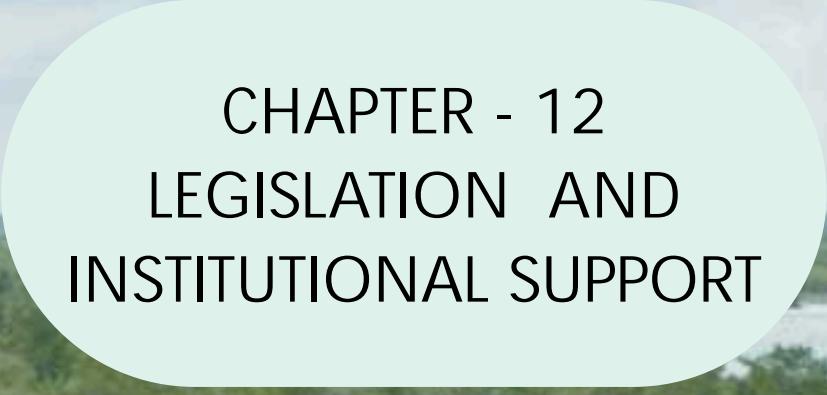
Collection and dissemination of information to various NGOs.

Liaison with the Planning Commission and other Govt. Ministry to create a database of various NGOs working in the field of environment and its associated areas.

- The Ministry in collaboration with the ENVIS Centre at WWF- India brought out the 9th edition of the NGO's Directories which was released by Hon'ble Ministers of State on World Environment Day, 2008. The latest edition has listed more than 2300 NGOs working on environment related issues all over the country. The brief information of the NGOs includes registration number and date, thematic areas of operations, contact address, website, major activities carried out etc

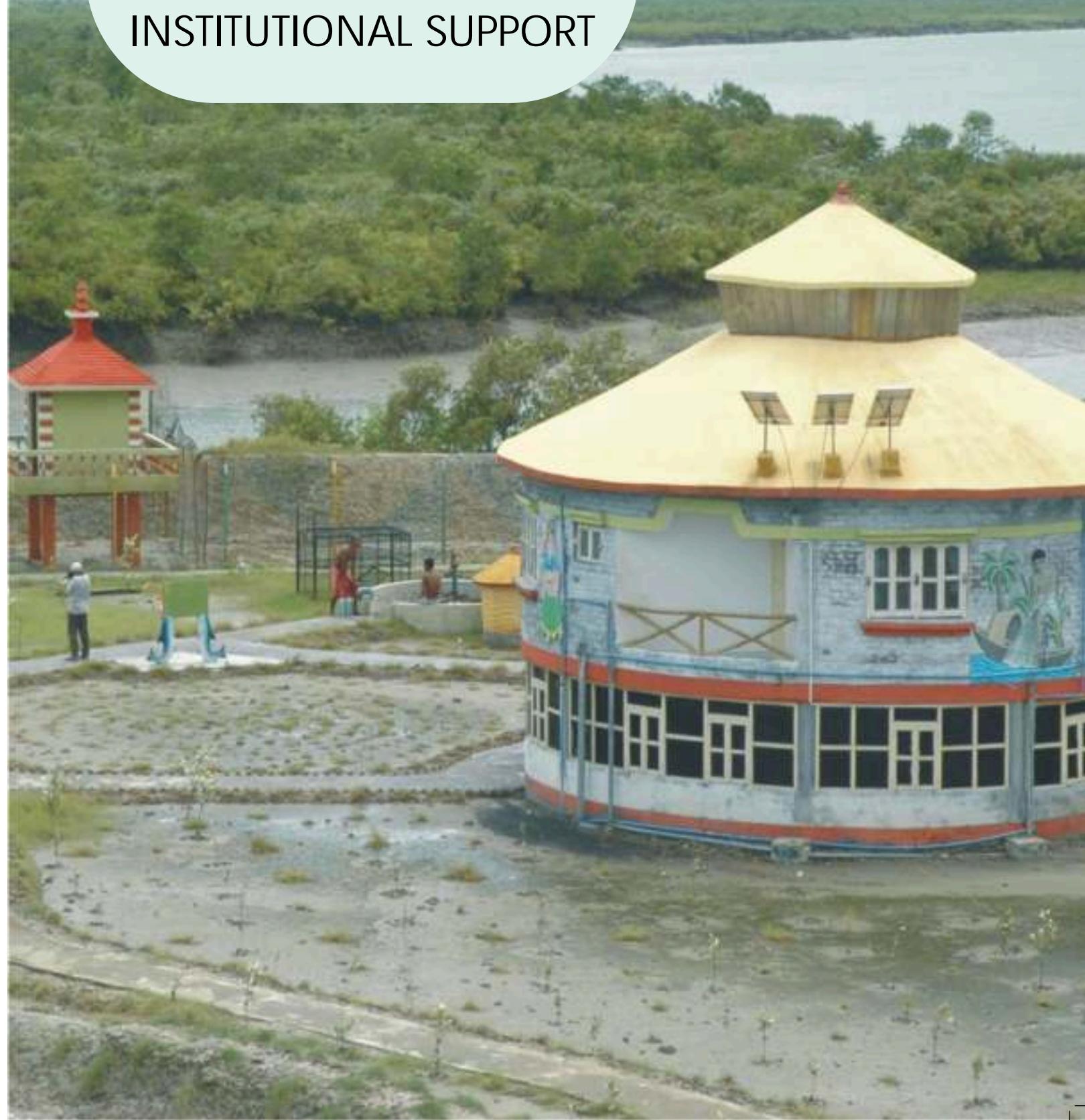


Fig-77. A view of Information and Facilitation Counter in the Ministry



CHAPTER - 12

LEGISLATION AND INSTITUTIONAL SUPPORT



Introduction

The Policy and Law Division of the Ministry is partly implementing the schemes 'Assistance for Abatement of Pollution, Environment Policy and Law' and 'Establishment of Environment Commission and Tribunal' and providing legislative and institutional support to other thematic divisions whenever need for any amendment to existing legislation/notification or enactment of new legislation arises. In addition, the division is specifically looking after the implementation of the National Environment Policy 2006, recommendations of the Law Commission in its 186th report and the Ecomark Scheme.

National Environment Policy, 2006

The National Environment Policy (NEP) 2006 is the first comprehensive policy document formulated at national level for realizing the overarching goal of sustainable development in the country. It does not displace but builds on earlier policies. It is the outcome of extensive consultations with experts, governments, industry associations, academic and research institutions, civil society, Non-governmental Organizations (NGOs) and the public. The National Environment Policy (NEP) outlines the significance of a number of new and continuing initiatives for enhancing environmental conservation which requires coordinated action of diverse actors and stakeholders at all levels.

The National Environment Policy has been widely circulated and is available on Ministry's website moef.gov.in. The Ministry has written to Central Ministries/Departments and State Governments/ UT Administrations to ensure that the environmental concerns

expressed in the NEP 2006 are appropriately integrated and mainstreamed in the Sectoral/State development plans during the XIth plans period. Further all the Central Ministries have also been requested for formulation of Action Plan for effective implementation of the NEP. The Division is coordinating the formulation and implementation of the Action Plans of various divisions of the Ministry.

An Interactive Workshop for formulation of Action Plans and review of implementation of National Environment Policy (NEP) 2006 was organized on January 31, 2009. The workshop have the participation of seventy Senior Officers (Deputy Secretary and above) of MoEF, Central and State Pollution Control Boards and various key Ministries and Departments. The Workshop provided a common forum to discuss the procedural hurdles and explore solutions jointly.

Law Commission Recommendation for setting up Environmental Courts

The Law Commission in its 186th Report pursuant to the judgment of Hon'ble Supreme Court of India in the matter of A.P. Pollution Control Board Vs. Prof. M.V. Naidu. (Reported in 1999(2) SCC 718 and 2001(2) SCC 62) has, inter alia, recommended establishment of environmental courts in each State consisting of judicial and scientific experts in the field of environment for dealing with environmental disputes having appellate jurisdiction in respect of appeals under various pollution control laws. The Commission also recommended repeal of the National Tribunal Act, 1995 and the National Environment Appellate Authority Act, 1997 after environmental courts have been set up. The Ministry has accepted the

recommendations of the Law Commission of India in principle. The draft of the National Environmental Tribunals (NET) Bill is being finalized in consultation with the Ministry of Law and Justice.

Eco-Mark Scheme

The Ministry launched the Eco-Mark Scheme in 1991 for identification of environment friendly products. The basic objective of the Scheme is to encourage the consumption of such environment friendly products by providing criteria and labeling for household and other consumer products which meet certain environmental criteria along with ISI quality requirements of the Bureau of Indian Standards. The Eco-Mark Scheme has been awarded a distinguished sign of "earthen pot" as its logo. This is a voluntary scheme based on the cradle to grave approach.

As of now, out of seventeen product categories for which criteria has been notified by the Ministry, licenses for three product categories have so far been obtained by twelve manufacturers. The Scheme is presently under review in order to expand the coverage of products and its adoption and for popularizing the same amongst the consumers and manufacturers.

Constitution of Expert Committees

To look into the system of various clearance including Forest/Environmental clearances for industrial and infra-structure projects and how best these can be implemented along with the requisite timelines, a High Power Committee under the Chairmanship of Secretary, Planning Commission is being set up.

Meeting of the High Powered Committee to

look into the recommendations of the Experts Group constituted in the Department of Economic Affairs on the system of statutory clearances for industrial and infrastructure projects under the Secretary, Planning Commission, was held on February 18, 2009.

A study group under the Chairmanship of Additional Secretary (CP) to address the issue of widening hiatus between environmental regulations and their enforcement and made recommendations as to the legal and institutional arrangement to secure better enforcement of environmental laws is also set up.

Meeting of the study group set up to look into the issues of widening hiatus between Environmental regulations etc. was held on March 30, 2009 under the Chairmanship of Additional Secretary (CP)

Trade and Environment

Introduction and objectives

With privatization, liberalization and globalization of the Indian Economy, environment and forest sectors are also undergoing signs of change. Also with the looming dangers of global warming and climate change, environment has emerged as a matter of great concern at both the national as well as international level. Environment and forests sectors have also started figuring as areas of interests in the bilateral and Free Trade Agreements. India being a founder member of the World Trade Organization (WTO) is governed by its basic binding principles and has been actively participating in such trade negotiations. The Doha Round of Trade Negotiations launched in November, 2001 has introduced negotiations in the environmental goods & services, as a result,





both the environmental goods and environmental services have emerged as areas of significance for India. Para 31(iii) of the Doha Ministerial Declaration (DMD) enjoins upon the WTO members to reduce or eliminate tariffs on environmental goods and services.

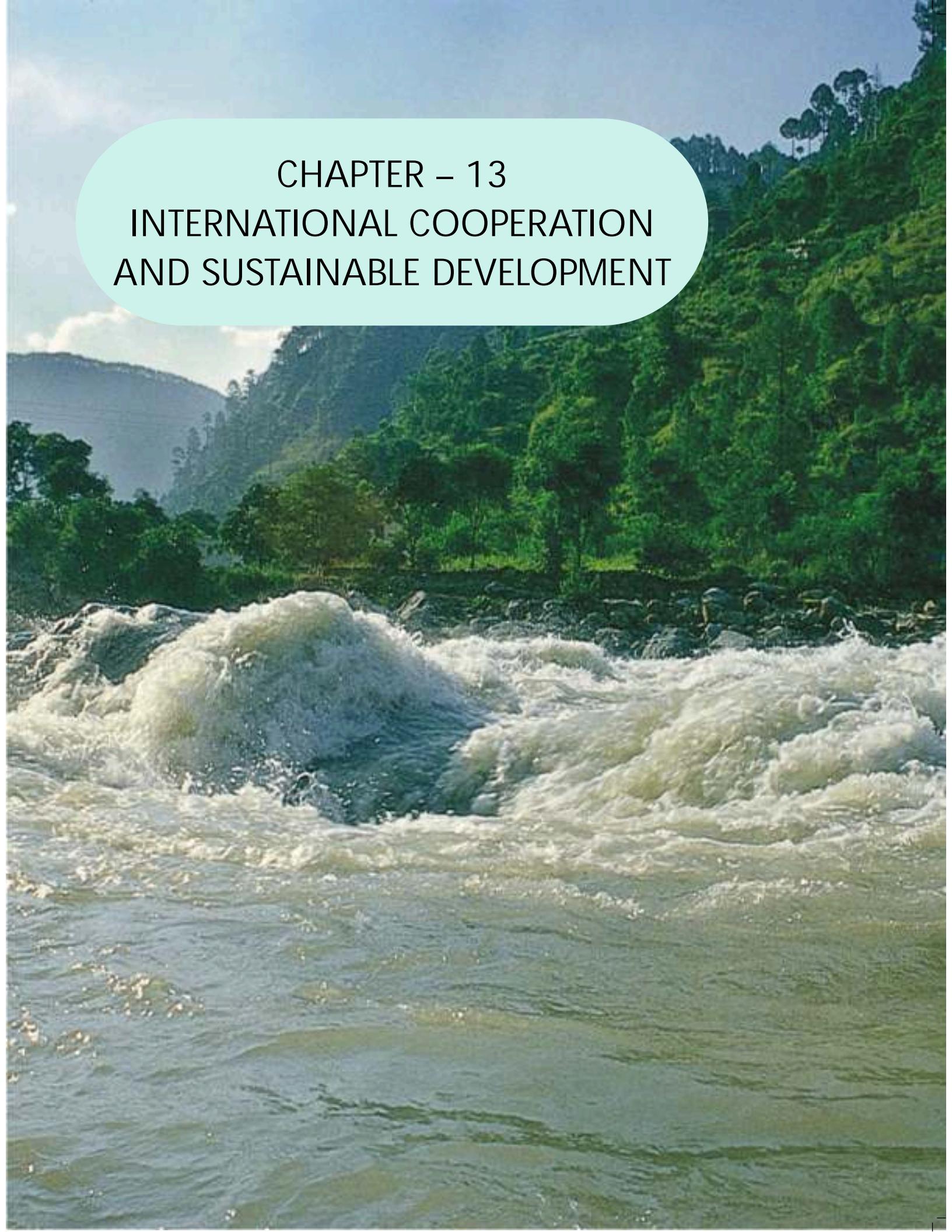
Trade & Environment Cell of the Ministry undertakes following items of work:

- Provide technical inputs to the preparatory process in the area of trade & environment, in particular, items under negotiations in the WTO and other multilateral, bilateral and regional fora;
- Act as the nodal section within the Ministry to deal with references received from the Ministry of Commerce and Industry; and
- Implementation of the ongoing consultancy projects on Trade & Environment.

Activities undertaken during the year

During the year 2008-09, the Trade &

Environment Cell examined and submitted position of the Ministry of Environment & Forests (MoEF) on the offers put on table under the aegis of the World Trade Organisation (WTO), both in the areas of Environmental Goods and services. The 10th meeting of the Inter Ministerial Consultative Group on Trade and Environment was held during the month of October, 2008. As per the decision taken during the 10th meeting of the IMCG two studies have been initiated with a purpose to examine various attempts being made to link environment with climate change. A group to explore the linkages between technology transfer and production processes has also been set up. Also under the ongoing project on Trade & Environment, a website dedicated to the Trade and Environment has been successfully launched by the Madras School of Economics. Detailed papers on the Trade and Environment on the Environmental Goods, Environmental Services, Regional Trade Agreements in Environmental Goods and Services have been developed under the project.



CHAPTER – 13

INTERNATIONAL COOPERATION
AND SUSTAINABLE DEVELOPMENT

Introduction

The Ministry of Environment and Forests is the nodal Ministry in the Government of India for all Multilateral Environmental Agreements. These include Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that deplete the Ozone Layer, UN Conventions on Biological Diversity, UN Framework Convention on Climate Change, UN Convention to Combat Desertification, Kyoto Protocol, the Basel Convention on Trans-boundary Movement of Hazardous Substances, Stockholm Convention on Persistent Organic Pollutants, Rotterdam Convention, Ramsar Convention etc.

International Co-operation & Sustainable Development Division is the nodal point within the Ministry to coordinate all international environmental cooperation and sustainable development issues. It is the nodal Division for United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), World Bank, UNIDO, UN Commission for Sustainable Development (CSD), Global Environment Facility (GEF) and regional bodies like Economic & Social Commission for Asia & Pacific (ESCAP), South Asian Association for Regional Cooperation (SAARC), South Asia Cooperative Environment Programme (SACEP), ADB and European Union (EU). The Division also handles bilateral country to country co-operation in the areas of environment protection and sustainable development.

Progress/Achievements

Commission on Sustainable Development (CSD)

- The United Nations Conference on Environment and Development (UNCED), was held in Brazil in 1992 adopted Agenda 21, which is a blue print for a

global plan of action for achieving sustainable development. The Commission on Sustainable Development (CSD) was set up in 1993 under United Nations Economic & Social Council (UN ECOSOC) for the purpose of review of progress of implementation of the Agenda 21. Ministry of External Affairs is the nodal Ministry for the CSD matters. However this Ministry plays the role for providing technical support and for implementation of Agenda 21.

- The 16th Session (being Review Session) of the Commission on Sustainable Development (CSD), was held from 5-16 May, 2008 in New York, which considered the thematic areas of agriculture, rural development, land, drought, desertification and Africa. The Indian delegation to the Session was led by Secretary, Ministry of Environment & Forests. India has also submitted its National Report 'Sustaining Rural Lives and Livelihoods' to the Commission. The proceedings of the 16th CSD are available at <http://www.un.org/esa/sustdev/csd/cs d16/csd16.htm>.
- The 17th Session being Policy Session of CSD will be held from 4-15 May, 2009 in New York. This session will focus on the thematic issues. Prior to the above, Indian delegation participated in the Intergovernmental Preparatory Meeting (IPM), held at New York in February, 2009.

United Nations Environment Programme (UNEP)

- The United Nations Environment Programme (UNEP) established in 1972 after the Rio Earth Summit is the principle entity within the UN System to assist the developing countries in building scientific

and technical capacity, fostering partnership and knowledge development to promote environment for sustainable development, based in Nairobi, Kenya, UNEP activities that range from assessment of environmental trends, especially early warning systems to dealing with the environmental disasters and emergencies to the promotion of environmental science and information.

- Mr. Achim Steiner, the Executive Director, United Nations Environment Programme (UNEP) and his team met Secretary (E&F) on 6th February, 2009 and discussed various issues pertaining to environment.
- The 25th Annual Session of UNEP's Governing Council/Global Ministerial Environmental Forum was held on 16-20 February, 2009 in Nairobi, Kenya. An Indian delegation participated in the meeting. The session mainly focused on two major thematic issues like- (i) Globalization and the Environment-'Global Crisis: National Chaos?- Towards a Green Economy' and (ii) International Environmental Governance and the United Nations Reform- 'IEG: Help or Hindrance?- IEG from a country perspective'.

Global Environment Facility (GEF)

Global Environment Facility (GEF) established in 1991, as an independent financial mechanism provides grants to developing countries and economies in transition for projects that benefit the global environment and promote sustainable livelihoods. India is a founder member of GEF. We are both a donor and recipient of GEF funds. India represents GEF South Asia Constituency (including Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka) in GEF Council.

- GEF projects address six focal areas –

biodiversity, climate change, land degradation, international waters, ozone layer depletion and persistent organic pollutants. They also address two crosscutting issues viz., sustainable forest management and sound chemical management. The GEF is a project co-financer providing "new and additional" funds to address the global environmental issues. GEF projects are implemented through its 10 agencies including UNDP, WB, UNEP, UNIDO, FAO, IFAD, ADB, AfDB, EBRD and IDB.

- Over the past 18 years, GEF has invested USD 8.6 billion directly as grant and leveraged USD 36.1 billion in co-financing for more than 2,400 projects in more than 165 countries. Since 1991, India has contributed USD 42 million to GEF, accessed USD 331 million as GEF grant, while leveraging a co-financing of USD 1,989 million.
- In India MoEF is GEF Operational Focal Point. It is primarily responsible for the in-country coordination of GEF projects and other operational activities as well as participating in the GEF Council meetings at Washington twice a year. Department of Economic Affairs is the GEF Political Focal Point and is responsible for GEF governance and policy related issues.
- GEF Empowered Committee chaired by the Secretary (E&F) functions as an empowered body to determine national priorities, streamline eligibility checks, approvals and endorsements of GEF proposals, monitor project implementation, and in formulating country's stand for the meetings of GEF Assembly and Council. The Committee meets on a quarterly basis. The GEF Cell in the Ministry assists in coordinating GEF activities in the country. The projects/

concept notes can be submitted to the GEF Cell on a rolling basis.

- Launched in 1992, GEF Small Grants Program (SGP) complements GEF full- and medium-sized project funding, by providing a window for the direct participation of NGOs, local communities, and other grassroots organizations. SGP India has funded more than 260 projects worth USD 5.2 million of grant and co-finance leveraged is USD 6.2 million from communities and other stakeholders like Govt., local administration & private sector
- On behalf of MoEF, SGP in India is being hosted and coordinated by the Centre for Environment Education. The National Steering Committee is chaired by the Joint Secretary, IC & SD Division, which approves the projects on a quarterly basis. The project proposals/ concept notes could be submitted to the CEE's regional cells on a rolling basis.
- SGP is a flagship program. To upscale and replicate successful SGP India initiatives at the grass root level, the Ministry has provided a grant of Rs 1.7 crores (since 2005 – 06).

South Asia Cooperative Environment Programme (SACEP)

- SACEP was set up in 1982 with headquarters in Colombo, Sri Lanka. It aims to promote regional Co-operation in South Asia in the field of environment, both natural and human, in the context of sustainable development and on issues of economic and social development which also impinge on the environment and vice versa. It supports conservation and management of natural resources of the region by working closely with all national, regional, and international

institutions, governmental and nongovernmental, as well as experts and groups engaged in such co-operation and conservation efforts.

- Secretary, Ministry of Environment and Forests is the SACEP Focal Point for India. The SACEP holds its Governing Council (GC) meetings, which concentrate on current regional issues as well as global concerns. The 11th Governing Council of SACEP was held at Jaipur, India from 20-22 May, 2008. The meeting deliberated upon organizational, institutional and programmatic matters relating to environmental cooperation in South Asia Region.

Delhi Sustainable Development Summit, 2009

- Sustainable Development being a thrust area of the Ministry of Environment and Forests, this Ministry has been supporting The Energy and Resources Institute (TERI) initiative to organize Delhi Sustainable Development Summit (DSDS) since 2001.
- The 9th Delhi Sustainable Development Summit was organized by TERI from February 5 to 7, 2009. The theme of the summit was 'Toward Copenhagen: An Equitable and Ethical Approach'.

South Asian Association for Regional Cooperation (SAARC)

- SAARC has eight countries as its members, viz., Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka. So far, seven Environment Ministers Conferences have been held under SAARC, which also has a Committee on Environment, Meteorology and Forest, for working out the detailed plan of action in these areas and implementing the same. Strengthening regional cooperation in environment is the

focus of the SAARC meetings.

- The Ministry will be hosting the 8th SAARC Environment Ministers' Conference at New Delhi on 20-21 October, 2009.

World Bank

- IC&SD Division is nodal division for the overall World Bank portfolio in environmental projects. It coordinates the initial tying up of activities including crucial negotiations before the projects are actually started by the concerned thematic divisions.
- Ms. Katherine Sierra, Vice President for Sustainable Development Network, World Bank along with her team met with Secretary (Environment & Forests) on 4th February, 2009 to discuss the role of World Bank in supporting climate change and sustainable development in India and globally.

International Conference on Marrakech Task Forces (MTF)

- The unsustainable production and consumption pattern constitutes a great environmental problem towards sustainable development as recognized in the World Summit on Sustainable Development held in Johannesburg, South Africa during 2002.
- Ministry of Environment & Forests along with United Nations Environment Programme (UNEP) and the Swedish Ministry of Environment with participation from U.K, Italy, France, Switzerland, Finland, Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka organized International Conference on Marrakech Task Forces (MTF) entitled 'Building Cooperation in Sustainable Consumption and Production in South Asia' at New Delhi on 3rd February, 2009.

Bilateral Cooperation

This Ministry has bilateral MoUs/Agreements on environment inter alia with Austria, Canada, China, Germany, Iran, Israel, Netherlands, Mauritius, Russia, Tajikistan, Turkmenistan, USA, UK and Vietnam. A new MoU entered into by the Ministry during the year is India-Brazil-South Africa (IBSA) Forum. These MoUs/Agreements cover a wide array of environmental issues. In addition to formal bilateral agreement there are cooperative activities with a host of other countries some of which are enumerated below :

- European Commission: The activities with European Commission covered implementation of the India-European Union (EU) Joint Action Plan, holding the Joint Working Group meeting and the EU supported Action Plan Support Facility project. All activities leading up to the Action Plan Support Facility have been completed and the project has started with activities under the first year's work plan. The Third India-EU Environment Forum and the Fifth India-EU Joint Working Group on Environment was also held in September 2008.
- The initiatives under the Joint Statement on India-UK High Level Dialogue on Sustainable Development were carried forward in a time bound manner with various activities planned for the four identified areas of cooperation, viz., Wildlife, Corporate Social Responsibility, Sustainable Forestry (Natural Resource Management) and Sustainable Production and Consumption.
- The Environmental Working Group India-Brazil-South Africa (IBSA) came into existence in October, 2008 with the signing of the Memorandum of Understanding during the IBSA Summit on



October 15, 2008 and hosting of its first meeting by the Ministry in New Delhi. The Working Group covered the areas of climate change, biological diversity and forestry issues for further cooperation, apart from the exchange of views on the multilateral environment agreements.

- Interactions with bilateral partners such as France, Norway, Sweden, Denmark, USA, Bhutan, Netherlands etc. continued on regular basis with a view to further the bilateral cooperation with these partners.
- The first Indo-German Environment Forum was held in collaboration with Germany on November 15-16, 2008 in New Delhi. The Forum facilitated a platform for various ministries of Government of India, other agencies and private sector with the German counterparts on environmental technologies in waste (including wastewater) management, sanitation, energy efficiency, climate change and CDM.

Advisory Services in Environmental Management (ASEM)

- This is an umbrella project under the aegis of Indo-German technical collaboration covering present and future projects being supported by the Government of Germany in the environmental sector. The initial funding was DM 3 million for the first phase of project (2002-2005). For the second phase (2005-2008) apart from 3 million Euros initially committed, an additional amount of Euro 1.7 millions was further committed. For the third phase (2008-11) of the project a total German grant of Euro 4.7 million has recently been agreed to.
- ASEM focuses on six major thrust areas namely, Environmental Planning, Waste management, Sustainable Small

Industries/ Cleaner Technologies, Clean Production and Products, Clean Development Mechanisms. The project has developed well in the field of Eco-cities, Eco-industrial Estates, Eco-Industrial Parks for Electroplating Industries of Madurai, waste management, Sustainable Small Industry and Clean Development Mechanism and e-waste management. Under the Human Resource Development Program of the project, relevant trainings and workshops are organised in the identified thrust areas.

- One of the important developments under the project was the commitment of the German side to provide technical support to the Jawaharlal Nehru Urban Renewal Mission being implemented by Ministry of Urban Development. Various activities have been planned for intervention under the project in the five selected cities of Cochin, Varanasi, Shimla, Nashik and Raipur.

UNIDO Eco-Business Partnership Programme

- In another initiative, a Trust Fund has been created with contributions from Central Pollution Control Board, UNIDO and City of Vienna for development of eco-business plans for the eco-cities. The planned activities under the project for undertaking feasibility studies have started.
- A number of other activities have been started during the year in question in the designated focal areas of the project such as technical assistance for cleaner production, air and water pollution control, municipal waste management, human resource development in environment, etc.

Training Abroad

Capacity building of officers in the field of environment and forestry abroad is carried

out by the IC&SD Division. A data bank of officers of various State Governments, Central and State Pollution Control Boards, State Environment and Forests Departments, etc. is maintained by this Division for this purpose. Twenty five officials attended trainings and study visits overseas in the field of sustainable development and environmental management, etc.

Externally Aided Projects

The Externally Aided Projects (EAP) Division deals with the appraisals, approvals of new projects and monitoring of Forestry Projects being implemented in the States with assistance from external donors. These projects are being reimbursed their actual expenditure as per the loan agreements. These funds have been utilized and proposed to be utilized in future also for rehabilitation of forest land, to improve the quality of life of the villagers adjoining forests, ensure people's participation, strengthening joint forest management institutions, to augment availability of fuel wood and fodder, promote farm forestry, agro forestry, water and soil conservation measures, encourage tree growing on private land and greening of the urban areas in accordance to the objectives envisaged in various projects under implementation. These projects inter-alia also aim at low key economic activities with a view to augment the income of the people, employment generation as well as addressing the sustainability in perpetuity once the funding ceases to flow due to completion of project. At present, eleven Forestry Projects with an investment of about Rs. 5577 Crores are being implemented in eleven States, the details are given in Table-20.

The forestry projects included for consideration under the Rolling Plan Financial Year 2008-10 for JBIC/JICA are:-

- Capacity Building of the State Forest

Training Schools/Institutions

- West Bengal Forestry Project
- Rajasthan Forestry and Bio-diversity Project Phase-II
- Integrated Project for Sustainable Development of Forest Resource in Sikkim.
- Assam Forestry Development Project
- Nagaland Afforestation and Economic Development Project

In addition there are 15 other forestry projects in the pipeline for posing to external donors for assistance.

EAP Division also acts as a nodal point for North-East Cell for forestry related matters viz. forest based industrial estates, transportation of forest produce, court cases in apex court, etc.

Climate Change

Climate Change is a serious global environmental concern, which is primarily caused by the building up of Greenhouse Gases in the atmosphere. Developing countries like India are particularly vulnerable to the adverse impacts of global warming caused by the increased atmospheric concentration of Greenhouse Gases. Climate Change poses additional challenge to India in the form of increased climatic variability and its adverse effects on poorer sections of its population.

India is conscious of the challenge of climate change, and the urgency of actions needed to counter adverse impacts of climate change. Past few years have witnessed the introduction of environmental measures in India that have targeted conservation of rivers, improvement of urban air quality, enhanced afforestation and a significant increase in the installed capacity of renewable energy technologies. These deliberate actions have realigned the



Table-20. Ongoing Externally Aided Forestry Projects

No.	Projects	Implementing Agency	Aid Agency	Project Period	Cost (Rs. in crores)
1.	Integrated Natural Resource Management and Poverty Reduction Project in Haryana	Haryana	JICA	2004-05 to 2009-10	286
2.	Rajasthan forestry and Biodiversity Project	Rajasthan	JICA	2003-04 to 2009-10	442
3.	Andhra Pradesh Community Forest Management Project	Andhra Pradesh	World Bank	2002-03 to 2009-10	653
4.	Punjab Afforestation Project-II	Punjab	JICA	2002-03 to 2006-07 (extended up to 2009-10)	264
5.	Tamil Nadu Afforestation Project – II	Tamil Nadu	JICA	2005-06 to 2012-13	567
6.	Karnataka Sustainable Forest management and Biodiversity Conservation Project	Karnataka	JICA	2005-06 to 2012-13	745
7.	Swan River Integrated Watershed Management Project	Himachal Pradesh	JICA	2006-07 to 2012-13	160
8.	Orissa Forestry Sector Development Project	Orissa	JICA	2006-07 to 2012-13	660
9.	"Gujarat Forestry Development Project Phase-II"	Gujarat	JICA	2007-08 to 2015-16	944
10.	"Tripura Integrated Forestry Development Project"	Tripura	JICA	6 years 2007 to 2013	256
11.	Uttar Pradesh Natural Resources Management Poverty Alleviation Project	Uttar Pradesh	JICA	6 Years 2008 to 2014	600
	Total				5577

economic development to a more climate friendly and sustainable path.

Government of India has set up an elaborate institutional mechanism to consider and address issues relating to climate change. A Council chaired by Prime Minister called Prime Minister's Council on Climate Change was constituted in June 2007 to coordinate national action for assessment, adaptation and mitigation of climate change. The Council provides the overall guidance to climate change related actions taken by various Ministries in the Government and other agencies. An expert committee set up in 2007 under the chairmanship of the Principal Scientific Adviser to Government of India is also looking into the impacts of climate change. The committee is studying the impact of anthropogenic climate change on India and is engaged in identifying the measures that may have to be taken to address the adverse impacts.

Having regard to the need to put forth and advance India's interests effectively in the international negotiations on Climate Change, a Policy Guidance Group of International Negotiations headed by Prime Minister and a Core Negotiating Team of officials and technical experts have also been set up.

National Action Plan on Climate Change

As a part of national voluntary actions to address climate change related concerns, India released its National Action Plan on Climate Change (NAPCC) on 30th June 2008. The National Action Plan advocates a strategy that promotes, firstly, the adaptation to Climate Change and secondly, further enhancement of the ecological sustainability of India's development path. It recognizes that climate change is a global challenge and, that it should be successfully overcome through a globally collaborative and cooperative effort

based on the basis of the principle of equity. The Action Plan suggests that the long-term convergence of per capita GHG emissions is the only equitable basis for a global agreement to tackle climate change. The Action Plan assures the international community that India's per capita GHG emissions would not exceed the per capita GHG emissions of developed countries, despite India's developmental imperatives.

India's National Action Plan stresses that maintaining a high growth rate is essential for increasing living standards of the vast majority of people of India and reducing their vulnerability of the impacts of climate change. Accordingly, the Action Plan identifies measures that promote the objectives of sustainable development of India while also yielding co-benefits for addressing climate change. It also outlines a national strategy that aims at enabling the country adapt to climate change and enhances the ecological sustainability of India's development path.

Eight National Missions (National Solar Mission, National Mission on Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change) which form the core of the National Action Plan represent multi-pronged, long term and integrated strategies for achieving key goals in the context of climate change. The National Missions are to be institutionalized by the respective Ministries and will be organized through inter-Sectoral groups. Comprehensive Mission documents detailing objectives, strategies, plan of action, timelines and monitoring and evaluation criteria being evolved.



Besides the 8 Missions, the NAPCC also outlines 24 Other Major Initiatives aimed at promoting technologies and actions that will have substantial benefits in terms of addressing Climate Change.

International Negotiations on Climate Change

Efforts to counter climate change at the international level are currently focused on the negotiations that are taking place amongst the member countries of the UNFCCC in pursuance of Bali Action Plan adopted at the thirteenth Conference of Parties (COP-13) held at Bali, Indonesia in December 2007. The Bali Action Plan (BAP) calls for full, effective and sustained implementation of the UNFCCC through long-term cooperative action, now, up to and beyond 2012. It is a comprehensive dialogue to address the four major building blocks of climate change, i.e. GHG mitigation; adaptation to climate change impacts; technology development and cooperation; and finance. This is a particularly significant development as it sets out differentiated approaches for the developed and developing countries in the key area of GHG mitigation on the basis of UN Framework Convention on Climate Change and underscores the importance of its principles and provisions, especially the 'common but differentiated responsibilities and respective capabilities'.

The Parties to the UNFCCC and its Kyoto Protocol have set up two Adhoc Working Groups to negotiate and agree on the decisions relating to Bali Action Plan and the second commitment period for emission reductions under the Protocol. It is expected that an agreed outcome would be reached and a decision will be adopted regarding BAP, at the fifteenth Conference of Parties (COP-15) to be held in December 2009. The work on recommendations on quantified

emissions limitation and reduction commitments of Annex-I Parties (Industrialized Countries) for the second commitment period of the Kyoto Protocol commencing from 2013 also has to be completed by 2009 end. Towards this end, UNFCCC have held several meetings in 2008. UN Climate Change Talks were held at Bangkok (31st March to 4th April 2008), Bonn, Germany (2nd -13th June 2008), Accra, Ghana (21st -27th August 2008). 14th Conference of Parties was held at Poznan, Poland from 1-12 December 2008. The COP-14 agreed on the modalities for the preparation of a negotiating text that would form the basis of the negotiations. Accordingly, pre-sessional meetings of the Ad Hoc Working Groups of the Convention and the Kyoto Protocol were held in Bonn from 29th March to 8th April 2009. The pre-sessional meetings were devoted to discussing the issues/ideas on which negotiations would begin from at the next meeting of the Parties at Bonn, Germany in June 2009. India has been able to project its views adequately and effectively in these meetings.

As the subject of climate change has gained increasing significance and prominence, it is being discussed bilaterally and multi-laterally in various international groupings. Climate Change forms part of political agenda of several international meetings e.g, Major Economies Meeting (MEM), G-8, G-20 and Greenland Dialogue. In the G8 and outreach Countries Summit held in July 2008 where India other major economies were invited, the Prime Minister emphasized the importance of enhanced implementation of the UNFCCC decisions through long-term cooperative action in accordance with the provisions and principles of the Convention, especially 'Common but differentiated responsibilities and respective capabilities' are respected in these negotiations and their outcomes in letter and spirit.

Bilateral/Multilateral Initiatives on Climate Change

India is a partner in the Asia Pacific Partnership on Clean Development and Climate (APP). The partnership consists of key developed and developing countries in Asia and North America across the Pacific - Australia, China, Japan, South Korea, Canada and the USA besides India. It focuses on development, diffusion and transfer of clean and more efficient technologies and is consistent with the principles of the UNFCCC and complements the efforts under the UNFCCC. Under APP, eight (8) Task Forces in the area of aluminum, buildings and appliances, cement, use of fossil energy, coal mining, power generation and transmission, renewable energy and distributed generation, and steel have been set up to facilitate collaboration in technology development and diffusion.

India engages bilaterally with several countries in the field of climate change. India has signed MOU with Italy and Canada for promoting cooperation in the field of CDM. A MoU for cooperation in the field of Clean Development Mechanism under the Kyoto Protocol was signed between the Government of India and Government of Kingdom of Denmark on 27 October 2008 in the Ministry of Environment & Forests, New Delhi. The Third Meeting of the Indo-UK Structured Dialogue on Climate Change was held in September 2008 at New Delhi wherein important issues such as Bali Action Plan, Technology Transfer, Forestry, National Action Plan, etc., were discussed. India and EU have also started work on a Joint Work Programme on Climate. India is engaged in discussions with World Bank, DFID and GTZ to launch specific studies/projects for adaptation to climate change in chosen areas/regions of the country. These projects will be so designed as to ensure that they are

consistent with the objectives of the National Action Plan.

Clean Development Mechanism

India has participated effectively in the Clean Development Mechanism (CDM) of the Kyoto Protocol to help developed countries with quantified emission limitation and reduction commitments to take up the greenhouse gas reduction project in India. The CDM aims to assist developing countries in achieving sustainable development by promoting environmentally friendly investment from industrialized country government and businesses. India's CDM potential represents a significant component of the global CDM market.

The Government of India has set up the National CDM Authority in December 2003 with its office in the Ministry of Environment & Forests. The National CDM Authority evaluates and recommends CDM projects for host country approval. As on 31 March 2009, the National CDM Authority (NCDMA) has accorded Host Country Approval to 1230 projects facilitating an investment of more than Rs. 151,650 crores. These projects are in the sectors of energy efficiency, fuel switching, industrial processes, municipal solid waste and renewable energy. If all these projects get registered by the CDM Executive Board, they have the potential to generate 574 million Certified Emission Reductions (CERs) by the year 2012 At a conservative price of the US\$10 per CER, it corresponds to an overall inflow of approximately US\$ 5.74 billion in the country by the year 2012, if all the projects get registered. Out of these, 438 projects have already been registered by the Executive Board of the CDM in UNFCCC. The total CERs issued to India as on 30 June 2009 are more than 67 million.

CDM is an important subject of negotiations under Kyoto Protocol. India is of the view that





CDM has helped the developing countries enhance their sustainable development and should be further strengthened in the 2nd commitment period of the Protocol from 2013.

[India's National Communication to United Nations Framework Convention on Climate Change \(UNFCCC\)](#)

Introduction and Objectives

India is a Party to the United Nations Framework Convention on Climate Change (UNFCCC), the objective of which is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Furnishing of information related to implementation of the Convention is an obligation of all Parties to UNFCCC and is provided in the National Communication. The elements of information in the communication are provided in the context of national circumstances and include:

- A greenhouse gas inventory by sources and removal by sinks
- A general description of steps taken to implement the Convention including an assessment of impacts, vulnerability due to climate change and associated adaptation needs, and
- Any other information relevant to the achievement of the objective of the Convention.

Towards fulfillment of obligation under the UNFCCC, India submitted its Initial National Communication (NATCOM I) to the UNFCCC Secretariat in June 2004, within three years of receipt of financial support from the Global Environment Facility (GEF). India is now in the process of preparing its second national communication (NATCOM II) to the

UNFCCC. The Ministry of Environment and Forests is both executing and implementing agency. The UNDP, New Delhi is the GEF implementing agency. A wide range of institutions covering research organizations, universities, industry associations and non-governmental organizations spread all across India and the relevant government ministries and their departments are participating in the preparation of NATCOM II.

Progress / Achievements

The key components of the work programme of NATCOM II launched in 2008 include (i) estimation of greenhouse gas emission inventories by sources and removals by sinks; (ii) An assessment of likely vulnerability due to climate change and development of adaptation frameworks.

Preparation of Greenhouse gas emission inventories by sources and removal sinks. A comprehensive GHG emission inventory by sources and removals by sinks for the base year 2000 using IPCC guidelines is being prepared under the aegis of NATCOM II. It covers the sectors in energy, industrial processes and product use, agriculture, land use, land use change and forestry and waste. The scope of improvement with reference to the inventories presented in NATCOM I include (i) estimation methodologies for some key categories identified in NATCOM I, the effort is to move towards higher levels of estimation for these categories; (ii) refinement of GHG emission factors developed during INC; (iii) new measurements to develop country-specific emission factors for some key categories; (iv) inclusion of additional gases (CO , NO_x , NMVOC, SO_2 , HFC, PFC and SF_6) to the extent capacities permit; (v) inclusion of additional GHG pools identified in IPCC 2006 guidelines for preparation of national greenhouse gas emission inventories that were not included in INC; and (vi) a strong

emphasis on QA/QC procedures as identified in IPCC Report on Good Practices Guidance (GPG) 2000 and 2003. Country wide institutions are involved in this activity and include research institutions, universities, nongovernmental organizations and industry associations together with relevant ministries and associated departments (Fig. 78).

- Assessment of Impacts and Vulnerability to climate change and development of adaptation frameworks

Under this component following activities are currently in progress include, (i) Generation of multiple climate and socio-economic scenarios at the national scale; (ii) further improvement of the national impact assessments of water resources, agriculture, forestry, natural ecosystems, coastal zones, human health with respect top INC; and (iii) Development of adaptation frameworks by undertaking

integrated inter-sectoral assessment approach.

Development of adaptation frameworks are being attempted through case mode for selected study areas covering following thematic area (a) water resources, agriculture productivity, food security and livelihoods, (b) human health associated with climate change and the changing profile of extreme events, (c) forests, forest products and vulnerabilities of associated livelihoods, (d) Himalayan ecosystems and Livelihoods; and (e) energy systems and infrastructure due to the changing temperature and precipitation patterns. The emphasis is to assess the current coping mechanisms operational at the local level to combat climate variability, and identify the incremental measure required to cope with the adverse impacts of climate

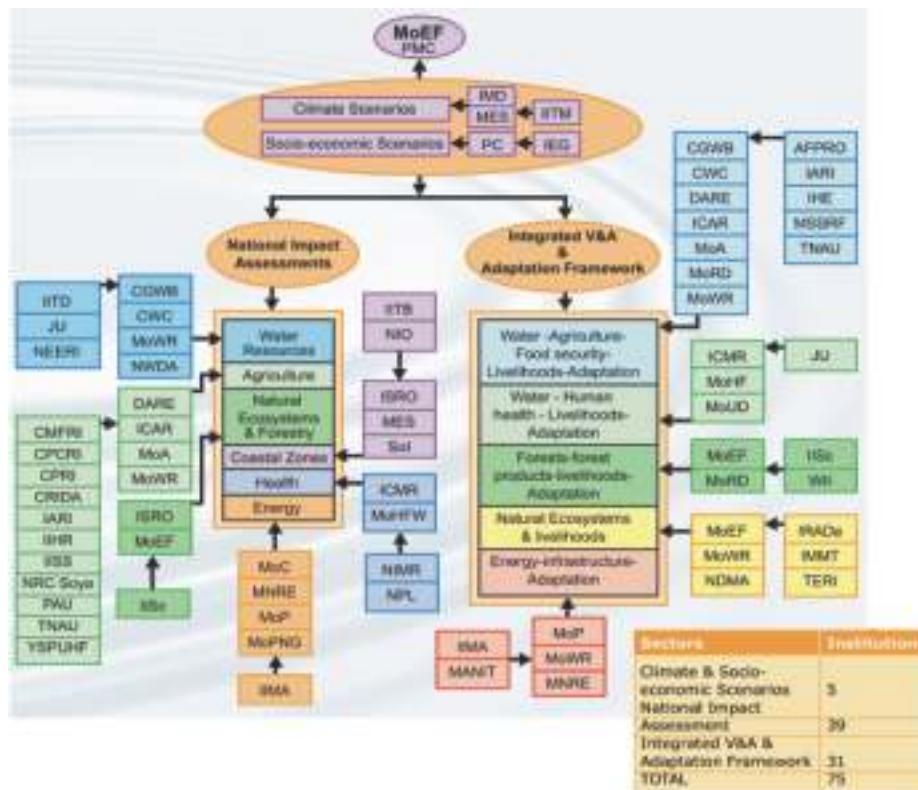


Fig.-78. Institutional arrangement for estimation of GHG inventories in NATCOM II.

change and develop adaptation frameworks that may be useful in the context of development of a national framework for adaptation. The institutional arrangement devised for this component is shown in Fig.-79.

- Capacity Building and Monitoring

Training workshops have been organized for enhancing capacity of the researchers for undertaking various activities. Also progress of work in each activity is being monitored through sectoral consultative meetings, through workshops and at the apex level by the National Steering Committee of the project. Regular monitoring of progress is also being undertaken to incorporate mid course corrections if any. Various trainings/ consultative meetings/ workshops held during the year include:

- Training on methodology to develop GHG inventory in the Industrial Process and Product Use Sector, January 25, 2008.
- Consultative meeting on Energy sector Greenhouse Gas Inventory Estimates for India's Second National Communication, April 28, 2008 at New Delhi.
- Consultative meeting on Land Use Land Use Change and Forestry Sector, May 26 and 27, 2008, IISc at Bengaluru.
- Workshop on Impacts, Vulnerability Assessment and Adaptation, August 11 and 12, 2008 at New Delhi.
- NATCOM Consultative meeting on Livestock, Waste and Industrial Process August 27, 2008, MoEF, New Delhi.
- Workshop on Climate Change Scenarios, October 13 and 14, 2008, Indian Institute of Tropical Meteorology, Pune.

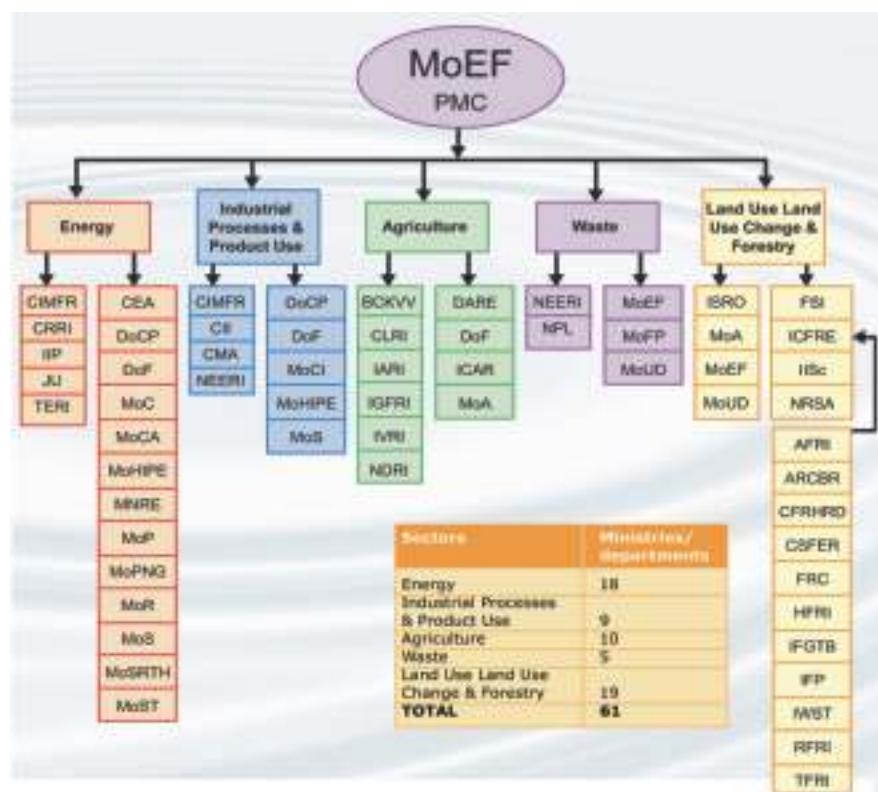


Fig.-79. Institutional arrangement for impacts, vulnerability and adaptation assessment in NATCOM II.

- NATCOM subgroup meeting, November 14, 2008, MoEF, New Delhi
- National Steering Committee meeting, November 20, 2008, MoEF, New Delhi.

Indo-UK Collaborative Research Programme – Phase-II (Impact and Adaptation)

Introduction and Objectives

The programme of work for Phase-II consist firstly in the national level assessment of impacts *inter-alia* improvement in climate change scenarios and revision of impact assessment at the national level and secondly adaptation responses to climate change for specific sectors through a regional project to build capacities in India for adapting to climate change. The regional project would concentrate on sectors such as water resources, agriculture and health. In addition, the Phase-II envisages training and institutional capacity building through establishment of links between Indian and UK Institutions for developing training opportunities relevant to the study.

A Steering Committee co-chaired by the representatives of MoEF and Department of Energy and Climate Change, UK oversees the development and implementation of the Phase-II programme.

During the period under report, bids for the various components after Phase-II viz. climate change scenarios, national level study on impacts and vulnerability, socio-economic impact and extreme events and adaptation response to climate change in the States of Orissa and Madhya Pradesh were invited. The bids received for projects in the identified themes were subsequently evaluated. Thereafter a meeting of the Joint Review Committee was held on September 24, 2008. Based on the recommendations of the Joint Review Committee, the final projects identified for the Phase-II of the Indo UK Collaboration

include:

- Development and dissemination of High Resolution climate change scenarios for India
- Linking water and agriculture in river basis and impacts of climate change
- Development of socio-economic scenarios of climate change
- Assessment of state level vulnerability and adaptation – a case study in Orissa
- State level vulnerability and adaptation assessment – a study in Madhya Pradesh.

This is a joint collaborative research programme between the Government of United Kingdom, Department of Energy and Climate Change (formerly, Department of Environment, Food and Rural Affairs) and the Ministry of Environment and Forests, Government of India. The objective of the research programme is to improve climate scenarios, quantifying and reducing uncertainty in the impacts, and introducing consideration of elements of adaptation in a regional project, with some stakeholders involvement.

Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change is a specialized body jointly established by the United Nations Environment Programme and World Meteorological Organization mandated to prepare scientific assessments on various aspects of climate change. The IPCC has been entrusted with the task of preparing its Fifth Assessment Report on Climate Change, *inter alia*, the physical science basis; impacts, vulnerability and adaptation; and mitigation of climate change based on the published peer-reviewed literature worldwide after the publication of its Fourth Assessment Report



brought out by the IPCC in the year 2007. As a nodal ministry in the Government for the IPCC, the objective of this programme is to undertake and facilitate implementation of various activities of the IPCC at both international and national level.

During the period under report, the IPCC was reconstituted for preparation of its next assessment report on various aspects of climate change, viz., the physical science basis of climate change; impacts, vulnerability and adaptation and mitigation of climate change. An Inter-Ministerial delegation participated in the various meetings of the IPCC.

Ozone Layer Protection

Introduction and Objectives

- Ozone, a tri-atomic molecule is formed naturally in the upper level of the Earth's atmosphere by high-energy Ultraviolet (UV) radiation from the Sun. The radiation breaks down oxygen molecules, releasing free atoms, some of which bond with other oxygen molecules to form ozone. About 90 per cent of all ozone formed in this way lies between fifteen and fifty five kilometers above the Earth's surface, called the Stratosphere.
- The stratospheric Ozone Layer absorbs all the harmful UV radiations emanating from the Sun. It protects plant and animal life from UV radiation. The UV radiation has the potential to cause skin cancer, eye cataract, suppress body's immune system, decrease crop yield etc. which led to the adoption of the Vienna Convention for the Protection of the Ozone Layer in 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987 along with its four Amendments. In India, provisions of the Montreal Protocol and its London Amendment came into effect from September 17, 1992. India also ratified the Copenhagen Amendment (1992), the Montreal Amendment (1997) and the Beijing Amendment (1999) on March 3, 2003.
- India produces Chlorofluorocarbons (CFC-11, CFC-12, CFC-113), Hydrochlorofluoro carbons (HCFC-22), Carbontetrachloride (CTC) and has stopped production of Halon-1211, Halon-1301, methyl chloroform and methyl bromide. These Ozone Depleting Substances (ODS) are used in refrigeration and air conditioning, foams, fire fighting, aerosol, fumigation and cleaning applications etc.
- The Government of India has entrusted the work relating to the Ozone layer protection and implementation of the Montreal Protocol to the Ministry.
- A detailed India Country Programme for phase out of ODS was prepared in 1993 to ensure the phase out of ODS according to the National Industrial Development Strategy, without undue burden to the consumers and the industry and for accessing the Protocol's Financial Mechanism in accordance with the requirements stipulated in the Montreal Protocol. The Country Programme was updated in 2006. The Executive Committee (Ex-Com) of the Multilateral Fund (MLF) at its 49th meeting held in July 2006 had approved the Country Programme Update for India.
- The Ministry has set up the Ozone Cell as a National Ozone Unit to look after and to render necessary services to implement the Protocol and its ODS phase-out programme in India. The Ministry has established an Empowered Steering Committee (ESC) Chaired by the Secretary (E&F) which is supported by the



Fig-80. Release of poster on the occasion of International Ozone Day, 2008.

Standing Committees. These Committees are responsible for the implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approval and project monitoring.

Activities undertaken so far

- India has taken a series of fiscal and regulatory measures to facilitate ODS phase-out in the country. Among fiscal measures taken, Government has accorded customs and excise duty exemptions on goods required for ODS phase-out projects and new investment and expansion of established industries with non-ODS technology. In the current financial year i.e. 2008-09 only benefit of customs duty has been given for the above purpose. The Reserve Bank of India has issued directions to all financial institutions and commercial banks not to finance new establishment with ODS technology. Trade in ODS with non-Parties to the Protocol has been banned. All ODS have been brought under the ambit of licensing for purpose of both imports and exports. Export of CFCs to Non-Article 5 Parties has also been banned.
- Awareness activities at the national and state level were organized to sensitize the stakeholders to phase-out the ODS in various sectors. The International Ozone Day function is being organized every year in the country on 16th September.
- "Montreal Protocol: India's Success Story", posters, stickers are brought out every year on the occasion of International Ozone Day giving latest information on ODS phase-out in the country and technologies adopted.
- A bi-monthly newsletter viz. 'VATIS UPDATE-Ozone Layer Protection' is being published giving latest information on the science of ozone and the technical options evolved and used in various sectors all over the globe.

- Training Programs for customs and other enforcement officers were organized.
- Training workshops for refrigeration servicing technicians on good service practices to reduce CFC consumption in servicing sector were organized.
- Participated in the meeting of the Ex-Com, Meeting of the Parties (MOP) and other related meetings.
- Data on production, consumption, export, import of ODSs was submitted to the Ozone Secretariat for the year 2007.
- Project Management Unit (PMU) was set up to implement the CFC and CTC National Phase-out Plans.
- A comprehensive Roadmap to Phase-out HCFCs in various sectors in India has been developed.

Awareness Activities

- The UN General Assembly on 23rd January, 1995 adopted a resolution 49/114 which proclaims 16th September as the International Day for the Preservation of the Ozone Layer, to commemorate the signing of the Montreal Protocol on Substances that Deplete the Ozone Layer which was signed on 16th September, 1987. The International Day for the Preservation of the Ozone Layer is celebrated at national and state levels since 1995.
- The Fourteenth International Day for the Preservation of the Ozone Layer was celebrated in Delhi on 16th September, 2008. The theme of this year's International Ozone Day was "Montreal Protocol – Global Partnership for Global Benefits". Shri Namo Narain Meena, Minister of State for Environment and Forests was the Chief Guest. Dr. Ajay Mathur, Director General of the Bureau of

Energy Efficiency delivered the Key note Address. Around five hundred fifty school children attended the function. On this occasion poster, painting, skit competitions were organized among school children. Prizes for the best three in each competition were given. The publication "Montreal Protocol: India's Success Story" was released and distributed to the participants on this occasion.

Achievements made

- India has met the following compliance targets as per the control schedule of the Montreal Protocol:-
- Freeze of CFC production and consumption in July, 1999 at 22588 ODP tons and 6681 ODP tons respectively.
- Freeze of Halon production and consumption on January 1, 2002.
- Total phase-out of Halon production and consumption in 2003.
- Phase-out of 85% production and consumption of CTC as on January 1, 2005.
- Accelerated phase-out of production of CFCs w.e.f August 1, 2008, seventeen months earlier than the phase-out schedule of the Montreal Protocol
- Phase-out of consumption of CFCs in all applications except in manufacturing of Metered Dose Inhalers (MDIs) for Asthma and Chronic Obstructive Pulmonary Disease (COPD) patients.
- The Ex-Com of the MLF had approved a total of 299 projects involving MLF funding of about US \$349 million for phasing out 25000 ODP tons of production and 23000 ODP tons of consumption of ODS.
- In 2007 and 2008 during 52nd to 56th

meeting of the Ex-Com of the MLF, US\$ 23.1 million were approved for implementation of 2007 and 2008 Annual Work Programs of CFC Production Sector Phase-out Project, National CFC Consumption Phase-out Plan (NCCoPP), CTC National Phase-out Plan, CFC Phase-out in manufacturing of MDIs and preparation of HCFC Phase-out Management Plan (HPMP).

- Training, workshops were organized for service technicians on good servicing practices and retrofitting of CFC based refrigeration appliances to non-CFCs. The technicians were drawn from both formal and informal sectors. More than 10,000 technicians have been trained under the NCCoPP.
- The equipment support has been provided to the trained technicians under NCCoPP to use good servicing practices in the field which has resulted in reduction of use of CFCs in servicing sector.
- Reclamation centers have been provided at a number of places and organizations including Indian Railways to recover, reclaim and reuse the CFCs.
- The 56th Meeting of the Ex-Com of the MLF for Implementation of the Montreal Protocol was held in Doha, Qatar from 8th – to 12th November, 2008. India played a key role in the contact group constituted to finalize the cost structure for determining the funding levels for preparation of HCFC investment and associated activities. Based on the proposal of the Contact Group, the Ex-Com approved US \$473,750 for preparation of HPMP strategy for India.
- India had submitted a proposal for funding National Strategy for Transition to Non CFC MDIs and Plan for Phase-out of

CFCs in the Manufacturing of Pharmaceutical MDIs in India. The 56th Ex-Com approved the proposal for an amount the US\$10.2 million.

- The Ex-Com at its 56th Meeting also approved the revised agreement for accelerated phase-out of CFCs production with a funding of US \$3.17 million which will be paid as compensation to the four CFC producers. The production of CFCs has already ceased as on August 1, 2008.
- The combined 8th Conference of Parties (COP) for the Protection of the Ozone Layer and 20th MOP to the Montreal Protocol on Substances that Deplete the Ozone Layer were held in Doha, Qatar from November 16 to 20, 2008. The 20th MOP adopted the following important decisions:
- India on behalf of Article 5 Parties played a key role during the technical and political negotiations of recommending an amount of US\$ 490 million for the triennium 2009-2011 replenishment of MLF which includes funding of HCFC phase-out. This is highest amount of replenishment so far in the Montreal Protocol replenishment trienniums.
- India also chaired the Asia and Pacific region meeting to nominate the Members of various committees viz. Ex-Com, Implementation Committee (Imp-Com) and Presidents for 8th Bureau of the COP and 20th MOP.
- The Contact Group on Essential uses and Campaign Production of CFC for MDIs was Co-Chaired by Austria and India. Based on the detailed discussions held in the Contact Group, it was decided to request the Technology and Economic Assessment Panel (TEAP) to present a

report to the 21st MOP with a preliminary report to the 29th Open Ended Working Group (OEWG) regarding the potential timing for final campaign production taking into account the information submitted by some of the Article-5 Parties in the Essential Use Nomination (EUN) for 2010.

- China was nominated to the Ex-Com as a Member and has made India as a Co-opted Member of the Ex-Com along with Jordan and Malaysia. Yemen has co-opted Kuwait, Saudi Arabia and Bangladesh as Members.
- The following workshops were conducted during this year:
 - HCFC Phase-out Consultative meeting was held at India Habitat Centre on July 4, 2008 New Delhi, India.
 - Use of Halons in Military Applications workshop was held on 13th October, 2008 at New Delhi.
 - Open Type Compressor (OTC) workshop on good practices and servicing were held in seven different states of India.
 - National Academy of Customs Narcotics and Drugs (NACEN) and Ozone Cell organized training program for customs officers as part of Policy and Customs training project in the Regional Training Institutes (RTIs) of NACEN.

Regulatory Measures

- The Ozone Depleting Substances (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986 has been notified in the Gazette of India on July 19, 2000. These Rules set the deadlines for phasing out of Various ODS, besides regulating production,

consumption, trade, import and export of ODS and the products containing ODS. The ODS Rules were amended in 2001, 2003, 2004, 2005 and 2007 to facilitate implementation of ODS phase-out by the enterprises in various sectors.

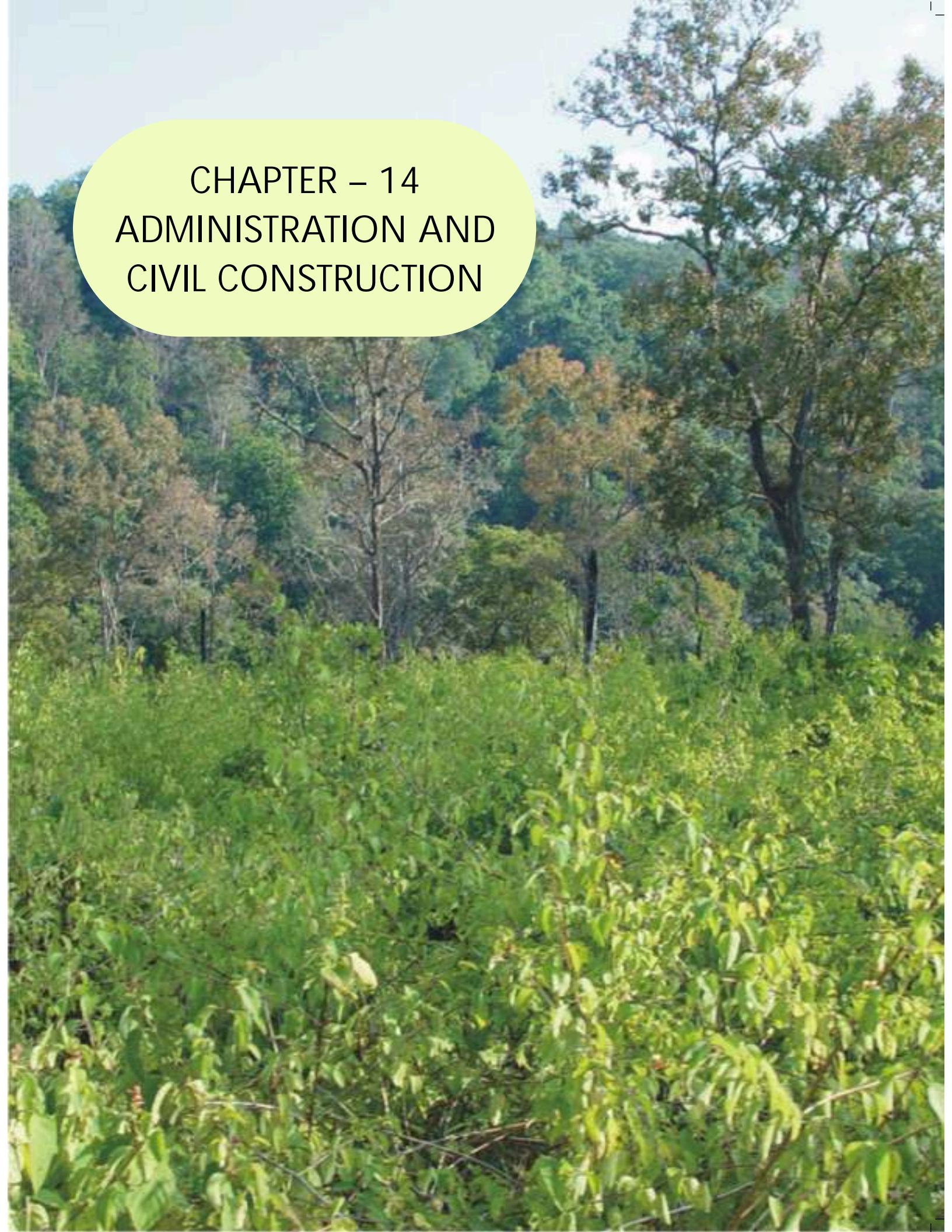
- These Rules prohibit the use of CFCs in manufacturing various products beyond January 1, 2003 except in MDI and other medical purposes. Similarly, use of halons is prohibited after 1st January, 2003 except for essential use. Other ODS such as CTC, methyl chloroform and CFC for MDI will be used upto January 1, 2010 as per the Montreal Protocol schedule. Further, the use of methyl bromide has been allowed upto January 1, 2015. Since HCFCs are used as interim substitute to replace CFCs, these would be allowed upto January 1, 2030.
- The latest amendment to the rules, have defined feedstock use of ODS and extended the date of registration for enterprises using ODS.

Fiscal Measures

- Customs and Excise duty exemption have been extended for MLF assisted ODS phase-out projects or expansion of capacity with non-ODS technology during the financial year 2008-2009.

Awards and Recognitions

- Dr. A. Duraisamy, Director, Ozone Cell has been awarded "2008 United States Environmental Protection Agency (USEPA) Award for Protection of Stratospheric Ozone Layer" at the special ceremony held on the afternoon of Monday, May 19, 2008 at the Kennedy Center for the Performing Arts in Washington DC.



CHAPTER – 14

ADMINISTRATION AND

CIVIL CONSTRUCTION

Personnel Administration

Staff Position

The staff strength of the Ministry including NAEB, NRCD is eight hundred twenty three. The details of the posts are given in Table-21.

Table-21. Number of employees in various groups and with reservation position

Group of Post	Sanctioned Strength	Number in Position	Scheduled Caste	Scheduled Tribe	OBC	Physically Handicapped
A	171	155	16	01	04	02
B	245	219	27	07	06	01
C	227	138	33	06	09	06
D	180	174	68	11	09	03
	823	686	144	25	28	12

The decisions of the Government on the recommendation of 6th Central Pay Commission have been implemented in the Ministry successfully.

The Ministry has outsourced some clerical jobs to tide over the shortage of the staff during the year.

Recruitment and Promotion of Scientists

The recruitment (through Direct Recruitment / Deputation) as well as promotion under Flexible Complementing Scheme (FCS) in the Group 'A' Scientific posts for the Ministry proper, its Regional Offices and all the Attached / Subordinate offices having such posts in their organizations is done by the Ministry. During the current year, the following posts of Scientists were filled by way of Direct Recruitment:

- Ministry Proper – one post of Scientist 'F' and one post of Scientist 'C'
- Zoological Survey of India – one post of Scientist 'G'

- National Museum of Natural History – one post of Scientist 'E' and one post of Scientist 'C'.

In addition to the above, the process to fill up the following posts is underway:

- Zoological Survey of India – Eighteen posts of Scientist 'C'
- Botanical Survey of India – Nine posts of Scientist 'C'

Review and Promotion under FCS

Under the Flexible Complementing Scheme (FCS), involving a two-tier system of evaluation for review/assessment of the Scientists for their promotion, the screenings/interviews of Scientists, as tabulated below were conducted during the current year:

General Administration

The General Administration (GA) Division of the Ministry has undertaken an ambitious project to set up a "Photo Gallery" in the corridors of various floors of Paryavaran Bhavan occupied by the Ministry. The Photo Gallery will showcase the rich natural resources of the country and will focus on various environmental issues. The Gallery is aimed at reinforcing our commitment to preserve the nature in its pristine glory for the

Organization	Screening undertaken	Interview held
Ministry Proper including Regional Offices	01	03
Botanical Survey of India	27	21
National Museum of Natural History	04	04
National River Conservation Directorate	01	01
Zoological Survey of India	40	22

benefit of future generations and highlighting the environmental issues threatening the nature. Further during the year, the GA division has undertaken maintenance of the building, procuring materials and equipment and providing essential services to the personnel of the Ministry including transport, communication, general upkeep etc.

Vigilance

The Vigilance Division is responsible for all vigilance/disciplinary matters relating to the Indian Forest Service officers both in the Ministry, including its all attached/subordinate/ autonomous organizations/PSUs, and IFS officers posted in the State Governments. The Vigilance Division functions under the direct control of Joint Secretary and Central Vigilance Officer (CVO) and overall supervision of Secretary, Environment and Forests.

The Vigilance Division is responsible for examination and processing of Disciplinary Cases, Appeals, Reviews and Memorials of Indian Forest Service Officers of all States/Union Territories, Investigation of Complaints, Obtaining and Maintenance of Annual Immovable Property Returns etc. Cases filed in various Benches of Central Administrative Tribunal and Courts in India in connection with the disciplinary matters are also handled in Vigilance Division. The prosecution cases launched against IFS Officers by various States/Union Territories and also other officers/staff of the Ministry are also dealt with in Vigilance Division.

The Division requires frequent consultation with the Central Vigilance Commission (CVC), Union Public Service Commission (UPSC), Central Bureau of Investigation (CBI) and Department of Personnel and Training (DoPT) as per rules and procedures laid down on the matter.

During the year, twenty three Disciplinary Proceedings cases, thirty Appeal cases, and seven Prosecution Sanction cases were processed in the Vigilance Division. Of these, eight Disciplinary Proceedings cases, eight Appeal cases and five Prosecution Sanction cases were finally disposed off. Court cases were pursued in the respective court/CAT Bench. Out of the thirty nine Complaints received through CVC, six complaints were finally disposed off after obtaining and considering the investigation reports. Other complaints are at various stages of investigation/examination. Thirty seven complaints received from other sources were also closed during the year. Applications received under RTI Act were also processed and replies sent to the applicants within the stipulated time. The progress on the disposal of DP, Appeal, Prosecution, Court cases and RTI cases as well as complaints is reviewed by the JS&CVO from time to time.

About two hundred ninety four Annual Property Returns (APRs) as on January 1, 2008, were received from Group 'A' and 'B' officers of the Ministry as well as organizations under it. All the APRs were scrutinized by the end of March, 2009.

Based on the sensitive posts already identified in the Ministry, rotational transfers of officers and staff, who have put in three years or more in a sensitive post, are made. Sensitive posts have also been identified in various field organizations and rotational transfers from sensitive posts are affected in these organizations as and when required.

Vigilance Awareness Week was observed in the Ministry during the period from 3rd November, 2008 to 7th November, 2008 and a pledge was administered by Secretary (E&F) to the officers and staff to bring about integrity and transparency in all spheres of activities and to work unstintingly for eradication of corruption in all spheres of life. Posters were displayed in the Ministry's premises during the Vigilance Awareness Week to create greater awareness amongst the employees of the Ministry as well as amongst the visiting public.

Monthly Reports on the cases relating to prosecution sanctions, disciplinary proceedings, complaints etc. was regularly sent to the CVC during the year.

Parliament

Introduction

The Parliament Division in the Ministry is responsible for co-ordination of all parliament matters related to the Ministry.

Progress of Activities Undertaken

During the year, a total number of six hundred twenty seven Parliament Questions pertaining to various aspects were answered by the Ministry (three eighty eight questions in the Lok Sabha, forty seven starred and three forty one unstarred and two hundred thirty nine questions in the Rajya Sabha, twenty six starred and two hundred thirteen unstarred). The questions covered a wide range of issues with which the Ministry is concerned, prominent among them being a wider range of issues with which the Ministry is concerned

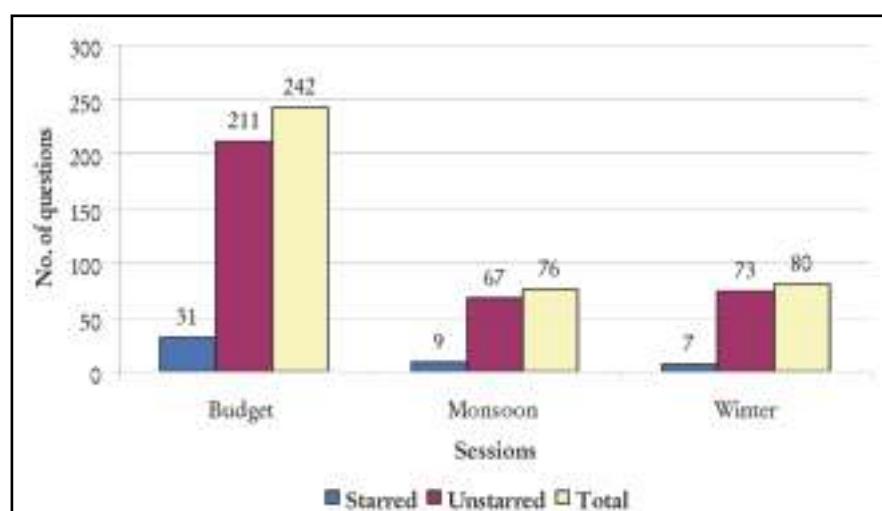


Fig-81. Number of questions replied to by the Ministry in Lok Sabha during 2008

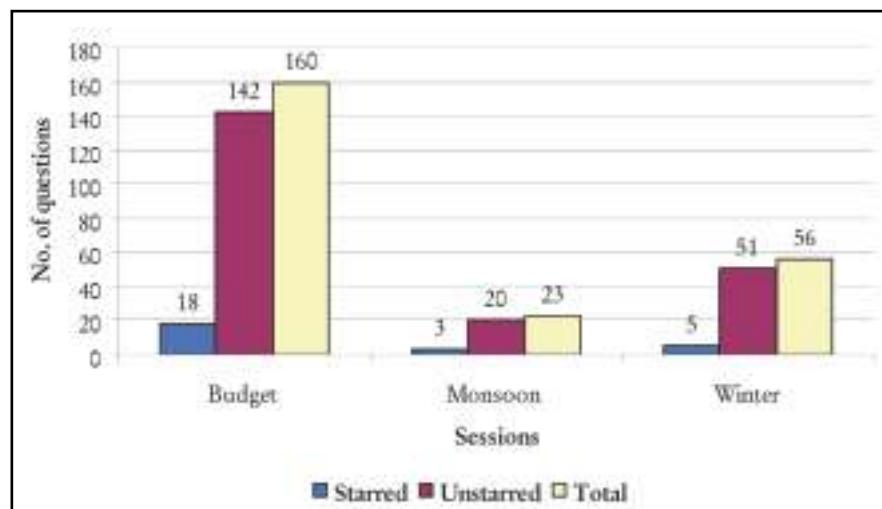


Fig-82. Number of questions replied to by the Ministry in Rajya Sabha during 2008

such as Conservation of Wildlife Management, Climate Change and its impact, Water Conservation, Pollution, Freshwater and Marine Conservation, Solid Waste Management, Renewable Sources of Energy etc.

The Question/Answer has been classified in different subject categories and readily available in the ENVIS Website: "www.wwfenvis.org".

The report of the trends and analysis of the Parliament Questions replied during the year 2006 by the Ministry of Environment and Forests and other Ministries is jointly prepared by Parliament Section of the Ministry of Environment and Forests and ENVIS Centre. Similarly, the report of the trends and analysis of Parliament Questions replied during the year 2007 by the MoEF and other Ministries is under process and will be published shortly. The present report will serve a helpful source of document for policy makers, academicians and researchers interested in Parliamentary studies as well as those, who are keen to bring environmental issues to the forefront of Government policy making.

The graphical presentation of the Parliament Questions replied to by the MoEF during 2008-09 both in Lok Sabha and Rajya Sabha in various sessions is given in Fig.-81 and Fig.-82.

During the year 2008, two meetings (14th and 15th) of the Consultative Committee of Members of Parliament attached to MoEF were held in New Delhi the subject matter of 14th meeting is assessment of forests and trees cover in the country and the strategies for achieving the goal as envisaged in the National Forest Policy and the subject matter of 15th meeting was 'Control of Pollution' were discussed. During the year, the Parliamentary Standing Committee of Members of

Parliament on Environment and Forests paid three visits to Chandigarh (June 22-25, 2008), Gangtok & Guwahati (September 25-30, 2008) and Thiruvananthapuram, Kanyakumari, Chennai, Port Blair and Hyderabad (November 18 to December 5, 2008) to take overview of the activities relating to protection and development of environment undertaken under different schemes of MoEF.

Internal Work Study Unit (IWSU)

Activities relating to internal work study are coordinated by IWS Unit of the Ministry. This is to ensure timely action by various sections on proper record management and strict compliance of various provisions of the manual of office procedure.

Progress/ Achievements

- During the year, one thousand four hundred twenty one files were sent for review from Departmental Record Room (DRR) out of which, six hundred fifteen files were weeded out by various Sections/ Divisions.
- In order to have a quick retrieval system and an accurate and permanent data base, the computerization of all the files in the DRR has been completed through development of software. This is very helpful in monitoring the record management in the Ministry. So far, the DRR has completed computerization of more than 18,000 files.
- Appraisal of nine hundred fifty four recorded files of category 'B' or files live for twenty five years or more have been completed by National Archives of India (NAI), New Delhi. Five hundred thirty two files have been transferred to NAI, after appraisal.



- An internal study to assess the manpower requirements for various Divisions/ Sections of the Ministry has been completed. Most of the recommendations in this regard have been implemented.
- Work Measurement Study of scientific and non-scientific posts in the Ministry including NAEB and NRCD, by the Work Measurement Committee with a core-member from Staff Inspection Unit (SIU), Department of Expenditure, is under process.
- O&M inspections of the organizations under the Ministry and Sections/ Divisions of the Ministry is being completed.
- Review of 'Induction Material' of the Ministry has been completed and is available on the Ministry's website.
- Review of 'Records Retention Schedule' for substantive functions is under progress.
- Review/ updation of compendium on "Channel of submission and final level of disposal" is under process.

Information Technology and e-Governance

Brief Objective

The Government has recognized Information Technology (IT) as a major important tool for speedy implementation and monitoring of various schemes and decisions in public interest. Accordingly, Ministry has embarked on a comprehensive exercise to implement an e-Governance project titled 'ENVISION' with the objective of transforming the functioning of the Ministry and its constituent organizations, and also to transform the way the Ministry serves its various stakeholders.

- e-Governance project of MoEF called ENVISION is "to apply the principles of

good governance – transparency, rationality, accountability, reduction in time and costs, ease and convenience of citizens and businesses in accessing the information and services provided by the Ministry through different channels e.g. internet.

- Seeks to render services to its various stakeholders with accurate, timely and reliable information and develop a more friendly and hospitable interface with public.
- 360° attention to the subject and the spectrum includes hardware, connectivity, LAN, WAN, software development, behind the scene infrastructure like Data Centre (DC) and Disaster Recovery (DR) and training of personnel. Project is to be implemented in three Stages:
- Stage 1 (Conceptualization) includes development of vision and objectives, determine scope of transformation envisaged and selection of a suitable consultant through a competitive bidding process. National Institute for Smart Government (NISG) was engaged for preparing the Request for Proposal (RFP) which led to the engagement of Stage 2 consultants for the Business Process Reengineering (BPR) exercise as well as implementation of Proof of Concept (PoC) for the identified processes.
- Stage 2 (Project Development) M/s PricewaterhouseCopers Pvt. Ltd. (PwC) engaged as Stage 2 consultants undertook detailed study of the 'AS-IS' processes and has designed the 'TO-BE' processes under the domain of BPR exercise for regulatory, functional and promotional activities leading to ease access to information through a website ensuring paperless office. To corroborate

soundness of the concept, selected processes will be taken up for Proof of Concept (PoC) implementation.

- Stage 3 (System Integration and Project Implementation) invited Expression of Interest (EOI) from the System Integrators to implement and maintain ENVISION solution based on the qualification criteria for submission of such proposals and short-listed seven organizations.

Progress/Achievements

- M/s PricewaterhouseCoopers Pvt. Ltd. (PwC) – Consultants for ENVISION Project carried out an exhaustive exercise of Business Process Re-engineering (BPR) for select activities in the Ministry based on 'As-Is' and 'To-Be' process. All the BPRs have been approved during the year.
- Request for proposal for Stage three consultants are under review.
- Implementation of Proof-of-Concept for leave, GPF, environmental clearance and wetland scheme has been undertaken and the software applications have been demonstrated to the concerned divisions.
- To strengthen the establishment of basic IT infrastructure, about seventy desktops and peripherals have been processed for the Ministry.
- Based on the Training Needs Analysis, the Ministry developed a comprehensive proposal for training of over five thousand employees in both IT and Non-IT domains. RFPs finalized, pre-bid meeting conducted, technical and financial bids received and meeting of Evaluation Committee held to finalise the agency.
- Proposal for Photographic digitization of textile designs, natural dyes and Illustrations in the old archival documents

at Botanical Survey of India, Kolkata have been reviewed, Expression of Interest, RFP circulated to the short-listed agencies and technical and financial bids are being finalized.

- Process for establishment of Programme Monitoring Unit (PMU) initiated.
- For scanning and digitization of records in the Ministry, Tender document finalized and action for procurement of IT infrastructure has been initiated.
- Process for re-structuring and re-designing the website of the Ministry has been initiated.
- Following applications developed by NIC have been implemented:
 - File Tracking System
 - Online leave sanction

RTI Cell

Activities relating to implementation of RTI Act, 2005 are coordinated by RTI Cell of the Ministry.

Progress/ Achievements

- During the year, a software, RTI-MIS has been activated with the help of NIC (of DoPT) to register, record and dispose off applications made under RTI Act, 2005.
- The Ministry has received one thousand fifty six RTI applications and eighty eight appeals under RTI Act, 2005 during the year 2008-09.
- For effective implementation of RTI Act, 2005, Central Public Information Officers (CPIOs) and Appellate Authorities (AAs) have been designated. The notification designating CPIOs/AAs is revised periodically as and when there is change in allocation work of CPIOs/AAs.

- RTI Cell conducted three workshops on effective implementation of RTI Act, 2005 for the staff and officers of the level of Joint Director in the Ministry.
- Decisions of Central Information Commission (CIC) and DoPT, relevant to this Ministry are being circulated to the CPIOs/AAs for better understanding.
- All the Subordinate Offices / Institutions / Autonomous bodies have been requested to periodically revise the notification for CPIOs/AAs.
- Reports being sent regularly to DoPT and Central Information Commission.
- The Ministry received eight hundred thirty one applications and thirty four appeals under RTI Act, 2005 during the year 2007-08. However, number of RTI applications and appeals during 2008-09 are one thousand and fifty six and eighty eight, respectively.

Protocol Unit

- Providing comprehensive protocol arrangements for Minister of Environment and Forests, Secretary, Special Secretary and Director General of Forests and Special Secretary (DGF&SS).
- During this period Visas of about 120 officers have been obtained and that too within given time frame.
- Protocol Unit has arranged more than 400 Domestic/ International tickets of officers of the Ministry.

Public Grievance Cell

A Grievance Cell has been functioning in the Ministry to attend to the complaints of public regarding forestry, environmental matters etc. Joint Secretary (Admin.) has been nominated as Public Grievance Officer of the Ministry.

The particulars of the Public Grievance Office of the Ministry are as under:

Joint Secretary (Admin.)

Room No.440, (4th Floor),

Paryavaran Bhawan, CGO Complex,

Lodi Road, New Delhi – 110 003

Tel.: 011-24361774.

e-mail: akg@nic.in

The general public can meet the Public Grievance Officer every Wednesday from 10.00 AM to 1.00 PM. The main function of the Cell is to ensure timely redressal of public grievances by taking up the matter with the concerned authorities such as District Magistrates, Municipal Corporations, Pollution Control Boards, State Governments, etc. Most of the complaints related to:

- Unauthorised industries located in residential areas discharging harmful gases and hazardous effluents in the immediate neighbourhood.
- Environmental degradation due to mismanagement of civic amenities like location of waste dump, water logging etc.
- Poor maintenance of open areas and parks; and
- Commercial establishments operating illegally in the residential buildings causing nuisance to people living in the immediate vicinity.
- Non-settlement of payment of salary dues and retirement dues, benefits like pension etc. to staff.
- During the year, forty five grievances were received from the general public and staff.

The Public Grievance cases are thus monitored regularly at specified time intervals

in MoEF and the replies are sent to the complainants as early as possible. Once the final replies are sent, the petition is treated as closed and the same is indicated in the statements prepared in respect of Public Grievances.

Implementation of Official Language Policy

Introduction

Sustained efforts were made through out the year to ensure proper implementation of the Official Language Policy of the Union, as envisaged in the Constitution of India, the Official Language Act and Rules, the Annual Programme and Order of Government of India issued in this regard from time to time. As a result, 100% compliance of the provisions made in Section 3(3) of the Act was achieved. Similarly 100% compliance of the Rule 5, 7(2) and 11 of the O.L. Rules was ensured. Efforts were made to achieve item-wise target as laid down in the Annual Programme for transacting official work of the Union in Hindi. The achievement of correspondence in Hindi from the Ministry with regions 'A', 'B' and 'C' has been higher than the preceding years.

Progress of Activities Undertaken

Hindi Salahkar Samiti

The meeting of Hindi Salahkar Samiti, under the Chairmanship of Hon'ble MoS (Environment) was organized on March 25, 2009. Efforts are being made to ensure time bound action on the decisions taken therein.

Revival of "PARYAVARAN"

The year under review witnessed the revival of "PARYAVARAN" – a quarterly magazine of the Ministry published in Hindi. The Hon'ble MoS released the 62nd issue of "Paryavaran" in the meeting of Hindi Salahkar Samiti.

Official Language Implementation Committee

Regular meetings of the Official Language Implementation Committee under the Chairmanship of the Joint Secretary (O.L. Incharge) were organized and timely action was ensured with regard to the decisions taken.

Hindi Workshop

With a view to assist the officials of the Ministry of Environment and Forests in carrying out their work in Hindi, a workshop was organized wherein forty employees were trained.

Incentive Schemes

All the incentive schemes introduced by the Government of India to propagate the use of Hindi were implemented.

Hindi Fortnight

Hindi Fortnight was organized in the Ministry from September 12 to 26, 2008; wherein a large number of officials participated in various Hindi competitions.

Cheques in Hindi

As per the decision taken in the meeting of Hindi Salahkar Samiti, Ministry started issuing cheques in Hindi.

Inspections

The Committee of Parliament on Official Language inspected Forest Survey of India, Dehradun, Tropical Forest Research Institute of India, Jabalpur, National Museum of Natural History, New Delhi and Botanical Survey of India, Arid Zone Circle, Jodhpur. In addition to these inspections, eight attached/subordinate offices were also inspected to review the position of implementation of Official Language Policy of the Union and making Progressive use of



Hindi therein, by Joint Secretary/Director (Official Language).

Civil Construction Unit (CCU)

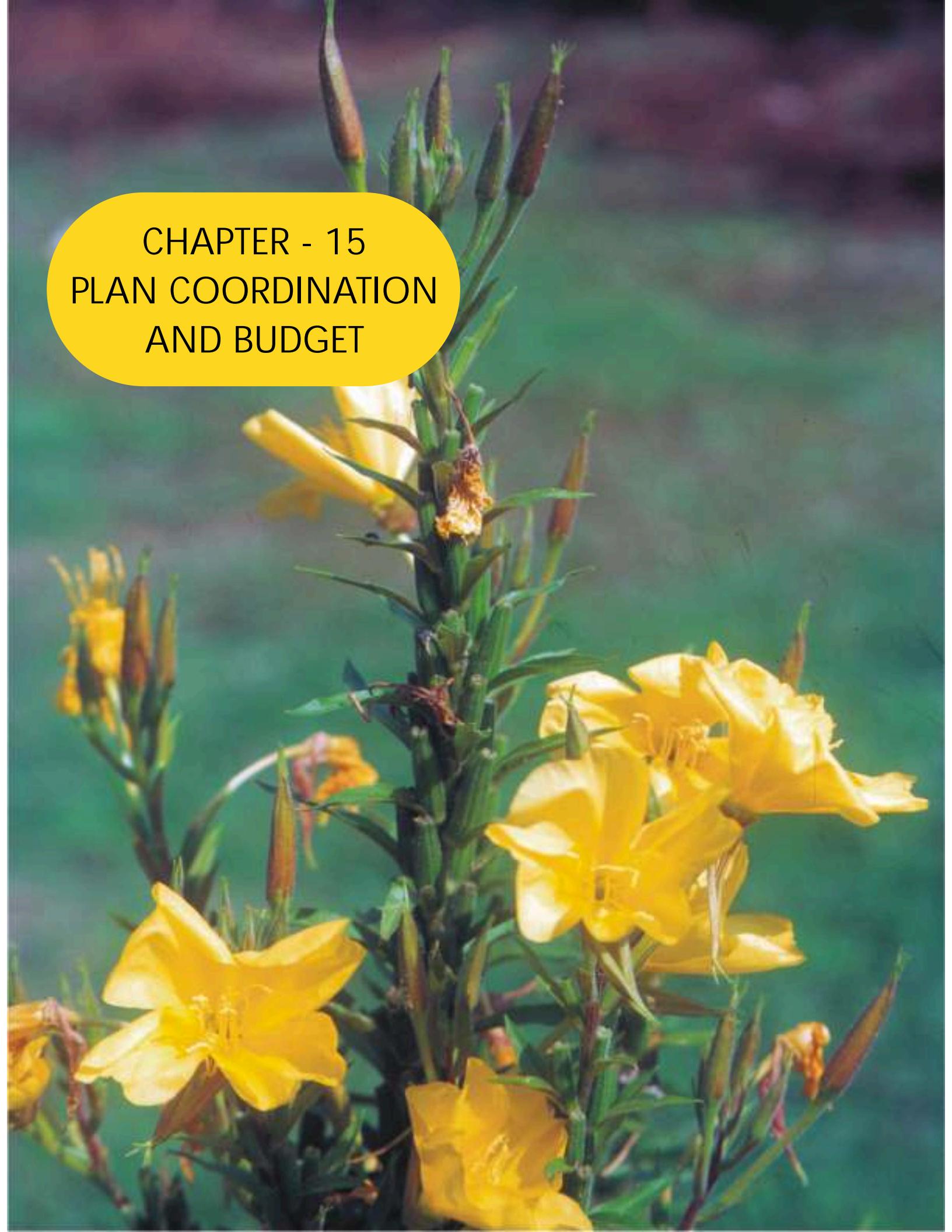
It was decided to have a separate construction unit within the Ministry, being a scientific Ministry, for better coordination of execution of works and the Civil Construction Unit was created during 1987. This Unit is catering to construction work for all the main and attached offices under the Ministry such as Botanical Survey of India, Zoological Survey of India, Forest Survey of India, Natural Museum of Natural History, Indira Gandhi National Forest Academy, Animal Welfare Division and Autonomous bodies funded by the Ministry like, Indian Council of Forestry Research and Education, G.B. Pant Institute of Himalayan Environment and Development, Indian Institute of Forest Management, Indian Plywood Research and Training Institute, Central Pollution Control Board and Central

Zoo Authority. A number of office buildings, laboratories, museums and residential quarters have been completed at Almora, Dehradun, Jodhpur, Jabalpur, Bhopal, Delhi, Mysore, Bengaluru, Coimbatore, Yercaud, Hyderabad, Shimla, Kozhikode, Shillong and Chhindwara.

There are three divisions looking after construction activities. Two divisions are located at Delhi for works in Northern Region and one is located at Bengaluru for works under Southern Region. The works under Western Region and Eastern Region are executed through CPWD and monitoring is done by this unit. To have effective control on construction activities, the sub-divisions are located at Delhi, Vadodara, Sawai Madhopur, Dehradun, Bhopal, Bengaluru and Kozhikode. Innovative techniques are being adopted to make works in planning/construction green.



Fig-83. ZSI Building in Kozhikode, constructed by CCU



CHAPTER - 15

PLAN COORDINATION AND BUDGET

Introduction

The Plan Coordination Division is responsible for the coordination of all plan schemes and programmes of the Ministry in close association with the Planning Commission. This involves preparation, monitoring and review of Five Year Plans, Annual Plans and the Annual Action Plans of the Ministry. The Division also looks after the monitoring of progress reports and reports under the 20-Point Programme (Points XV item No.52 & 53).

XIth Five Year Plan (2007-2012)

Against an approved outlay of Rs.5945 crores, the total expenditure of the Ministry during the Xth Five Year Plan (2002-07) amounted to Rs.5115 crores. For the XIth Five Year Plan, 2007-12, the Ministry has been provided with an outlay of Rs.10005 crores. A rationalization exercise was also carried out by clubbing/merging large number of plan

schemes of the Ministry into twenty two thematic schemes. The Annual plan 2007-08, first year of the XIth Plan had an approved outlay of Rs.1400 crores against which the actual utilization amounted to Rs.1349.73 crores. For 2008-09, the approved outlay of the Ministry is Rs.1500 crores against which the actual utilization amounted to Rs.1490.39 crores (provisional). Sector-wise details are given in Table-22.

The progress of plan schemes are reviewed regularly in the Ministry and necessary corrective action is taken to ensure proper and meaningful deployment of resources with a view to build up the capacities of the State Governments in Forestry and Environment Sector, for the programmatic aspects and variegated Centrally Sponsored and Central Sector

Table-22. Xth Plan Expenditure, Eleventh Plan Outlays / Expenditure – Ministry of Environment and Forests

Sl. No.	Sector	X th Plan		XI th Plan	2007-2008		2008-2009		(Rs. Crore)
		Outlay	Exp.		Outlay	Outlay	Exp.	Outlay	
1	Environment	1200.00	918.83	1246.01	259.16	224.22	255.00	245.76	
2	National River Conservation Directorate	1670.00	1543.69	2540.00	340.00	320.94	326.71	326.28	
3	Forestry & Wildlife	1600.00	1283.55	2948.99	371.61	361.73	521.08	521.28	
4	National Afforestation and Eco- development Board	1300.00	1293.40	3150.00	359.23	422.05	372.21	372.07	
5	Animal Welfare	175.00	75.11	120.00	21.00	20.79	25.00	25.00	
	Total	5945.00	5114.58	10005.00	1351.00	1349.73	1500.00	1490.39	

Scheme.

Annual Plan 2009-10

An outlay of Rs.1880.00 crores has been allocated in the regular Budget 2009-10 for the Annual Plan 2009-10 of the

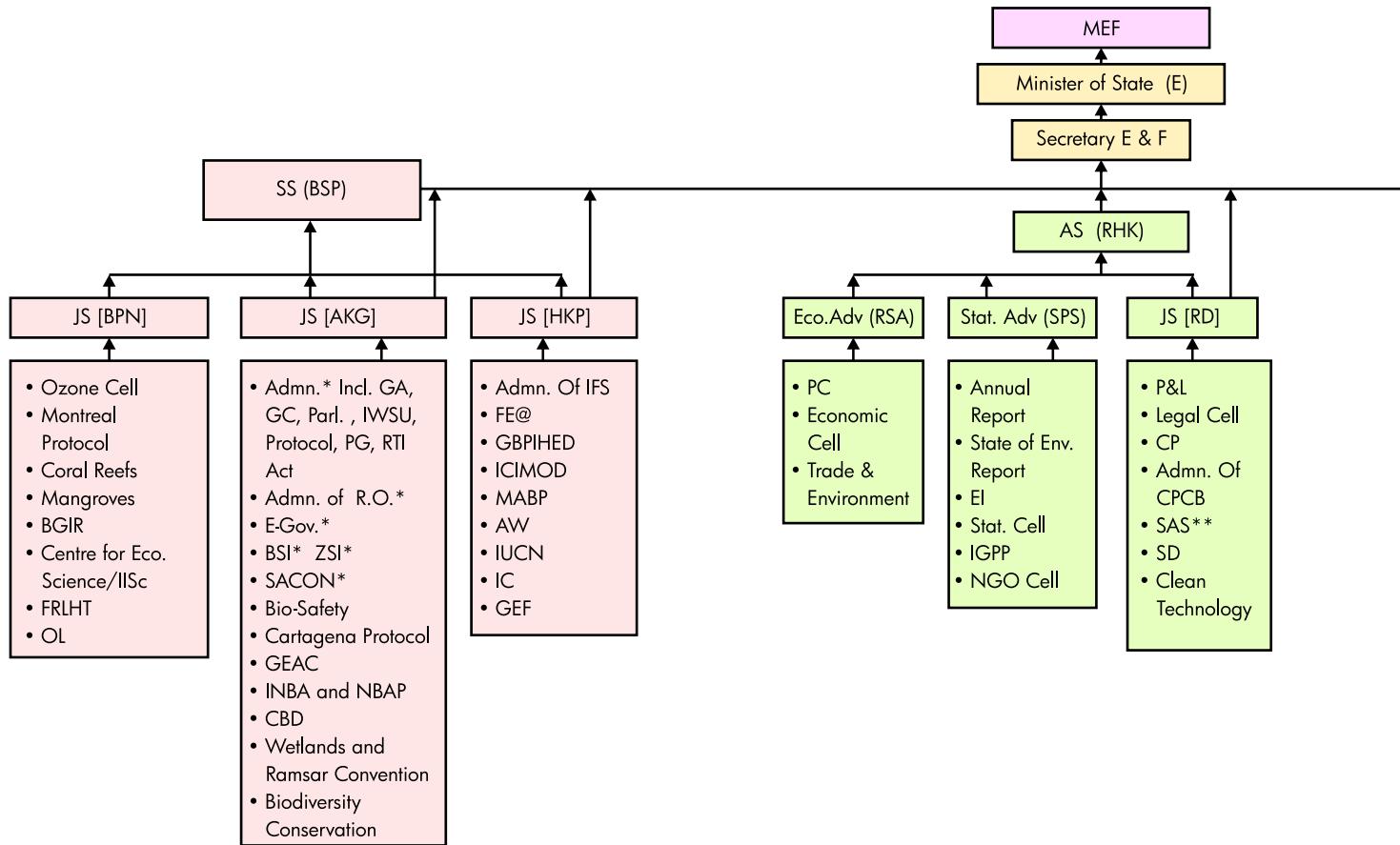
Ministry. The approved outlay comprises of Rs.868.75 crores in Environment and Ecology Sector and Rs.1011.25 crore in the Forestry and Wildlife Sector. Sector-wise details are given in Table-23.

Table-23: Plan Outlay for 2009-10

(Rs. Crore)

Sl. No.	Sector	Outlay 2009-10
1	Environment	291.42
2	National River Conservation Directorate	577.33
3	Forestry & Wildlife	599.63
4	National Afforestation and Eco-development Board	386.62
5	Animal Welfare	25.00
	Total	1880.00

ORGANISATIONAL STRUCTURE OF (Divisions under



* This work will directly be submitted to the Secretary (E&F)

** Officers for this work will report to AS (RHK)

@ JS (HKP) will report to DGF&SS

Officers for this work will report to AS(JMM)

AW : Animal Welfare

BGIR : Botanical Garden of the Indian Republic

BG : Botanic Garden

BSI : Botanical Survey of India

CC : Climate change

CDM : Clean Development Mechanism

CP : Control of Pollution

CRZ : Coastal Regulation Zone

CPCB : Central Pollution Control Board

CBP : Capacity Building Project

CBD : Convention on Biological Diversity

EE : Environment Education

EIVR : Entities of Incomparable Value Regulations

ICIMOD : International Centre for Integrated Mountain Development

FRLHT : Foundation for Revitalization of Local Health Traditions

GBPIHED : G.B. Pant Himalayan Institute of Environment Development

GPG : Global Public Goods

GEAC : Genetic Engineering Approval Committee

GC : General Co-ordination

GEF : Global Environment Facility

GA : General Administration

IGPP : Indira Gandhi Paryavaran Puraskar

IA : Impact Assessment

IC : International Co-operation

FE : Forest Establishment

IPCC : International Panel on Climate Change

IWSU : Internal Work Study Unit

MABP : Man and Biosphere Programme

MD : Male Declaration

NBAP : National Biodiversity Action Plan

NBA : National Biodiversity Authority

NATCOM : National Communication

OL : Official Language

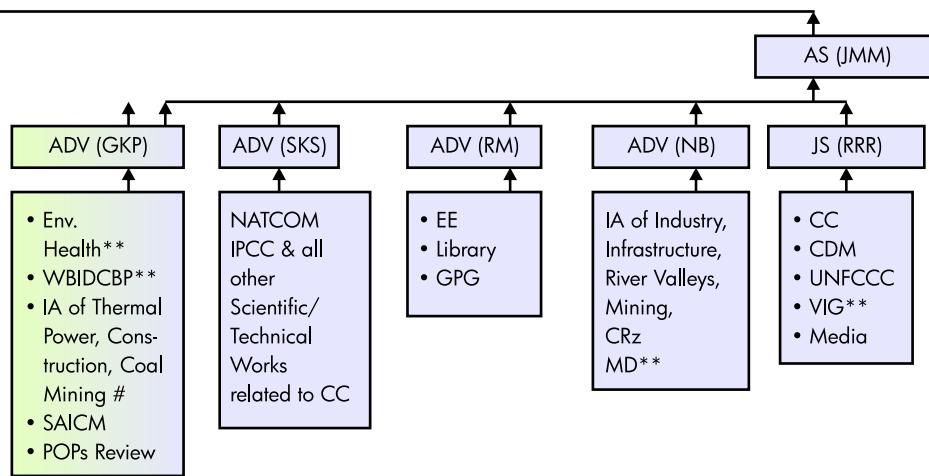
PG : Public Grievances

PC : Plan Co-ordination

P&L : Policy and Law

MINISTRY OF ENVIRONMENT AND FORESTS

Environment Sector)

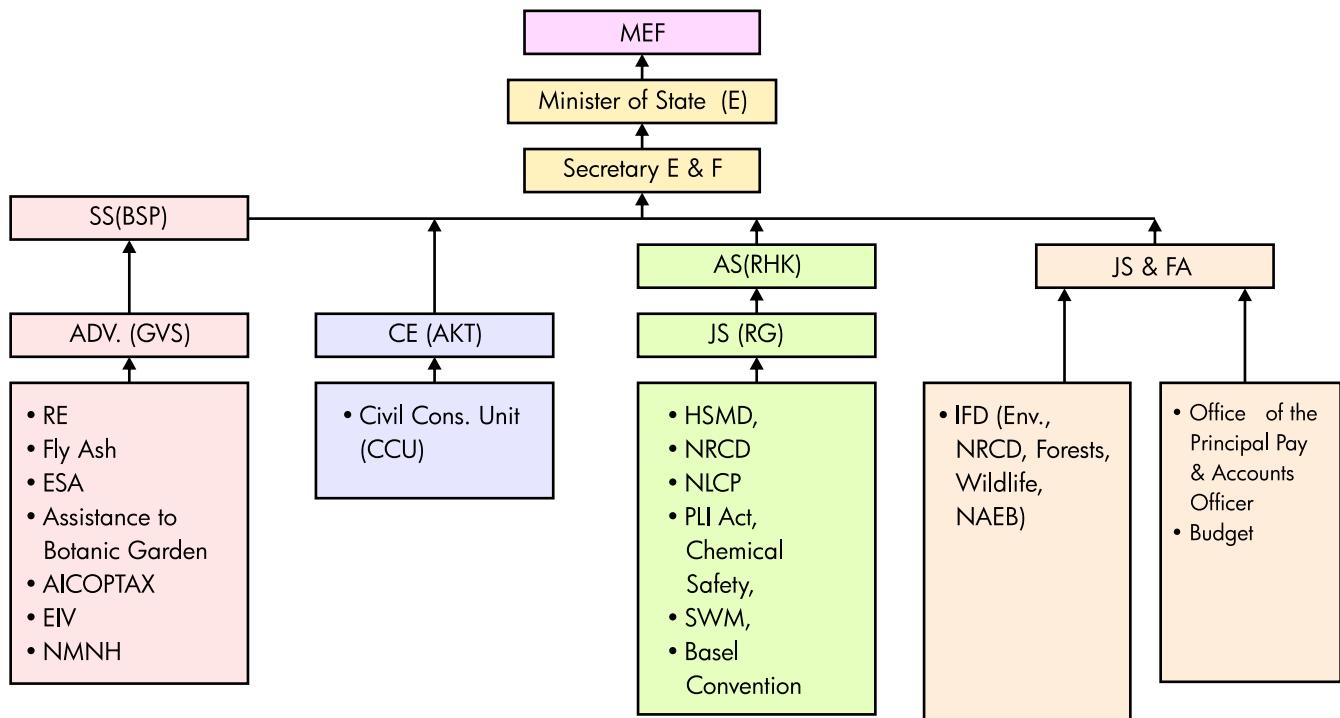


POPs : Persistent Organic Pollutants
 RE : Research in Environment
 SACON : Salim Ali Centre for Ornithology & Natural History
 SAICM : Strategic Approach to International Chemicals Management
 SAS : Source Apportionment Studies
 SD : Sustainable Development
 UNFCCC : United Nations Framework Convention on Climate Change
 UNCCD : United Nations Convention to Combat Desertification

 VIG : Vigilance
 WBIDCBP : World Bank Industrial Development Capacity Building Project
 ZSI : Zoological Survey of India

SS (BSP): B.S. Parsheera, Special Secretary
AS (RHK): R.H. Khwaja, Addl. Secretary
AS (JMM): J.M. Mauskar, Addl. Secretary
JS (BPN): B.P. Nilaratna, Joint Secretary
JS (HKP): H.K. Pande, Joint Secretary
JS (AKG): A.K. Goyal, Joint Secretary
Eco. Adv (RSA): R.S. Ahlawat, Economic Adviser
Stat. Adv (SPS): S.P. Sharma, Statistical Adviser
JS (RD): Rajneesh Dube, Joint Secretary
Adv (GKP): G.K. Pande, Adviser
Adv (SKS): S.K. Sharma, Adviser
Adv (RM): R. Mehta, Adviser
Adv (NB): Nalini Bhat, Adviser
JS (RRR): R.R. Rashmi, Joint Secretary

ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT AND FORESTS (Divisions under Environment Sector)



SS (BSP): B.S. Parsheera, Special Secretary
 AS (RHK): R.H. Khwaja, Addl. Secretary
 Adv (GVS): G.V. Subramaniam, Adviser
 CE (AKT): A.K. Trivedi, Chief Engineer
 JS (RG): R. Gauba, Joint Secretary
 JS&FA: Joint Secretary and Financial Adviser

AICOPTAX : All India Coordinated Project on Building in Taxonomy

CRZ : Coastal Regulation Zone

CCU : Civil Construction Unit

EIV : Entities of Incomparable Value

ESA : Ecologically Sensitive Areas

HSMD : Hazardous Substances Management Division

IA : Impact Assessment

IFD : Integrated Finance Division

NRCD : National River Conservation Directorate

NDMA : National Disaster Management Authority

NMNH : National Museum of Natural History

NLCP : National Lake Conservation Plan

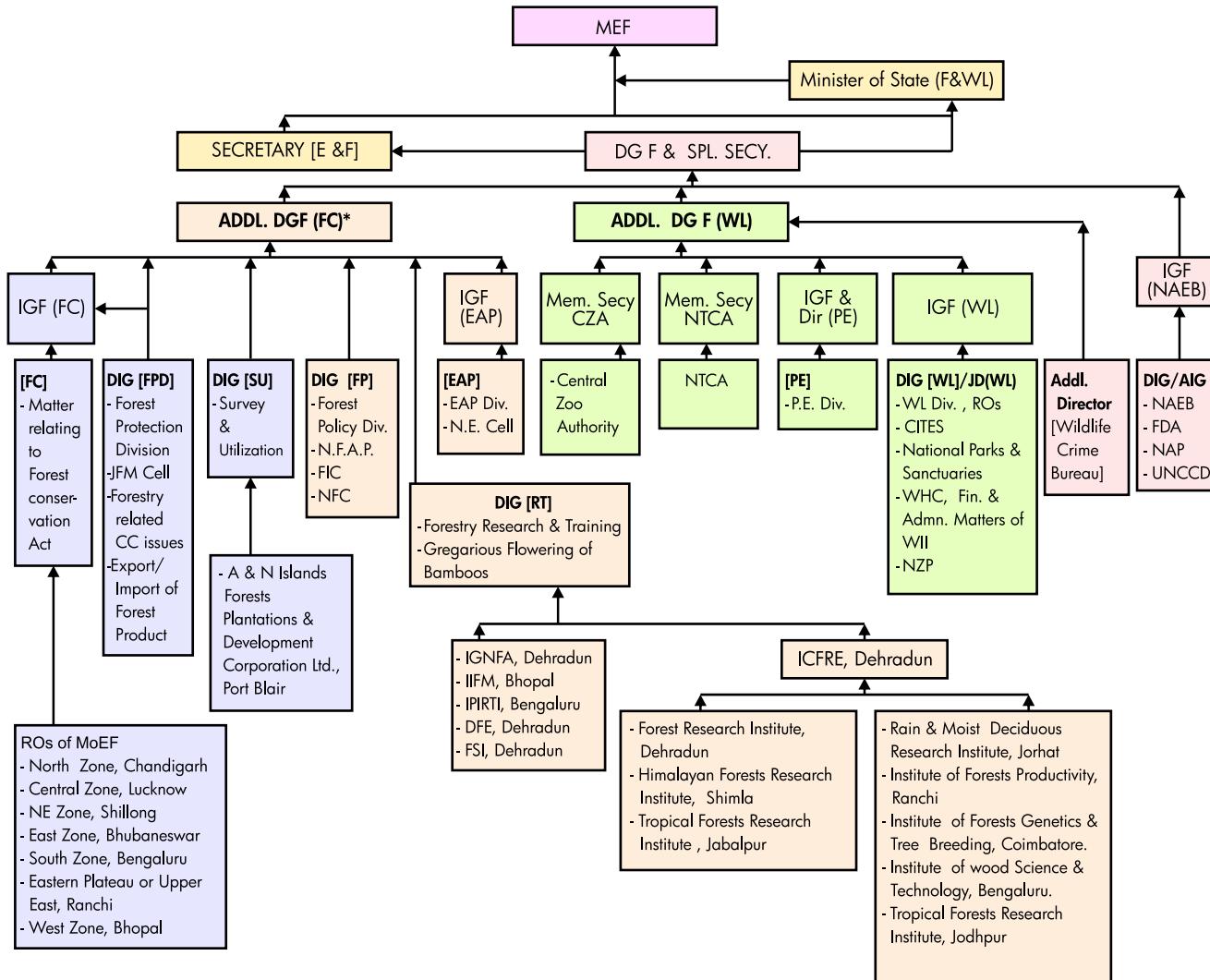
NAEB : National Afforestation and Eco-Development Board

PLI : Public Liability Insurance

RE : Research in Environment

SWM : Solid Wastes Management

ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT AND FORESTS (Divisions under Forestry and Wildlife Sector)



*The post of ADDL. DGF (FC) is vacant

- | | |
|--------|---|
| CITES | : Convention on International Trade on Endangered Species |
| DFE | : Directorate of Forest Education |
| EAP | : Externally Aided Projects |
| FC | : Forest Conservation |
| FPD | : Forest Protection Division |
| FP | : Forest Policy |
| FIC | : Forest International Cooperation |
| FSI | : Forests Survey of India |
| IPIRTI | : Indian Plywood Industries Research and Training Institute |
| IIFM | : Indian Institute of Forest Management |
| IGNFA | : Indira Gandhi National Forest Academy |
| JFM | : Joint Forest Management |

- | | |
|------|--|
| NFAP | : National Forestry Action Programme |
| PE | : Project Elephant |
| NZP | : National Zoological Park, New Delhi |
| NFC | : National Forestry Commission |
| NAEB | : National Afforestation & Eco-development |
| NTCA | : National Tiger Project Authority Board |
| ROs | : Regional Offices |
| RT | : Research & Training |
| SU | : Survey & Utilization |
| WHC | : World Heritage Convention |
| WL | : Wildlife |
| WII | : Wildlife Institute of India |

REGIONAL OFFICES OF THE MINISTRY

S.No.	Name of the Organization/ Institute	Communication Linkage	Area
Regional Offices			
1.	Shri K. S. Reddy Chief Conservator of Forests (Central) Kendriya Sadan, 4 th Floor, E&F Wing, II Block Koramangala, Bangalore- 560034	T.No.080-25537184 Fax No.080-25537184 E-mail:- reddyks99@hotmail.com	Regional Office, Southern Zone, Bangalore
2.	Shri J. K. Tewari Chief Conservator of Forests (Central) A/3, Chandersekharpur, Bhubaneswar-751023	Ph.0674-2301213 Fax.0674- 2302432 E-mail:- mef@nic.in	Regional Office, Eastern Zone, Bhubaneswar
3.	Shri A. K Rana Chief Conservator of Forests (Central) Kendriya Paryavaran Bhavan, Link Road No.3, Bhopal-462016	Ph.0755-2465494 E-mail:- rcccfbhopal@gmail.com	Regional Office, Western Zone, Bhopal
4.	Shri J. K. Tewari Chief Conservator of Forests (Addl. Charge) Upland Road, Laitumhran Shillong-793003	Tel:0364-2227673, 2227929, 2502278 E-mail:- tewarijk@yahoo.co.in mofner-meg@nic.in	Regional Office, North- Eastern Zone, Shillong
5.	Shri Azam Zaidi Chief Conservator of Forests (C) Kendriya Bhavan, 5 th Floor, Sector-H, Aliganj, Lucknow- 226024	Telefax:0522-2324043 E-mail:- azamzaidi375@yahoo.co.in	Regional Office, Central Zone, Lucknow
6.	Shri S.K. Sehrawat Conservator of Forests (Central) Bay No.24-25, Sector 31-A, Dakshan Marg, Chandigarh- 160030	T.No.0172-2604134, Fax No.0172-2604134 E-mail:- sehrawat@hotmail.com	Regional Office, Northern Zone, Chandigarh

Annexure-II B

REGIONAL CENTRES OF NATIONAL AFFORESTATION AND ECO-DEVELOPMENT BOARD (NAEB)

S.No.	Name & Address of Regional Centre	State/UTs covered as per MOU
1.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. B-1/9, Community Centre, Janakpuri, New Delhi-110058	Haryana, Rajasthan, Uttar Pradesh, Uttarakhand and UT of Delhi
2.	Regional Centre for NAEB Agriculture Finance Corporation Ltd. Dhanraj Mahal, 1st Floor, CSM Marg, Bombay-400001	Maharashtra, Gujarat, Goa and UTs of Daman & Diu, Dadar & Nagar Haveli
3.	Regional Centre for NAEB North Eastern Hill University, Shillong – 793 014	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland & Tripura
4.	Regional Centre for NAEB University of Agricultural Sciences, GKV Campus, Bengaluru-560065	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and UTs of Puducherry and Lakshadweep
5.	Regional Centre for NAEB Indian Institute of Forest Management, Nehru Nagar, Post Box no. 357, Bhopal-462003	Chhattisgarh, Madhya Pradesh & Orissa
6.	Regional Centre for NAEB Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan-173230	Himachal Pradesh, Jammu & Kashmir, Punjab and UT of Chandigarh
7.	Regional Centre for NAEB Jadavpur University, Kolkata-700032	Bihar, Jharkhand, Sikkim, West Bengal & UT of Andaman & Nicobar Island

**CENTRES OF EXCELLENCE / AUTONOMOUS / ASSOCIATED AGENCIES ETC. OF MINISTRY
OF ENVIRONMENT AND FORESTS**

Centres of Excellence

- | | |
|--|---|
| 1. Centre for Environment Education,
Nehru Foundation for Development,
Thaltej Tekra, Ahmedabad – 380 054 | Tel : 079-26858002-09
Fax : 91-079-26858010
email: cee@ceeindia.org |
| 2. C.P.R Environmental Education Centre
1 A, Eldams Road, Chennai – 600 018 | Tel : 044-24346526
Fax : 91-44-24320756
email: cpreec@vsnl.com |
| 3. Centre for Ecological Sciences
Indian Institute of Science,
Bengaluru – 560 012 | Tel:080-23600382
Fax: 080-23602280
email: chairman@ces.iisc.ernet.in |
| 4. Centre for Mining
Environment, Indian School of Mines,
Dhanbad – 826 004 | Tel : 0326-2206372, 2202486
Fax : 0326-2203042
email:cme@ismdhanbad.ac.in |
| 5. Salim Ali Centre for Ornithology and
natural History (SACON)
Kalyampalayam, Coimbatore – 641 010 | Tel: (0422) 807973, 807983
Fax : (0422)657088
email:centre@sacon.ernet.in |
| 6. Centre for Environmental
Management of Degraded Ecosystems
School of Environmental Studies
University of Delhi, Delhi – 110 007 | Telefax: 011-27666237 |
| 7. Tropical Botanic Garden and Research Institute
Pacha Palode, Thiruvananthapuram – 695562,
Kerala | Tel : 0472 - 2869246
Fax : 0472-2869646
email: gmnair@satyam.net.in |
| 8. Madras School of Economics
Gandhi Mandampam Road,
Chennai – 600 025 | Telefax: 044-22354847
Fax. : 044-22352155
sankar_u75@hotmail.com
http://www.mse.ac.in |
| 9. Foundation for Revitalization of
Local Health Traditions, 50 MSH Layout,
2nd Stage, 3rd Main, 2nd Cross,
Anand Nagar, Bengaluru – 560024 | Tel. : 080-8565890, 8565873
Fax.: 080-8565873
email : s.ajith@frlht.org.in
http://envis.frlht.org.in |

Autonomous Agencies

- | | |
|--|---|
| a) Environment Wing | |
| 1. Central Pollution Control Board,
Parivesh Bhawan, CBD-cum-Office Complex,
East Arjun Nagar, Delhi - 110 032 | Tel : (011) 22308902, 22301932
Fax: (011) 22307233, 22304948
email: cpcb@alpha.nic.in |

2.	Gobind Ballabh Pant Institute of Himalayan Environment and Development, Kosi - Katarmal, Almora - 263 643, Uttarakhand b Forest Wing	Tel : (05962) 241014 Fax : (05962) 241150 email: ao@gbpihed.nic.in
1.	Indian Institute of Forest Management, P.B. No. 357, Nehru Nagar, Bhopal - 462 003	Tel : (0755) 775716 Fax: (0755)772878 email:ramprasad@iifm.bren.nic.in
2.	Indian Plywood Industries Research and Training Institute, P.B. No. 2273, Tumkur Road, Bengaluru - 560 022	Tel : (080) 8394231, 8394232 Fax : 91-80-8396361 email: ipirti@giasbg01.vsnl.net.in
3	Indian Council of Forestry Research and Education, P.O. New Forests Dehradun - 248 006	Tel : (0135)757021 Fax: (0135)756865 email: katwalrps@icfre.up.nic.in
Research Institutes		
1	Forest Research Institute P.O. New Forests Dehradun - 248 006	Tel : (0135) 755277 Fax: (0135) 756865 email : rawatgs@icfre.up.nic.in
2	Institute of Forest Genetics and Tree Breeding, Forest College Campus, P.B. No.1061, R.S. Puram H.P.O., Coimbatore - 641 002	Tel : (0422) 431540, 435541 Fax : (0422) 430549 Email: ifgcb@sathyam.net.in
3	Institute of Wood Science and Technology, 18th Cross, Malleswaram, Bengaluru - 560 003	Tel : (080) 3341731 Fax : (080) 3340529 email:ksrao@iwst.res.in
4	Arid Forest Research Institute, New Pali Road, Jodhpur – 342 005	Tel: (0291)2722549 Fax: (0291) 2722764 email: director@afri.res.in http://www.afri.res.in
5	Tropical Forest Research Institute P.O. RFRC, Mandla Road, Jabalpur - 482 021	Tel : (0761) 322585 Fax: (0761) 321759 email: tfri@mantramail.com
6	Rain Forest Research Institute P.B. No. 136, Deovan, Jorhat - 785 001, Assam	Tel : 0376-322052, 322054 Fax: (0376) 322052 email : rainfor@sancharnet.in
7	Himalayan Forests Research Institute Shimla - 171 009	Tel : (0177) 2626778 Fax: (0177) 2626779 email : hfri@hotdok.net.in
8	Institute of Forest Productivity Ranchi - 834 001	Tel :(0651) 208234 Fax: (0651) 208234 email : ifp@bitsmart.dot.com

Centres

- | | | |
|---|--|--|
| 1 | Centre for Social Forestry & Eco-rehabilitation
Allahabad - 211 002 | Tel : (0532) 609037
Fax: (0532) 609037
email : csfer@nde.vsnl.net.in |
| 2 | Centre for Forestry Research & Human Resource Development, Nagpur Road, Chhindwara-480001 | Tel: (07162) 43237

email : tfri@mantramail.com |
| 3 | Forest Research Centre
F-105, 1st Floor, Sri Ranga Towers
Sardar Nagar, Safilguda,
Hyderabad-500004 |

email : ksrao@iwst.res.in |
| 4 | Advanced Centre for Bamboo and Rattan
P.B. No. 136, Deovan,
Jorhat-785001, Assam

c) Wildlife Wing |

Tel : (0135) 640112-115
Fax:(0135) 640117
email: wii@gov.in |
| 1 | Wildlife Institute of India,
P.B. No. 18, Chandrabani
Dehradun - 248 001 |

Tel : 011-23381585
Fax : 011-23386012
email : cza@ndf.vsnl.net.in
http://envfor.nic.in/cza |
| 2 | Central Zoo Authority
Bikaner House, Annexe VI, Shahjahan Road
New Delhi - 110011 | |

Subordinate Offices

a) Environment Wing

- | | | |
|---|---|---|
| 1 | Botanical Survey of India
CGO Complex, 3rd MSO Building,
DF Block, Sector 1, Salt Lake City,
Kolkata – 700 064 | Tel : 033-23346040/4963
Fax : 033-23215631
email:bsi_headquarter@rediffmail.com |
| 2 | Zoological Survey of India
M-Block, New Alipur, Kolkata - 700 053 | Tel : (033) 24006893, 24003383
Fax : (033) 24006893
email: enviszsi@cal.vsnl.net.in |
| 3 | National Museum of Natural History,
FICCI Building, Barakhamba Road
New Delhi - 110 001 | Tel : (011) 3314932
Fax : (011) 3314932
http://www.nmnh.org |

Regional Centres of ZSI

- | | | |
|----|---|---|
| 1. | The Officer In Charge,
Zoological Survey Of India,
Eastern Regional Station, Fruit Garden,
Risha Colony, Shillong-793003, Meghalaya. | Tel.:0364-223638, 226495
Fax:0364-226495 |
|----|---|---|

2. The Officer In Charge,
Zoological Survey Of India,
Western Regional Station, Vidya Nagar,
Sector 29, PB No. 3053, PCNTDA Post,
Near Akurdi Rly, Station, Pune-411044,
Maharashtra.
Tel.:020-7652564, 7651927,
5880054(R)
Fax:020-7652564
3. The Officer In Charge,
Zoological Survey Of India,
Northern Regional Station,
218 Kaulagarh Road, P.O : IPE,
Dehradun-248195, U. P.
Tel.: 0135-758349, 758362 (O/C),
54939 (O), 758362
Fax:0135- 671826
4. The Officer In Charge,
Zoological Survey Of India,
Central Regional Station,
424, New Adarsh Colony,
Kamala Nehru Nagar, Jabalpur-482002,
Madyapradesh.
Tel.:0761-315592
5. The Officer In Charge,
Zoological Survey Of India,
Desert Regional Station,
Pali Road, Jhalamand,
Jodhpur-342001, Rajasthan.
Tel.:0291-750408
6. The Officer In Charge,
Zoological Survey Of India,
Southern Regional Station,
100, Santhome High Road,
Chennai-600028,
Tamil Nadu.
Tel. : 4942898, 4943255
Fax. : 044-4942898
7. The Officer In Charge,
Zoological Survey Of India,
Arunachal Pradesh Field Station,m,
Senkhi Valley, Post Box No. 112,
Itanagar-791113, Arunachal Pradesh.
Tel. : 0360-203652,
2203653(R)
Fax : 0360-20652
8. The Officer In Charge,
Zoological Survey Of India,
Gangetic Plains Regional Station,
Handloom Bhawan(4thFL.),
Rajendra Nagar, Patna-800016, Bihar.
Tel. : 670686, 350332
9. The Officer In Charge,
Zoological Survey Of India,
Marine Aquarium Cum Research Centre,
Digha, District: Midnapore-741428,
West Bengal.
Tel. : 66310, 66311,
66312, 66463(R)

- 
10. The Officer In Charge,
Zoological Survey Of India,
High Altitude Zoology Field Station,
Opposite Sapron Gurudwar,
Sapron, Solan-173211
Tel. : 01792-20413, 24483,
09816024105(Mobile)
23174(R)
Fax : 01792-21060
 11. The Officer In Charge,
Zoological Survey Of India,
Marine Biological Station,
100, Santhome High Road,
Chennai-600028, Tamil Nadu.
Tel. : 4942680, 4943191,
4450853(R)
Fax : 044-4942680
 12. The Officer In Charge,
Zoological Survey Of India,
Andaman and Nicobar Reg. Station,
Port Blair-7441002, Andaman.
Tel. : 03192-33148,
30115(R), 33157(R),
Fax : 03192-30115
 13. The Officer In Charge,
Zoological Survey Of India,
Fresh Water Biological Station,
1-1-300/B, Ashok Nagar,
Hyderabad-500020, Andhra Pradesh.
Tel. : 040-7603514
4800620(R)
Fax : 040-7634662
 14. The Officer In Charge,
Zoological Survey Of India,
Sunderbans Field Reg. Station,
Canning-743329,
Dist: 24 Parganas(S), West Bengal.
Tel. : 9118-5521
(Local Call From Calcutta)
033-4550651
Fax : 03128-55211
 15. The Officer In Charge,
Zoological Survey Of India,
Estuarine Biological Station,
Hill Patna, Behrampur-760005,
Orissa.
Tel. : 0680-206894,
202676(R)
Fax : 0680-200637
 16. The Officer In Charge,
Zoological Survey Of India,
Western Ghats, Field Res. Stn.,
Kamala Buildings, 1st Floor,
Annie Hall Road,
Kozikode-673002, Kerala.
Tel. : 0495-357884(R)
Telefax : 0495-701928

Regional Centres of BSI

1. Botanical Survey of India
India, Central Circle, 10,
Chatham Lines, Allahabad- 211002,
Uttar Pradesh.
TeleFax: 0532 2250179
Phone : 0532 2441192
2. Botanical Survey of India
Northern Circle, 192, Kaulgarh Road,
Dehra Dun- 248195, Uttarakhand
Phone: 0135-2753433
Fax: 0135-2757951

3.	Botanical Survey of India 775/80, Subhas Nagar, Khema Ka Kuan, P.O Nandavan, Jodhpur- 342008, Rajasthan	Phone: 0291 2747163 Fax: 0291 2741736
4.	Botanical Survey of India Western Circle, 7, Koregaon Road, Pune- 411001, Maharashtra	Phone : 26122125 Fax (020 26124139
5.	Botanical Survey of India Southern Circle, T.N.A.U. Campurs, Lawlay Road, P.O. Coimbatore-641003, Tamil Nadu.	Phone: 2432788, 2432487 Fax: 0422 2432835
6.	Botanical Survey of India Eastern Circle, Woodlands, Laithmukrtta, Shillong – 793003	Phone : 0364 2223971, 2223618 Fax: 0364 2224119
7.	Botanical Survey of India Arunchal Field Station, Sankie View, Itanagar – 791111, Arunachal Pradesh	Phone: 0360 2212405 Fax: 0360 2211713
8.	Botanical Survey of India Andaman & Nicobar Circle, P.O. No. 692, Haddo, Port Blair-744102.	Phone: 03192 233224 Fax: 03192 230120
9.	Botanical Survey of India Sikkim Himalayan Circle, Below Rajbhawan Campus, P.O. Rajbhawan, Gangtok – 737103 Sikkim	Phone 202789 Fax: 03592 204717
10.	Botanical Survey of India Decan Circle, Zoological Survey of India Campus Plot No. 366/1, Attapur, Hyderguda post Hyderabad - 500 048	Tel:(0422) 2435987, M.: 098668849872
	b) Forest Wing	
1.	Forest Survey of India, Kaulagarh Road, P.O. IPE, Dehradun-248195	Tel:(0135) 756139, 755037 Fax:(0135) 759104 email: fsidir@nde.vsnl.net.in
2.	Indira Gandhi National Forest Academy P.O. New Forests, Dehradun - 248 006	Tel : (0135)2754647 Fax: (0135) 2757314 email: ignfa@ignfa.up.nic.in
3.	Directorate of Forest Education P.O. New Forest Dehradun - 248 006, UP	Tel: (0135) 757326 Fax : (0135) 757326

Regional Offices of Forest Survey of India

1. Regional Director (Central Zone)
Forest Survey of India, Central Zone
C.G.O. Complex, Block 'A',
Seminary Hills, Nagpur-440006
Tel : 0172-2510194 (O),
2511309 (R)
email: tejinder_84@rediffmail.com
2. Regional Director (Eastern Zone)
Forest Survey of India, 97/1B, Hazra Road
(2nd Floor), Kolkata – 700026
Tel : 033-24752812 (O)
24483377 (R),
9830054124 (M)
Fax : 033-24752812
email: regdirez@hotmail.com
3. Regional Director (SZ)
Forest Survey of India, 8th Floor, B-Wing,
Kendriya Sadan, Koramangala,
Bengaluru - 34
Tel : 080-25520136
Fax : 080-25520136
email: fsisz@blr.vsnl.net.in
4. Regional Director (North Zone)
Forest Survey of India, North Zone,
Himlok Parisar, "Shivalik Khand",
Batsley Longwood, Shimla - 171001,
Himachal Pradesh
c) Wildlife Wing
Tel : 0177-2658285
Fax : 01772655572

1. Director,
National Zoological Park,
Mathura Road, New Delhi - 110 003
Tel : (011) 4619825
Fax : (011) 4602408

Regional Offices

1. Wildlife Preservation
Western Region, 11 Air Cargo Complex
Sahar, Mumbai - 400 099
Tel : (022) 8230666
Fax: (022)8230666
2. Wildlife Preservation
Eastern Region, Nizam Palace,
6th Floor, M.S. Building
234/4, A.J.C. Bose Road,
Kolkata - 700 020
Tel : (033) 2478698
Fax : (033) 2478698
3. Wildlife Preservation
Northern Region, Bikaner House,
Shahjahan Road, New Delhi - 110 011
Tel : (011) 3384456
Fax: (011) 3384456
4. Wildlife Preservation
Southern Region, C-2/A, Rajaji Bhawan,
Basant Nagar, C.G.O. Complex
Chennai - 600 090
Tel : (044) 4916747
Fax: (044)4916747

Public Sector Undertaking

1. Andaman & Nicobar Islands Forests and
Plantation Development Corporation Ltd.
Van Vikas Bhawan, Port Blair,
Andaman & Nicobar Islands.
Tel : (03192) 20261, 20752
Fax : (03192) 21254

LIST OF PROJECTS SANCTIONED DURING 2008-2009

Environment Research Programme (ERP)

S.No.	Title of the Project	Name of Principal Investigator & Institute
1.	Photocatalytic degradation of organic pollutants from industry waste using heteropolytungstic acid – encapsulated nano-sized TiO ₂ supported nanoporous materials.	Dr. S. Anandan, Department of Chemistry, National Institute of Technology, Tiruchirapalli-620015, Tamil Nadu
2.	Temporal and spatial variability of dissolved trace metals and organic carbon in the river Nethravati, Southwest Coast of India.	Dr. K. Balakrishna Department of Civil Engineering, Manipal Institute of Technology, Manipal -576104, Karnataka
3.	A study of gene-environmental interaction in preterm delivery cases with special reference to organochlorine pesticide levels in the north Indian population.	Dr. B.D. Banerjee University College of Medical Sciences & GTB Hospital, Dilshad Garden, New Delhi-110095.
4.	Bioconversion of cotton gin Waste to value-added Product.	Dr. (Mrs.) Krishna Pramanik Department of Chemical Engineering, National Institute of Technology, Rourkela-769008, Orissa
5.	Electroanalytical applications of organic -inorganic composite ion exchange material for detection and determination of heavy metals and pesticide residue in water at micro level.	Dr. Asif Ali Khan Department of Applied Chemistry, Faculty of Engineering & Technology, Aligarh Muslim University, Aligarh (U.P.)
6.	River Water Quality Modelling Load from Coffee Processing Units Around Cauvery River Basin.	Dr. B. Manoj Kumar, Department of Environmental Engineering, S. J. College of Engineering, Mysore-570006, Karnataka.
7.	Development of a bioleaching strategy for sustainable disposal and recycling of e-waste in India. Information Technology, Kandaghat,	Dr. Sudhir Syal, Department of Biotechnology and Bioinformatics, Jaypee University of Waknaghata, PO Dumehar, Bani, Solan-173215, Himachal Pradesh
8.	Study on the polytene chromosome polymorphism in chironomids and their relation	Dr. Trilochan Midya Department of Zoology, with pollution in aquatic bodies. Presidency College, Kolkata, West Bengal

S.No. Title of the Project	Name of Principal Investigator & Institute
9. Use of Ground-Granulated- Blast-Furnace-Slag (GGBFS) in Plain and Reinforced concrete.	Dr. Jagdish Prasad Department of Civil Engineering, Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand
10. Detection and treatment of endocrine disrupters in wastewater and sludge using green technology.	Dr. Rajeev Jain School of Studies in Chemistry, Jiwaji University, Gwalior-474011, Madhya Pradesh
11. Production of bioplastics from agroindustrial wastes.	Dr. (Mrs.) J. Kasthuri Department of Zoology, Rajaratnam College, Sivakashi-626123, Tamil Nadu,
12. Synthesis and Utilization of Carbon Nano Material as a Sensor to detect pesticide residue in food, soil and water.	Dr. Maheshwar Sharon Nanotechnology Research Centre, Birla College Bhiwandi Road, Kalyan (West), District Thane, Maharashtra
13. Hydrofluro Ethers as third generation substitute for CFCs.	Dr. D. Velayutham Electroorganic Division, Central Electro Chemical Research Institute, Karaikudi-630006, Tamil Nadu
14. Reclamation of copper rich malajkhand tailing dam through Phytoremediation employing biconsortia of arbuscular mycorrhiza fungi and bacteria.	Prof. S. P. Gautam Chairman, Madhya Pradesh Pollution Control Board, Paryavaran Parisar, E-5, Arera Colony, Bhopal-462016, Madhya Pradesh. (Project Jointly supported by the Ministry of Environment & Forests and Hindustan Copper Ltd., Malajkhand)
15. Timber wood protection from wood decaying basidiomycetes using actinomycetes.	Prof. Rajinder K Gupta School of Biotechnology, Guru Gobind Singh Indraprastha University, New Delhi-110043
16. Trace element analysis of Loktak Lake and rivers draining into it and its impact on health.	Prof. N Rajmuhan Singh Department of Chemistry, Manipur Canchipur, Imphal-795003, Manipur
17. Optimization and application of microbial formulation for removal of toxic metals from effluents of small scale industries.	Dr. Anushree Malik Centre for Rural Development & Technology, Indian Institute of Technology,

S.No.	Title of the Project	Name of Principal Investigator & Institute
18	Analysis of Surface and Groundwater pollution by Indiscriminate use of Agrochemicals Disease (Pesticides) in selected Paddy, Cotton and Vegetable Growing Farms of India.	New Delhi-110016. Dr. Tanu Jindal, Amity Centre for Biocontrol and Plant Management, Amity University Campus, Block A, Expressway, Sector-125, NOIDA, (U.P.)
19.	Defluridation of ground water using electrochemical coagulation technology.	Dr. Mahesh S. Department of Environmental Engineering, S.J. College of Engineering, Mysore-570006, Karnataka
20.	Development of stable and synergistic bio-pesticide formulation using phytochemicals to enhance bioeffeacy of neem based preparations.	Dr. A K. Tripathi Central Institute of Medicinal and Aromatic Plants, P.O. CIMAP, Lucknow-226015 (U.P.)
21.	State of the Art Report on Bioremediation of Contaminated Sites in India.	Prof. MNV Prasad Department of Plant Science, School of Life Sciences, University of Hyderabad, Hyderabad-500046, Andhra Pradesh
22.	Model for optimized spacing of Transpiring Hydrophilic Trees on Vegetative covers of MSW Landfill.	Dr. Shashi Mathur Department of Civil Engineering, I.I.T. Delhi, New Delhi-110016.
23.	Degradation of Organic Pollutants, colored dyes and pesticides in water Resources using polymer protected metal nanoparticles: A Nanotechnological approach.	Dr. K. Pandian Department of Inorganic Chemistry, University of Madras, Guindy Campus, Chennai-699925, Tamil Nadu
24.	Impact of bottom trawling on infaunal communities of inshore waters of Parangipettai and Cuddalore.	Dr. P. Murugesan Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai- 608502, Tamil Nadu
25.	Utilization and recycling of farm, industrial and urban solid wastes as eco-friendly approach for augmenting yield maximization in Cauvery delta region.	Dr. (Mrs.) A Sundari Department of Agronomy Faculty of Agriculture, Annamalai University, Annamalainagar-6080021, Tamil Nadu
26.	Microbial decolourisation of coloured textile industrial effluents.	Dr. Kamaljit Singh Department of Applied Chemical Science & Technology, Guru Nanak Dev Univeristy,

S.No. Title of the Project	Name of Principal Investigator & Institute
	Amritsar-143005, Punjab
27. Mycorrhizal Technology for phytoremediation of organic pollutants.	Dr. Anil Vyas Department of Botany, J.N.V. University, Jodhpur-342005, Rajasthan
28. Studies on Pollution of Pond/Fishery water of Guwahati with respect to Fish Health : Remediation by Zeolitic Action.	Dr. Anup Kumar Talukdar Department of Chemistry, Gauhati University Gauhati-781014, Assam
29. Assessment of toxic elements in water of semi-urban areas of Assam and investigation of the disease related contaminants.	Prof. A.K. Mishra, Department of Chemistry, Gauhati University, Gauhati-78101, Assam
30. Some Mathematical Model for pollutant uptakes in plants.	Dr. Arun Kumar, Department of Mathematics, Govt. College Kota, Kota-324001, Rajasthan
31. Composting of Refuse (Organic Municipal Solid Waste) Employing Microbial Biotechnology.	Dr. P.S. Bundela, Madhya Pradesh Pollution Control Board (MPPCB), Jabalpur, M.P.
32. Eco-toxicological study of engineered oxide Nanoparticles: A microcosm approach	Dr. Amitava Mukherjee, School of Biotechnology, Chemical & Biomedical Engineering VIT – University Vellore – 632014, Tamil Nadu

Ecosystem Research Scheme (ERS)

S.No. Title of the Project	Name of Principal Investigator & Institute
1. Floristic studies on Macrophytic diversity of Nameri National Park(Assam) and Pakke Tiger research (Arunachal Pradesh)"	Dr. Nilakshee Devi Department of Botany, Gauhati University, Gauhati-781014, Assam
2 Ants as an indicator of ecosystem health in North-West Shivaliks	Dr. Himender Bharti, Department of Zoology, Punjabi University, Patiala-147002, Punjab
3 Development of nursery technology and measurement of ecological and natural regeneration status of chilgoza pine (<i>Pinus gerardiana wal</i>)-a rare and endangered	Dr. G.S. Shamet, Department of Silviculture & Agroforestry, Dr. Y.S. Parmar University of Horticulture & species of India, Forestry, Nauni, Solan- 173 230 (HP)
4 Studies on the Diversity and Distribution of Soil Microarthropod Funa of Grassland and Adjoining Cultivated Fields in Subtropical	Dr. D.C. Ray, Department of Ecology & Environmental Sciences, Assam university,

S.No.	Title of the Project	Name of Principal Investigator & Institute
	Ecosystems of Cachar, Assam NE	Silchar-788011, Assam
5	Taxonomy, Biodiversity and Habitat Association of Noctuid Moths Lepidoptera: Noctuidae) in Institute, various Conifer Forests of Himachal Pradesh.	Dr. Pawan Kumar Rana Scientist-B,Himalayan Forest Research (ICFRE), Conifer Campus, Panthaghati, Shimla(H.P)-171009.
6	Ichthyofaunal diversity and studies on the biology of certain indigenous ornamental fishes of Meghalaya	Sh. S.N. Ramanujam Dept. of Zoology, School of Life Sciences North Eastern Hill Univ. Shillong-793002, Meghalaya

Eastern and Western Ghats Research Programme (E&WGRP)

S.No.	Title of the Project	Name of Principal Investigator & Institute
1.	Diversity of Vermifauna and their population dynamics in Kolli Hills, A part of Eastern Ghats, Tamil Nadu	Dr. P. Neelnarayanan, Nehru Memorial College, Puthanampatti-621 007, Tiruchirappalli (Dt.), Tamil Nadu
2.	Biodiversity and endemism of hill stream amphibians of the Western Ghats of Kerala and Karnataka	Dr. Sathyabhama Das Biju, Centre for Environmental Management of Degraded Ecosystems School of Environmental Studies University of Delhi – 110007.

Policy Research Projects

S.No.	Title of the Project	Name of Principal Investigator & Institute
1.	Development of Mine closure strategy for sustainable surface coal mining in West Bengal	Dr. Suranjan Sinha, Bengal Engineering and Science University, Shibpur, West Bengal

Biosphere Reserve Scheme

S.No.	Title of the Project	Name of Organization
1.	Impact of Glacier Recession on the Vegetative Cover of the Valley of Flowers, Uttrakhand Himalaya	H.N.B. Garhwal University, Srinagar

National Natural Resource Management System (NNRMS)

S.No.	Title of the Project	Name of Principal Investigator & Institute
1	Inventorying Sacred Groves of Jharkhand forests and their Characterization through RS- GIS technology	Dr. R.K. Sinha, Centre for Regional Studies, T.M. Bhagalpur University Bhagalpur-812007.

- 2 Exploration, diversity, and mapping of vegetation in the urban forests of Kumaun Himalayan towns using Remote Sensing & GIS. Dr. Subrat Sharma, Scientist B, G.B. Pant Institute of Himalayan Environment & Development, Kosi-Katarmal, Almora – 263643, Uttarakhand.
- 3 Development of a comprehensive information system with GIS, GPS and Remote sensing interface for environment impact assessment of the proposed river link canal projects of Peninsular India Dr. B. Prakasa Rao, Professor, Department of Geo- Engineering, College of Engineering, Andhra University - Visakhapatnam-530003.
- 4 Habitat characterization at landscape level with special emphasis on Geobotanical Analysis at Achanakmar-Amarkantak Biosphere Reserve. Dr. Shashikant Tripathi, Lecturer, Remote Sensing & GIS Centre, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.) – 485 331

National River Conservation

S.No.	Name of the Project/Scheme	Name of the Town/City
Tamil Nadu		
1.	Interception & Diversion (Additional Works at Villivakkam Phase-I)	Chennai (ORCP)
2.	Interception & Diversion (Additional Works at Ayanavaram)	Chennai (ORCP)
3.	Interception & Diversion (Additional Works at Seethammal Colony)	Chennai (ORCP)
4.	Interception & Diversion (Additional Works Jawahar Nagar & Strengthening)	Chennai (ORCP)
5.	Interception & Diversion (Additional Works at Thruvanmiyur)	Chennai (ORCP)
6.	Interception & Diversion (Additional Works at Greams Road)	Chennai (ORCP)
7.	Interception & Diversion (Additional Works at Cooum basin)	Chennai (ORCP)
8.	Solid Waste Management (7 Additional towns)	Karur (ORCP)
9.	Sewage Treatment Plant (17 mld)	Kumbakonam (ORCP)
10.	Interception & Diversion (Additional Works)	Chennail (ORCP)
Uttarakhand		
11.	Sewage Treatment Plant (3 mld)	Badrinath (S/C Towns)
	Sewage Treatment Plant (1.4 mld)	Karan Paryag (S/C Towns)
West Bengal		

12.	Additional works for STP	Bansberia (GAP-II),(Main Stem)
13.	River Front Development-II	Bansberia (GAP-II),(Main Stem)
14.	River Front Development at Hoogly-Chinsurah	Barrackpore (GAP-II), (Main Stem)
15.	River Front Development at Siliguri	Barrackpore (GAP-II), (Main Stem)
16.	River Front Development at Bhatpara	Barrackpore (GAP-II), (Main Stem)
17.	River Front Development at Kamarahati	Barrackpore (GAP-II), (Main Stem)
18.	Electric Crematoria (Twin units)	Chakdah (S/C Towns)
19.	Electric Crematoria	Dhullan (S/C Towns)
20.	Electric Crematoria	Diamond Harbour (S/C Towns)
21.	Electric Crematoria	Katwa (S/C Towns)
22.	River Front Development - II	Naihati (S/C Towns)
23.	Interception & Diversion	Rishra (GAP-II),(Main Stem)

Delhi

24.	Appointment (Consultant) for Preparation of DPRs and MP	Delhi (YAP-II)
25.	Appointment (Consultant) for Preparation of DPRs and MP	Delhi (YAP-II)
26.	Appointment (Consultant) for Preparation of DPRs and MP	Delhi (YAP-II)
27.	Laying of Wazirabad, Trunk Sewer	Delhi (YAP-II)
28.	Sewage Treatment Plant	Delhi (YAP-II)
29.	Laying of Bela Road Trunk Sewer	Delhi (YAP-II)
30.	Consultant for Institutional Strengthening & capacity building	Delhi (YAP-II)

Uttar Pradesh

31.	Raising Main	Allahabad, (Uttar Pradesh)
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Maharashtra

32.	Pollution Abatement	Prakkasha (ORCP)
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YAP	→	Yamuna Action Plan
ORCP	→	Other River Conservation Plan
S/C Towns	→	Supreme Court Order Towns
GAP-II	→	Ganga Action Plan Phase-II (Main Stem)

National Lake Conservation Plan

S.No.	Lake	State	Sanctioned cost (in Rs. crore)
1.	Three lakes of Bangalore namely Vengaiahkere, Nagavara and Jarganahalli	Karnataka	11.48
2.	Bellandur lake, Bangalore	-do-	5.54
3.	Kotekere lake, Belgaum	-do-	5.64
4.	Bhishma lake, Gadag	-do-	2.50
5.	Lal Bagh, Bangalore	-do-	1.66
6.	Channapatna lake, Hasan	-do-	4.97
7.	Sharanbhasveshwara lake, Gulbarga	-do-	4.89
8.	Akkamahadevi lake, Haveri	-do-	2.64
9.	Kundawada lake, Davangere	-do-	3.41
10.	Kote Tavarekere lake, Chikmagalur	-do-	3.64
11.	Tripuranthkeshwar lake, Bidar	-do-	4.67
12.	Gowramma & Hambalmba	-do-	4.77
13.	Amanikere	-do-	13.37
14.	Banjara lake, Hyderabad	Andhra Pradesh	2.75
15.	Powai lake, Mumbai	Maharashtra	6.62
16.	Nine lakes in Thane	-do-	2.53
17.	Mahalaxmi lake, Vadagaon	-do-	1.85
18.	Rankala lake, Kolhapur	-do-	8.65
19.	Varhala Devi lake, Bhiwandi	-do-	4.60
20.	Sidheshwar	-do-	4.32
21.	Mansagar lake, Jaipur	Rajasthan	24.72
22.	Anasagar lake, Ajmer	-do-	15.28
23.	Pushkar	-do-	48.36
24.	Fatehsagar	-do-	41.86
25.	Ooty lake	Tamil Nadu	1.95
26.	Kodaikanal lake, Dindigul	-do-	10.42
27.	Three lakes of Agartala	Tripura	2.02
28.	Four lakes in Nainital	Uttarakhand	16.85
29.	Nainital lake, Nainital	-do-	47.97
30.	Rabindra Sarovar	West Bengal	6.96
31.	Mirik lake, Darjeeling	-do-	4.01
32.	Adi Ganga	-do-	24.94
33.	Dal lake, Sri Nagar	J&K	298.76
34.	Veli Akkulam lake, Thiruvananthapuram	Kerala	24.56
35.	Bindu Sagar lake, Bhubaneswar	Orissa	3.50
36.	Rani talab, Rewa	Madhya Pradesh	3.31
37.	Sagar lake, Sagar	-do-	21.33
38.	Shivpuri Lakes (Jadav Sagar, Chandpatha), Shivpuri	-do-	51.99
39.	Mansi Ganga lake, Govardhan, Mathura	Uttar Pradesh	22.71
40.	Pichola Lake, System, Udaipur	Rajasthan	84.75
	Total		856.76

LIST OF PROJECTS COMPLETED DURING 2008-2009

Environment Research Programme (ERP)

S.No.	Title of the Project	Name of Principal Investigator & Institute
1.	Identification and quantification of polycyclic aromatic hydrocarbons [PAHs] in soil and Gomti river sediment in Lucknow city.	Dr. Jai Raj Behari, Indian Institute of Toxicological Research (Formerly ITRC) Lucknow-226001
2.	Heavy Metal Pollution Abatement using cellulose containing materials. Mumbai-400019	Dr. S.R. Shukla, Institute of Chemical Technology,
3.	Target oriented zeolite analogues for monitoring and control strategies for organo toxins. National Environmental Engineering Research Institute (NEERI),	Dr. Sadhana Rayalu, Head, Environmental Material Unit, Nehru Marg, Nagpur- 440020 (Maharashtra)
4.	Biological control of volatile organic compounds [VOCs]. & Technology, Indian Institute of Technology, Banaras Hindu University Varanasi – 221 005 (U.P.)	Dr. S.N. Upadhyay Department of Chemical Engineering
5.	Induction of Biodegradability in Plastic waste for use in Water Pollution Alleviation Technologies.	Dr. Baljit Singh, Department of Chemistry, Himachal Pradesh University, Shimla-171005
7.	Gelling out oil from a complex mixture using low molecular mass organic gelator: to wards the containing oil spills, an environment hazardous.	Dr. P Dastidar, Central Salt & Marine Chemical Research Institute, Gijubhai Badheka Marg, Bhavnagar-363002 GUJARAT
8.	Traditional methods of water harvesting and its impact on environment in Bikaner district, Rajasthan. Rajasthan-334003.	Dr. Jai Bharat Singh Department of Geography, Government Dunger College, Bikaner,
9.	Effect of indoor air pollution on respiratory function of children.	Dr. Raj Kumar Vallabhbhai Patel Chest Institute, University of Delhi-110007
10.	Development of technology for utilization of phosphogypsum as filler for polymer formulations. Whitefield Road, Bangalore-560048	Dr. R. Radhakrishnan, Sriram Institute for Indian Research, Plot No. 14 & 15, Sadarmangala Industrial Area,
11.	Exploitation of cyanobacteria for metal binding	Dr. Nirupma Mallik,

S.No. Title of the Project	Name of Principal Investigator & Institute
detoxification and metal removal from aquatic ecosystem. Kharagpur-721302	Agriculture & Food Engineering Department, Indian Institute of Technology,
12. Spatial variability and impact study of anthropogenic mercury in the vicinity of selected Pandit Ravishankar Shukla University, Raipur-492010	Dr. Shash Parvez, Department of Chemistry, environment.
13. Electro-synthesis of perfluroalkanes as non-ozone depleting substitutes for CFCs. (CECRI), Karaikudi – 630006	Dr. D. Velayutham Central Electrochemical Research Institute
14. Development of a novel solid waste remediation process through resources recovery and its reintegration as value added state-of-art products in the titanium minerals processing industry. Thiruvananthapuram-695019	Dr. MLP Reddy, National Institute for Interdisciplinary Science and Technology (Formerly RRL-Thiruvananthapuram), Industrial Estate P.O.,
15. Assessment of human exposure to PCBs through biological monitoring. P.B. No. 2031, Meghani Nagar, Ahmedabad - 380016	Dr. V.K. Bhatnagar, National Institute of Occupational Health,
16. Environmental acceptability of pre-cast stabilized block using treated municipal marginal solid waste. Bengaluru-560059	Dr. S.C. Sharma, RV College of Engineering, R.V. Vidyaniketan Post, Mysore Road,
17. Development of bio-fiber reinforced sandwich R.V. College of Engineering, R.V. Vidyaniketan Post, Mysore Road Bengaluru-560059	Dr. R. Suresh structure.
18. Hybrid process for the conversion of lignocellulosic materials. R.V. College of Engineering, R.V. Vidyaniketan, Post, Mysore Road, Bengaluru-560059	Dr.M.S.Murali, Department of Mechanical Engineering,
19. Effect of coastal water quality on the corrosion and bio fouling characteristics of marine engineering alloys.	Dr. G. Subramanian, Central Electrochemical Research Institute, Karaikudi – 630006
20. Microwave assisted grafting of vinyl monomers on to the natural gums: a source of effective	Dr. Vandana Singh, Department of Chemistry, Allahabad

- coagulating and flocculating agents for wastewater.
21. Experimental investigations on environmental impact using tyre pyrolysis oil in internal combustion engines.
Chennai-602105
22. Development of modular household sanitation device for decentralized sewage treatment. and Technology
(Formerly RRL-Thiruvananthapuram), Industrial Estate P.O., Thiruvananthapuram-695019
23. Assessment of the status of heavy metal and pollutant in common edibles with reference to human health in urban Meghalaya.
North Eastern Hill University, Bijni Complex, Laitumakhrah, Shillong-793003
(MEGHALAYA)
24. Geo-chemical assessment of fluoride content in rock / soil / water systems in Karbianglong District, Assam.
25. Management of acid mine drainage in North-East Institute of Science & Technology, Jorhat – 785006 (ASSAM)
26. Development of a process for production of liquid fuel from petroleum refinery solid waste of North Eastern region of India by thermal and catalytic cracking.



Ecosystem Research Scheme (ERS)

S.No.	Title of the project	Name of Principal Investigator (PI) & Institute
1.	Effects of Forest Use on Biodiversity Conservation Values as seen in Bird Communities of Sariska Tiger Reserve, Rajasthan	Ms. Ghazala Shahbuddin, Council for Social Development, Sangha Rachna, 53, Lodhi Estate, New Delhi-110003.
2.	Assessment of Biodiversity, Bio-ecology and Conservation Strategies of Sericigenous insects in North-Eastern Region of India. Mokokchung, Post Box No. 12, Nagaland -798 601	Dr. L.N. Kakati Department of Zoology, Nagaland University Hqs. Lumami,

3. Rehabilitation of degraded soils of Upper Assam due to Excessive Mining of Coal. & Technology(IASST),Vigyanpath Paschim Boragaon, Garchuk,Guwahati-781022, Assam.
4. Germplasm Collection and Production of Improved Planting Stocks of Terminalia chebula Retz. and Terminalia bellirics (Gaertner) Roxb.
5. Regeneration and Plant Diversity Status along the Disturbance Gradient on Natural Oak Forests in Garhwal Himalaya. Srinagar-Garhwal 246174, Uttarakhand
- Dr. P. Azad
Institute of Advanced Study in Science
- Dr. Maheshwar Hegde,
Institute of Forest Genetics and tree breeding, R.S. Puram, Coimbatore-641 002.
- Dr. D.S. Chauhan,
Lecturer of Forestry, Department of Forestry, Post Box No. 59, HNB Garhwal University,

Eastern and Western Ghats Research Programme (E&WGRP)

S.No.	Title of the project	Name of Principal Investigator (PI) & Institute
1.	Ex-situ Conservation and Rehabilitation of selected threatened medical plants of South Western Ghats	Dr. S. Ignacimuthu, Entomology Research Institute, Loyola College, Chennai-600034
2.	Ecology and behaviour of forest owls in the Western Ghats and developing a habitat model for their conservation	Dr. E.S. Jayson, Kerala Forest Research Institute, Thrissur, Kerala-680653
3.	Bench Scale Production & Applications of Activated Carbon from Coconut Pith Waste Laboratory, Bhubneswar-751013	Dr. J.L. Gumaste, Amt Department, Regional Research
4.	Fungal Diversity in Western Ghats of Karnataka Dharwad-580003	Dr. Ch. Ramesh, Department in Botany, Karnataka University,
5.	Study on taxonomy and Spore Morphology of ferns of South Kerala Thirunelveli-627002 Tamil Nadu	Dr. G. Bhadran Nair, St. Xavier's College, Pallayamkottai,
6.	Chromolaena odorata invasion to Western Ghats: causes, consequences and management Environmental Studies, University of Delhi, Delhi-110007	Dr. Inderjit Singh, Centre for Environmental Management of Degraded Ecosystems, School of
7.	Conservation and Cultivation of Ferns of Western Ghats Kolhapur-416004	Dr. (Smt.) Meena M. Dongare, Department of Botany, Shivaji University,

8. Study on the impact of developmental activities on the quality of surface and ground water resources in Konaseema area of Andhra Pradesh
9. Exploration of tribal botanical knowledge for sustainable socioeconomic development & conservation of biodiversity of Agasthiar Hills, Western Ghats, India through women self help groups.
10. Ecology of Indian Grey Hornbill (*Ocypterus birostris*) with special reference to its role in seed dispersal in Southern Eastern Ghats
11. Studies on the ectomycorrhizal fungal diversity in different forest types and their association with endemic, indigenous and exotic species in the Western Ghats forests of Thiruvananthapuram
- Prof. N. Someswara Rao,
Department of Inorganic & Analytical Chemistry, Andhra University,
Visakhapatnam-530003
- Dr. A. Johan De Britto,
Department of Botany, St. Xavier's College,
Palayamkottai, Tamil Nadu-627002
- Dr. P. Balasubramanian,
Salim Ali Centre for Ornithology & Natural History (SACON), Anaikatty,
Coimbatore-641108, Tamil Nadu
- Dr. K.B. Vrinda
Division of Microbiology, Tropical Botanic Garden and Research Institute, Palode,
Kerala-695562

Policy Research Project

S.No.	Title of the project	Name of Principal Investigator & Institute
1.	Valuation of Ecological Services of Wetlands in India. Institute, Kolkata-700108 WEST BENGAL	Dr. Krishna Mazumdar, Economic Research Unit, Indian Statistical
2.	Feasibility of embodying incentive based environmental regulatory instruments State and Central taxation regimes (including VAT)	Dr. D K Srivastava, Madras School of Economics,Mandapam Road, Kottur, Chennai-600025, Tamil Nadu
3.	Policy, Institutional & legal barriers to economic utilization of fly ash. Resources Institute (TERI), Darbari Seth Block, India Habitat Centre, Lodhi Road, New Delhi- 110003	Shri S K Chand Policy Analysis Division,The Energy and
4.	Is India tunnelling through an Environmental Kuznet's Curve (EKC). Lodhi Road, New Delhi-110003	The Energy Research Institute (TERI), Darbari Seth Block, India Habitat Centre,

Biosphere Reserve Scheme

S.No.	Title of the Project	Name of Organization
1.	Macrofungal Biodiversity of Nanda Devi Biosphere Reserve and it's in vitro	Punjab University, Chandigarh – 160 014

- conservation
2. Studies on the animal habitat interaction in the buffer zone of Nanda Devi Biosphere Reserve
 3. Study on the biodiversity of Agaricales at Sikkim Himalaya
- Wildlife Institute of India, Dehradun
University of Calcutta, Kolkata.

National Natural Resource Management System (NNRMS)

S.No.	Title of the Project	Name of Organization
1.	Biogeochemistry of the Western Ghats region between Goa and Mangalore using RS and other modern techniques New Delhi-110067	Prof. V. Subramanian, School of Environmental Studies, Jawaharlal Nehru University,
2.	Evaluation of Impacts of Land use changes on Environmental quality (Air, water, soil and Bioenvironment) of Hyderabad and its surroundings using RS, GIS and Field Studies (JNTU) Kukatpally, Hyderabad -500072	Prof.Y.Anjaneyulu, Centre of Environment, Institute of Post Graduate Studies and Research, Jawahar Lal Nehru Technical University,
3.	Integrated Study of Wetland of Goalpara District, Assam using Remote Sensing & Geographical Information System (GIS) Techniques Guwahati- 781005 Assam	Dr. A.K. Baruwa, Director, Assam Technology and Environmental Council, Bigyan Bhawan, G.S. Road, Near ABC Bus Stop,
4.	Nationwide Forest Encroachment Mapping using Remotely Sensed Data and Geographic Information System	Dr. Ajai, Space Application Centre, Ambawadi P.O., Ahmedabad -380 015
5.	Assessment of Biodiversity and preparation of Conservation Plan for the forest of North Gujarat Region, Gujarat Opp. Changleshwar Temple, Bhuj, Kachch- 370 001	Dr. Justus Joshua, Gujarat Institute of Desert Ecology, Post Box No.83, Mundra Road,
6.	Integrated Remote Sensing Study of Pulicat Lagoon and its Catchments	Mr. K. Murthyunjaya Reddy Director, Andhra Pradesh Remote Sensing Application Centre (APRSAC), 2nd Floor, DES Campus, Khairatabad, Hyderabad- 500 004,
7.	Application of Remote Sensing for Bioresource Characterization of Gangetic Grassland Ecosystem in & around	Dr. Afifullah Khan, Department of Wildlife Sciences, Aligarh Muslim University,

Hastinapur Wildlife Sanctuary	Aligarh 202 002, U.P.
8. GIS Based Forest Density Stratification & Time Series Analysis for Resource Mapping and Monitoring in J & K State using Remote Sensing Techniques	Dr. Humayun Rashid, J&K State Remote Sensing Centre, Directorate of Ecology, Environment & Remote Sensing, SDA Housing Colony, Bemina, Srinagar-190018
9. Conservation of Ecologically Sensitive Areas Hotspots in India – An integrated approach through Remote Sensing and GIS	Dr. Sudhakar, Scientist SD, Forestry and Ecology Division, NRSA, Balanagar, Hyderabad – 500 037

National River Conservation

S. No.	Name of the Project/Scheme	Name of the Town/City
Karnataka		
1.	Interception & Diversion	Kollegal, ORCP
2.	Sewage Treatment Plant	Kollegal, ORCP
Orissa		
3.	Interception & Diversion Zone-II	Talcher, ORCP
4.	River Front Development	Talcher, ORCP
Uttar Pradesh		
5.	Bathing Ghat at Brijghat	Garmukteswar,GAP-II, Main Stem
6.	Common Chrome Recovery Plan (0.07 mld)	Kanpur, GAP-II, Main Stem
7.	Interception & Diversion	Mirzapur, GAP-II, Main Stem
8.	Sewage Treatment Plant (Vindh.)	Mirzapur, GAP-II, Main Stem
9.	Interception & Diversion (Part – II)	Jaunpur, Gomti-II
10.	Interception & Diversion (Part – II)	Sultanpur. Gomti-II
Uttarakhand		
11.	Interception & Diversion Part – I	Sri-Nagar, S.C. Towns
West Bengal		
12.	Interception & Diversion	Jijganj-Azimganj, S.C. Towns
13.	Public Participation & Awareness Programme	Jijganj-Azimganj, S.C. Towns
14.	Sewage Treatment Plant (mld)	Jijganj-Azimganj, S.C. Towns
15.	Afforestation	Katwa, S.C. Towns
16.	Interception & Diversion	Katwa, S.C. Towns

17. River Front Development Murshidabad, S.C. Towns

Haryana

18. Additional Sewerage Works Karnal, YAP-II

NRCP ➔ National River Conservation Plan

S/C Towns ➔ Supreme Court Order Towns

GAP-II ➔ Ganga Action Plan Phase-II

DAP ➔ Damodar Action Plan

STATE-WISE AND TOWN-WISE DETAILS OF SANCTIONED COST IN 165 TOWNS UNDER NATIONAL RIVER CONSERVATION PLAN

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
I	ANDHRA PRADESH			
1	Bhadrachalam	1	Godavari	200.70
2	Mancherial		Godavari	231.30
3	Rajamundry		Godavari	2178.60
4	Ramagundam		Godavari	574.55
5	Hyderabad	2	Musi	33565.53
	Sub Total :			36750.68
II	BIHAR			
6	Arrah	3	Ganga	34.25
7	Barahya		Ganga	40.48
8	Barh		Ganga	18.90
9	Bhagalpur		Ganga	20.09
10	Buxar		Ganga	7.63
11	Chapra		Ganga	0.00
12	Fatwah		Ganga	18.02
13	Hazipur		Ganga	0.00
14	Kahelgaon		Ganga	0.00
15	Mokamah		Ganga	0.00
16	Munger		Ganga	40.30
17	Patna		Ganga	178.07
18	Sultanganj		Ganga	37.43
	Sub Total :			395.18
III	DELHI			
19	Delhi	4	Yamuna	18064.08
	YAP-II		Yamuna	46935.45
	Sub Total			64999.53
IV	GOA			
20	Panaji	5	Mandovi	1409.52
	Sub Total			1409.52

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
V	GUJARAT			
21	Ahemadabad	6	Sabarmati	10195.87
	Sub Total :			10195.87
VI	HARYANA			
22	Chhachhrauli		Yamuna	104.79
23	Faridabad		Yamuna	7573.57
24	Gharaunda		Yamuna	141.27
25	Gohana		Yamuna	347.51
26	Gurgaon		Yamuna	2764.64
27	Indri		Yamuna	136.88
28	Karnal		Yamuna	2493.94
29	Palwal		Yamuna	1054.19
30	Panipat		Yamuna	4351.02
31	Radaur		Yamuna	108.86
32	Sonepat		Yamuna	2263.40
33	Yamunanagar-Jagdri		Yamuna	2880.22
	YAP-II		Yamuna	5160.97
	Sub Total:			29381.26
VII	JHARKHAND			
34	Ghatshila	7	Subarnarekha	68.02
35	Jamshedpur		Subarnarekha	174.52
36	Ranchi		Subarnarekha	133.07
37	Bokaro-Kangali	8	Damodar	9.87
38	Chirkunda		Damodar	0.00
39	Dugdha		Damodar	0.00
40	Jharia		Damodar	0.00
41	Ramgarh		Damodar	16.17
42	Sahebganj		Ganga	20.67
43	Sindri		Damodar	0.00
44	Sudamdih		Damodar	9.87
45	Telmachu		Damodar	5.53
	Sub Total :			437.73

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
VIII	KARNATAKA			
46	Bhadravati	9	Bhadra	376.98
47	Davangere	10	Tungabhadra	466.05
48	Harihara		Tungabhadra	249.94
49	K.R.Nagar	11	Cauvery	57.80
50	Kollegal		Cauvery	108.65
51	Nanjangud		Cauvery	223.86
52	Shimoga	12	Tunga	370.38
53	Srirangapatna		Cauvery	144.01
54	Bangalore	13	Pennar	4627.00
	Sub Total :			6624.67
IX	KERALA			
55	Pamba	14	Pamba	1844.98
	Sub Total :			1844.98
X	MADHYA PRADESH			
56	Bhopal	15	Betwa	339.32
57	Burhanpur	16	Tapti	481.47
58	Chapara	17	Wainganga	39.85
59	Indore	18	Khan	4019.20
60	Jabalpur	19	Narmada	133.85
61	Keolari		Wainganga	36.16
62	Mandideep		Betwa	36.13
63	Nagda	20	Chambal	310.79
64	Seoni		Wainganga	25.10
65	Ujjain	21	Kshipra	1804.96
66	Vidisha		Betwa	447.47
67	Hoshangabad		Narmada	1299.07
68	Rewa	22	Beehar	2012.00
	Sub Total :			10985.41
XI	MAHARASHTRA			
69	Karad	23	Krishna	318.72

Ministry of Environment and Forests

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
70	Nanded		Godavari	1346.76
71	Nashik		Godavari	6201.76
72	Sangli		Krishna	2555.27
73	Trimbakeshwar		Godavari	1164.00
74	Prakkasha	24	Tapi	244.43
	Sub Total :			11830.94
XII	NAGALAND			
75	Dimapur	25	Diphu and Dhansiri	3174.00
	Sub Total :			3174.00
XIII	ORISSA			
76	Chandbali	26	Brahamini	34.90
77	Cuttack	27	Mahanadi	804.30
78	Dharamshala		Brahamini	19.63
79	Talcher		Brahamini	370.20
80	Puri		Coastal Area	8044.86
	Sub Total :			9273.89
XIV	PUNJAB			
81	Jalandhar	28	Satluj	5221.78
82	Ludhiana		Satluj	13351.21
83	Phagwara		Satluj	1386.21
84	Phillaur		Satluj	112.06
85	Kapurthala		Satluj	1256.26
86	Sultanpur Lodhi		Satluj	240.74
	Sub Total :			21568.26
XV	RAJASTHAN			
87	Keshoraipattan		Chambal	72.55
88	Kota		Chambal	63.85
	Sub Total :			136.40
XVI	SIKKIM			
89	Gangtok	29	Rani Chu	1717.00

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
90	Singtom		Rani Chu	483.57
91	Ranipool		Rani Chu	590.24
	Sub Total :			2790.81
XVII	TAMIL NADU			
92	Bhiwani		Cauvery	392.84
93	Chennai	30, 31	Adyar, Cooum	40425.46
94	Erode		Cauvery	1472.13
95	Kumarapalayam		Cauvery	232.14
96	Pallipalayam		Cauvery	184.67
97	Trichy		Cauvery	430.05
98	Karur		Cauvery	3105.32
99	Kumbakonam		Cauvery	4410.45
100	Mayiladuthurai		Cauvery	4481.04
101	Trichirappalli		Cauvery	11667.00
102	Thanjavur	32	Vennar	6021.06
103	Madurai	33	Vaigai	13024.18
104	Tirunelveli	34	Tamrabarani	5492.90
	Sub Total :			91339.25
XVIII	UTTAR PRADESH			
105	Agra		Yamuna	8429.50
106	Allahabad		Ganga	5853.04
107	Anupshaher		Ganga	450.38
108	Bijnor		Ganga	434.43
109	Chunar		Ganga	39.53
110	Etawah		Yamuna	559.76
111	Farrukkabad		Ganga	0.00
112	Garhmukteshwar		Ganga	130.94
113	Ghaziabad		Yamuna	9457.95
114	Ghazipur		Ganga	55.93
115	Jaunpur	35	Gomti	377.17
116	Kanpur		Ganga	8276.53
117	Lucknow		Gomti	31067.27

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
118	Mathura		Yamuna	2486.12
119	Mirzapur		Ganga	261.69
120	Mughal Sarai		Ganga	148.08
121	Muzaffar Nagar		Yamuna	1285.94
122	NOIDA		Yamuna	2704.69
123	Saharanpur		Yamuna	2486.62
124	Saidpur		Ganga	0.00
125	Sultanpur		Gomti	434.65
126	Varanasi		Ganga	4161.21
127	Vrindavan		Yamuna	855.92
	YAP-II			11507.94
	Sub Total (UP)			91465.29
XIX	UTTARAKHAND			
128	Badrinath		Ganga	1208.07
129	Deoprayag		Ganga	124.45
130	Gopeshwar		Ganga	30.36
131	Hardwar & Rishikesh		Ganga	4989.62
132	Joshimath		Ganga	16.90
133	Karnaparag		Ganga	356.73
134	Ranipur		Ganga	392.55
135	Rudraprayag		Ganga	74.29
136	Srinagar		Ganga	590.05
137	Uttar Kashi		Ganga	816.46
	Sub Total			8599.48
XX	WEST BENGAL			
138	Andal		Damodar	17.85
139	Asansol		Damodar	340.66
140	Bhadreshwar & Champdani		Ganga	943.87
141	Baidyabati		Ganga	1002.41
142	Bansberia		Ganga	896.04
143	Barrackpore		Ganga	2932.32
144	Budge-Budge		Ganga	826.72

S.No.	State/Town	River No.	River	Sanctioned Cost (DPR) (Rs. in lakh)
145	Chakdah		Ganga	128.43
146	Circular Canal		Ganga	893.63
147	Dhulian		Ganga	144.87
148	Diamond Harbour		Ganga	375.07
149	Durgapur		Damodar	21.20
150	Garulia		Ganga	470.73
151	Gayeshpur, Halilshar & Kancharapara		Ganga	2002.51
152	Jangipur		Ganga	144.64
153	Jijganj Azimganj		Ganga	451.93
154	Katwa		Ganga	295.71
155	Kharda (Extended)		Ganga	545.35
156	Konnagar		Ganga	1362.52
157	Maheshtala		Ganga	1131.70
158	Murshidabad		Ganga	228.69
159	Naihati		Ganga	1741.93
160	North Barrackpore		Ganga	1428.58
161	Raniganj		Damodar	18.70
162	Rishra		Ganga	1020.54
163	Tolly's Nallah		Ganga	2397.44
164	Uttarpara Kotrung		Ganga	929.31
165	Siliguri	36	Mahananda	4038.99
	Sub Total (W.B.)			26732.34
	Total : (20 States) :			429935.49
	CETP, Calcutta (West Bengal)			8292.00
	ESTT. & R&D			
	OVER ALL TOTAL :			438227.49

IMPLEMENTING AGENCIES OF STATES UNDER NATIONAL RIVER CONSERVATION PLAN

S.No.	Nodal Implementing Agency
1.	ANDHRA PRADESH i) Engineer-in Chief, Public Health Engg. Department, A.C. Guards, Hyderabad ii) Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board, Khairtabad, Hyderabad -500 004 iii) Managing Director, AP Tourism Corporation Ltd., "Tourism House", 3-5-891, Himayat Nagar, Hyderabad-500029, Andhra Pradesh
2.	BIHAR Managing Director, BRJP, West Boring Canal Road, Patna, Bihar -800 001
3.	GOA Executive Engineer, WD -III, PHE Goa Public Works Deptt. St. INEZ, Panaji, Goa
4.	GUJARAT Municipal Commissioner, Ahmedabad Municipal Corporation, Ahmedabad-380 001.
5.	HARYANA Engineer-in-Chief PWD Public Health Branch. Bay No. 13-18 Sector-4, Panchkula, Haryana
6.	JHARKHAND Managing Director, MADA, Luby Circular Road, Dhanbad, Jharkhand,
7.	KARNATAKA i) Managing Director, Karnataka Urban Water Supply & Drainage Board, KHB Complex, Cauvery Bhawan, K.G. Road, Bangalore-560 009. ii) Member Secretary, Kr S.P.C.B., 6, 7, 8 & 9th floor, Public Utility Building, M.G. Road, Bangalore-560 001 Karnataka.
8.	KERALA Managing Director, Kerala Water Authority, Jala Bhawan, Thiruvananthapuram, Kerala

9. MADHYA PRADESH
 i) Member Secretary,
 M.P. Pollution Control Board, Paryavaran Parisar,
 E-5, Arera Colony, Bhopal-462 013
 ii) E-N-C, PHED,
 Govt. of M.P., Satpura Bhawan
 Bhopal
10. MAHARASTRA
 i) Member Secretary,
 Maharashtra Jeevan
 Pradhikaran (MJP), 4th floor, Express Tower,
 Nariman Point, Maharashtra
 ii) Commissioner,
 Nasik Municipal Corporation
 Nasik, Maharashtra
11. NAGALAND
 Chief Engineer,
 Public Health Engineering, Department,
 Govt. of Nagaland, Kohima
12. NCT DELHI
 i) Delhi Jal Board,
 Varunulaya Phase-II,
 Jhandewalan, Delhi-110 005.
 ii) Additional Commissioner (S&JJS)
 Municipal Corporation of Delhi,
 I.P. Estate, New Delhi-110 002
13. ORISSA
 Member Secretary/Chief Engineer,
 Orissa Water Supply and Sewerage Board,
 Satya Nagar, Bhubaneswar.
14. PUNJAB
 Managing Director,
 Punjab Water Supply & Sewerage Board, Plot I-B,
 Sector-27A, Madhya Marg, Chandigarh
15. RAJASTHAN
 Chief Engineer (Hqs) PHED,
 2, Civil Lines, Govt. of Rajasthan, Jaipur-302 006.
16. SIKKIM
 PCE-cum-Secretary,
 Water Security & PHED, Govt. of Sikkim, Gangtok
17. TAMIL NADU
 i) Managing Director, CMWSSB, No-1,
 Pumping Station Road, Chintadripet,
 Chennai-600 002
 Chennai
 ii) Managing Director,
 TWAD Board, Chepauk, Chennai-600 005
 iii) Secretary,
 Municipal Admin & Water Supply,
 Govt. of Tamil Nadu, Secretariat,

18. UTTAR PRADESH

Managing Director,
U.P. Jal Nigam, 6, Rana Pratap Marg, Lucknow

19. UTTRAKHAND

Managing Director
Uttaranchal Peyjal Nigam, 11, Mohini Road
Dehradun

20. WEST BENGAL

i) Cheif Executive Officer,
KMDA, Prashasan Bhawan,
DD-I, Sector-I, Kolkata-700 064

ii) Director of Industries,
Commerce & Industries Dept.
Govt. of W. Bengal, New Secretariat
Building, 9th Floor, 1, K.S. Roy Road
Kolkata - 700 001

Annexure-VII A

LIST OF WETLANDS IDENTIFIED UNDER NATIONAL WETLAND CONSERVATION PROGRAMME

S.No.	State/UT	S.No.	Name of Wetlands
1.	Andhra Pradesh	1.	Kolleru
2.	Assam	2.	Deepar Beel
		3.	Urpad Beel
		4.	Sone Beel
3.	Bihar	5.	Kabar
		6.	Barilla
		7.	Kusheshwar Asthan
4.	Gujarat	8.	Nalsarovar
		9.	Great Rann of Kachh
		10.	Thol Bird Sanctuary
		11.	Khijadiya Bird Sanctuary
		12.	Little Rann of Kachh
		13.	Pariej
		14.	Wadhwana
		15.	Nanikakrad
5.	Haryana	16.	Sultanpur
		17.	Bhindawas
6.	Himachal Pradesh	18.	Renuka
		19.	Pong Dam
		20.	Chandratal
		21.	Rewalsar
		22.	Khajjiar
7.	Jammu & Kashmir	23.	Wullar
		24.	Tso Morari
		25.	Tisgul Tso & Chisul Marshes
		26.	Hokersar
		27.	Mansar-Surinsar
		28.	Ranjitsagar

S.No.	State/UT	S.No.	Name of Wetlands
		29.	Pangong Tsar
		30.	Gharana
		31.	Hygam
		32.	Mirgund
		33.	Shalburgh
		34.	Chushul & Hanley
8.	Jharkhand	35.	Udhwa
		36.	Tilaiya Dam
9.	Karnataka	37.	Magadhi
		38.	Gudavi Bird Sanctuary
		39.	Bonal
		40.	Hidkal & Ghataprabha
		41.	Heggeri
		42.	Ranganthittu
		43.	K.G. Koppa wetland
10.	Kerala	44.	Ashtamudi
		45.	Sasthamkotta
		46.	Kottuli
		47.	Kadulandi
		48.	Vembnad Kol
11.	Madhya Pradesh	49.	Barna
		50.	Yashwant Sagar
		51.	Wetland of Ken River
		52.	National Chambal Sanctuary
		53.	Ghatigaon
		54.	Ratapani
		55.	Denwa Tawa wetland
		56.	Kanha Tiger Reserve
		57.	Pench Tiger Reserve
		58.	Sakhyasagar

S.No.	State/UT	S.No.	Name of Wetlands
		59.	Dihaila
		60.	Govindsagar
		61.	Sirpur
12.	Maharashtra	62.	Ujni
		63.	Jayakawadi
		64.	Nalganga wetland
13.	Manipur	65.	Loktak
14.	Mizoram	66.	Tamdil
		67.	Palak
15.	Orissa	68.	Chilka
		69.	Kuanria wetland
		70.	Kanjia wetland
		71.	Daha wetland
		72.	Anusupa
16	Puducherry	73.	Ousteri lake
17.	Punjab	74.	Harike
		75.	Ropar
		76.	Kanjli
		77.	Nangal
18.	Rajasthan	78.	Sambhar
19.	Sikkim	79.	Khechuperi Holy Lake
		80.	Tamze Wetland
		81.	Tembao Wetland Complex
		82.	Phendang Wetland Complex
		83.	Gurudokmar Wetland
		84.	Tsomgo wetland
20.	Tamil Nadu	85.	Point Calimer
		86.	Kaliveli
		87.	Pallaikarni
21.	Tripura	88.	Rudrasagar

S.No.	State/UT	S.No.	Name of Wetlands
		89.	Gumti reservoir
22.	Uttar Pradesh.	90.	Nawabganj
		91.	Sandi
		92.	Lakh Bahoshi
		93.	Samaspur
		94.	Alwara Wetland
		95.	Semarai Lake
		96.	Nagaria lake
		97.	Keetham Lake
		98.	Shekha wetland
		99.	Saman Bird Sanctuary
		100.	Sarsai Nawar
		101.	Patna Bird Sanctuary
		102.	Chandotal
		103.	Tal Bhaghel
		104.	Taal Ganbhirvan & Taal Salona
		105.	Aadi Jal Jeev Jheel
23.	Uttarakhand	106.	Ban Ganga Jhilmil Tal
		107.	Asan
24.	West Bengal	108.	East Calcutta Wetland
		109.	Sunderbans
		110.	Ahiron Beel
		111.	Rasik Beel
		112.	Santragachi
25.	Meghalaya	113.	Patlakhawa- Rasomati
		114.	Umiam lake
26.	UT (Chandigarh)	115.	Sukhna

Annexure-VII B

LIST OF WETLANDS OF INTERNATIONAL IMPORTANCE FROM INDIA UNDER RAMSAR CONVENTION

S.No	Name of Wetland	State	Date of declaration
1.	Chandratal	H.P.	08/11/05
2.	Renuka	H.P.	08/11/05
3.	Rudrasagar	Tripura	08/11/05
4.	Uppar Ganga	U.P.	08/11/05
5.	Hokarsar	J&K	08/11/05
6.	Surinsar – Mansar	J&K	08/11/05
7.	Bhitarkanika Mangroves	Orissa	19/08/02
8.	Bhoj Wetland	Madhya Pradesh	19/08/02
9.	Deepor Beel	Assam	19/08/02
10.	East Calcutta Wetlands	West Bengal	19/08/02
11.	Kolleru Lake	Andhra Pradesh	19/08/02
12.	Sasthamkotta Lake	Kerala	19/08/02
13.	Ashtamudi Wetland	Kerala	19/08/02
14.	Tsomoriri	Jammu & Kashmir	19/08/02
15.	Vembanad-Kol Wetland	Kerala	19/08/02
16.	Point Calimere Sanctuary	Tamil Nadu	19/08/02
17.	Pong Dam Lake	Himachal Pradesh	19/08/02
18.	Kanjli	Punjab	22/01/02
19.	Ropar	Punjab	22/01/02
20.	Harike Lake	Punjab	23/03/90
21.	Loktak Lake MR	Manipur	23/03/90
22.	Sambhar Lake	Rajasthan	23/03/90
23.	Wular Lake	Jammu & Kashmir	23/03/90
24.	Chilika Lake	Orissa	01/10/81
25.	Keoladeo National Park MR	Rajasthan	01/10/81

NAMES OF NODAL AGENCIES OF NGC PROGRAMME

State/UT	State Nodal Agency
Andhra Pradesh	Directorate of NGC, Deptt. of Environment, Forests, Science & Tech. , Govt. of A.P., No. 18, A-Block, Buddha Bhavan Complex, MG Road, Hyderabad - 500 003
Andaman & Nicobar (UT)	H. Q. Circle, Department of Forests, Van Sadan, Haddo, Port Blair – 741002
Arunachal Pradesh	Arunachal Pradesh State Pollution Control Board, Env. & Forests Office Complex, 'P' Sector, tanagar-791111
Assam	Assam Science, Technology and Environment Council, U. N. Bezbaruah Road, Silpukhuri, Guwahati – 781003
Bihar	Bihar State Poll. Control Board, Beltron Bhawan, 2nd floor, Lal Bahadur Shastri Nagar, Patna – 800023
Chandigarh (UT)	Department of Environment, Chandigarh Administration, Additional Town Hall Building, IInd Floor, Sector –17-, Chandigarh-160017.
Chhattisgarh	Chhattisgarh Environment Conservation Board, Nanak Niwas Civil Lines, Raipur
Dadra & Nagar Haveli (UT)	Pollution Control Committee (PCC), DNH, Silvasa – 396220
Daman& Diu (UT)	Pollution Control Committee, D&D, Moti Daman – 396220
Delhi (NCT)	Eco Club Society of Delhi, Department of Environment, Govt. of NCT of Delhi, Level –6, C-Wing, Delhi Secretariat, I.P Estate, New Delhi – 110002
Goa	Goa State Council of Science, Technology & Environment, Opp. Saligao Seminary, Saligao, Barcez Goa - 408511
Gujarat	Gujarat Ecological Education and Research Foundation (GEER), Near Indroda Park, Sec. – 9, Gandhi Nagar- 382009
Haryana	Haryana State Pollution Control Board, Plot No. C-11, Sector –6, Panchkula –134101
Himachal Pradesh	State Council for Science, Technology & Environment, 34, SDA Complex, Kasumpti, Shimla-171009
Jammu & Kashmir	J & K State Pollution Control Board Jammu Parivesh Bhawan, Glandni Transport Nagar (Narwal) Jammu (Nov to April)

State/UT	State Nodal Agency
	Srinagar- Sheikh-ul Alam Campus, Rajbagh behind Govt Silk Factory, Srinagar- Kashmir (May to Oct)
Jharkhand	Jharkhand State Pollution Control Board, TA, Division Building (Ground Floor), HEC, Dhurva, Ranchi -834004
Karnataka	Indo Norwegian Environment Programme, Deptt. of Forests, Env. & Ecology, 49, Parisar Bhawan, IInd Floor, Church Street, Bangalore - 560001
Kerala	Kerala State Council for Science, Tech. & Environment, Shashtra Bhawan, Pattom, Thiruvannthapuram – 695523
Lakshadweep (UT)	Dept. of Environment and Forests, UT Administration of Lakshadweep, Kavaratti - 682555.
Madhya Pradesh	Environment Planning and Coordination Organisation (EPCO), Kachnar, Parayavaran Parisar, E-5, Sector, Arera Colony, Bhopal-462106
Maharashtra	Directorate of Social Forestry, Maharashtra State, Central Administrative Building, Pune-411001
Manipur	Manipur Pollution Control Board, Lamphelpat, Near Imphal West D.C. Office, Imphal-795004
Meghalaya	Forests & Environment Deptt., Sylvan House, Lower Lauchumere, Shillong-793001
Mizoram	Mizoram Pollution Control Board, MG Road, Khatla, Aizawl – 796001
Nagaland	Nagaland Pollution Control Board, Signal Point, Dimapur –797112
Orissa	Centre for Environmental Studies (CES), Forests & Environment Deptt., Govt. of Orissa, N-3/56, IRC Village Bhubaneswar – 751015
Puducherry (UT)	Environment Education Cell, State Training Centre, Perunthalivar Kamaraj Education Complex, 'B' Block, IV Floor, Anna Nagar, Puducherry – 605005
Punjab	Punjab State Council for Science and Technology, Adjacent Sacred Heart School, Sector – 26, Post Box No. 727, Chandigarh – 160019

State/UT	State Nodal Agency
Rajasthan	Rajasthan Rajya Bharat Scouts & Guides, Rajya Mukhyalaya, Jawahar Lal Nehru Marg, Bajaj Nagar, Jaipur – 302015
Sikkim	Sikkim State Pollution Control Board, Deptt. of Forests, Environment & Wildlife, Govt of Sikkim, Deorali –737102
Tamil Nadu	Department of Environment, Govt. of Tamil Nadu, No 1, Jeenis Road, Panagal Building, Saidapet, Chennai – 600015
Tripura	Tripura State Pollution Control Board, Vigyan Bhawan, Pt. Nehru Complex, Gorkha Basti, P.O. Kunjaban, Agartala Tripura (W) – 799006
Uttar Pradesh	Directorate of Environment, Vinit Khand - 1, Gomti Nagar, Lucknow –226010
Uttarakhand	Sabhi Ke Liye Shiksha Parishad, Shiksha Shankul, Mayur Vihar, Sahsradhara Road, Dehradun
West Bengal	West Bengal Pollution Control Board, Paribesh Bhawan, 10-A, Block LA, Sector 3, Salt Lake City, Kolkata-700098

LIST OF RRAs UNDER NEAC 2008-09

S.No.	Name of Organisations	Area of Jurisdiction
1.	Sri Swarupa Nistha Ashrama, Philosophical Welfare Society, H.No. 1-1189-99, 1st Floor, N.G.O. Colony, Kadiri-515591, Anathapur Distt. Andhra Pradesh	Andhra Pradesh (South)
2.	Deccan Development Society, 101, Kishan Residency House No.1-11-242/1, Street No.5, Begum Pet, Hyderabad- 500 016	Andhra Pradesh (North)
3.	Assam Science Society, Lamb Road, Latasil, Guwahati-781 001 P.B.No.78, Assam, India	Assam
4.	Rural Youth Coordination Centre, Road No.2, House No. 15, Manas Marg, Near Vidyambika Apartment, West Shivpuri, Patna-800023, Bihar	Bihar
5.	Jan Kalyan Parishad, Moh. Namana Kala Ring Road, (Near Comel School), Ambikapur, Distt. Surguja, Chhattisgarh-497001	Chhattisgarh
6.	Indian Environmental Society, U-112, Vidhata House, 3rd Floor, Vikas Marg, Shakarpur, Delhi- 110 092 Branch Office: Kaveri Building, Ground Floor, Sanjay Palace, Agra	Delhi & Western U.P.
7.	Vikram Sarabhai Centre for Development Interaction (VIKSAT), Nehru Foundation for Development, Taltej Tekra, Vastrapur Road, Ahmedabad- 380 054	Gujarat & Daman Diu
8.	Haryana Nav Yuvak Kala Sangam (HNYKS) 46, Sector-I, Rohtak-124001, Haryana	Haryana
9.	State Council for Science, Technology & Environment H.P. 34, SDA Complex, Kasumpti, Shimla- 171 009	Himachal Pradesh
10.	World Wide Fund for Nature-India, Jammu & Kashmir State Office, C/O Centre for Environment Education & Training, New University Campus, Jammu-180006	Jammu
11.	The NGOs Co-ordination Federation (J&K), Usman Complex Solina, Srinagar-190009 (J&K)	Kashmir including Ladakh

S.No.	Name of Organisations	Area of Jurisdiction
12.	Gram Vikas Kendra, K-3/57, Hans Stoehr Road, TELCO Colony, Jamshedpur- 831 004	Jharkhand
13.	Karnataka Rajya Vijnana Parishat, Vijnana Bhawan, No. 24 /2 &24/3, 21st Main Road, Banashankari-II Stage, Bengaluru- 560 070	Karnataka
14.	Centre for Environment & Development, Thozhuvancode, Vattiyoorkavu P.O., Thiruvananthapuram, Kerala -695013	Kerala, Lakshadweep & Minicoy Island
15.	Bhartiya Agro-Industries Foundation (BAIF), Development Research Foundation, BAIF Bhawan, Dr. Manibhai Desai Nagar, National Highway No. 4, Warje, Pune- 411 058	Maharashtra, Goa & Dadar & Nagar Haveli
16.	Environment & Ecology Wing, Deptt. of Environment and Forests, Government of Manipur, Porompat, Near D.C. Officer, Imphal (east)-795 001	Manipur
17.	Environmental Planning & Coordination Organisation (EPCO), 'Kachnar' Paryavarhan Parisar, E-5, Arera Colony, Bhopal- 462 016	Madhya Pradesh
18.	Centre for Environment Protection (CEP), B-27/1, Tuikual South, Aizwal-796001, Mizoram	Mizoram
19.	Nagaland Pollution Control Board, Signal Point, Dimapur, Nagaland-797112	Nagaland
20.	Centre for Environment Studies, Forests and Environment Department, Government of Orissa, N-3/56 I.R.C. Village, Bhubaneshwar- 751015	South Orissa
21.	Animal Welfare Society of Orissa, Branch Office: At/Po- Bhandaripokhari, Distt-Bhadrak, Orissa Head Office: Qr. No. 4R-2, Unit -8 Gopbandhu Square, Bhubaneshwar -751012	North Orissa
22.	Punjab State Council for Science & Technology, MG SIPA Building, Near Sacred Heart Public School, Sector-26, Chandigarh- 160 019	Punjab & Chandigarh
23.	Consumer Unity & Trust Society (CUTS), D-217, Bhaskar Marg, Bani Park, Jaipur-302016, Rajasthan	Rajasthan

S.No.	Name of Organisations	Area of Jurisdiction
24.	C.P. Ramaswamy Iyer Foundation, The grove, 1-Eldmas Road, Alwerpet, Chennai- 600 018	Tamil Nadu (North) & Andaman & Nicobar Islands
25.	C.P. Ramaswamy Environment Education Centre, No. 1-A, Eldams Road, Chennai- 600 018	Pondicherry
26.	PEACE Trust, Near Police Colony, Trichy Road, Dindigul, Tamil Nadu-624005	Tamil Nadu (South)
27.	Tripura State Pollution Control Board, Pandit Nehru Complex, Gorkhabasti, Agartala-799 006	Tripura
28.	Devoted Organization for Reforming Environment (DORE),196-B, Khari Bazar, Ranikhet-263645, Uttarakhand	Uttarakhand
29.	Shohratgarh Environmental Society, Prem Kunj, 9, Adarsh Colony, Shohratgarh, Siddharth Nagar Distt. 272 205 (U.P.)	Uttar Pradesh (East)
30.	School of Fundamental Research, 29, Pratapaditya Road, Kolkata- 700 026	West Bengal Except Darjeeling Hilly Areas & Siliguri
31.	Federation of Societies for Environmental Protection (FOSEP), Darjeeling, Dr. S.M. Das Road, Red Cross Building, Darjelling-734101, West Bengal	Darjeeling Hilly Area & Siliguri
32.	Department of Environment and Forests, Office of the PCCF & Prinl. Secry., 'P'-Sector, Government of Arunachal Pradesh, Itanagar- 791 111	Arunachal Pradesh
33.	Department of Forests and Environment, Government of Meghalaya, Shillong-793 001.	Meghalaya
34.	State Environment Agency Forest, Environment and Wildlife Management Department, Government of Sikkim, Gangtok-737 101	Sikkim

LIST OF ENVIS CENTRES

Sl.No.	Address	Communication Linkages	Subject Area
ENVIS Institutional Centres (Subject Specific)			
1	Dr.D.S. Kamyotra Member Secretary, Shri Keyur Shah ENVIS Coordinator Central Pollution Control Board(CPCB) Parivesh Bhawan, CBD-Cum Office Complex, East Arjun Nagar Delhi-110 032, Delhi	Phone: 011-22305794 (Extn. 226) Fax: 011-22307233,22304948 Email: cpcb@envis.nic.in	Control of Pollution (Water, Air and Noise)
2	Dr. Ashwani Kumar, Director Dr. (Mrs.) Poonam Kakkar ENVIS Coordinator Industrial Toxicological Research Centre(ITRC) Post Box No.80 Mahatma Gandhi Marg Lucknow-226 001, Uttar Pradesh	Phone: 0522-2284591, 2621856, 2613357, 2627586, 2613786 (Extn. 269, 305, 306, 307) Mobile: 9335902630 Fax: 0522-2628227, 2611547 Email: itrc@envis.nic.in, envisiitr@envisiitr.org.in, director@iitrindia.org, ashwani26@rediffmail.com, poonam_kakkar@yahoo.com	Toxic Chemicals
3	Dr. H.N. Sayed, Director Dr. Sunil Kumar, Deputy Dir (Sr. Grade) & ENVIS Coordinator National Institute of Occupational Health(NIOH) Meghani Nagar, Ahmedabad Gujarat-380016	Phone: 079-22686351,22686259 Fax: 079-22686361 Email: nioh@envis.nic.in	Environmental and Occupational Health
4	Prof. R. Sukumar, Chairman Dr. T.V. Ramachandran, ENVIS Coordinator Centre for Ecological Sciences - Indian Institute of Science(IIS) Indian Institute of Science Bangalore Karnataka-560 012, Bangalore	Phone: 91-080-23600985, 22933099, 22932506, Fax: 91-080-23601428, 23600085, 23600683 Email: iisc@envis.nic.in	Western Ghats and Biological Diversity

Sl.No.	Address	Communication Linkages	Subject Area
5	Prof. T. Balasubramanian Director and ENVIS In-Charge Centre for Advanced Studies in Marine Biology(CASMB) Annamalai University, Parangipettai-608 502, Tamil Nadu	Phone: 04144-243223,243533, 253089, 09443330214, Fax: 04144- 243555 Email: casmb@envis.nic.in, cdl_aucasmbsancharnet.in stbcas@nic.in	Mangroves, Estuaries, Lagoons, Coral Reefs
6	Dr. Ramakrishna, Director Dr. T.K. Pal, ENVIS Coordinator Zoological Survey of India(ZSI) Prani Vigyan Bhawan, M Block, New Alipore, Kolkata-700053, West Bengal	Phone: 033-24008595, 24006893, 24003925 (Extn. 292) Mobile: 9433325558, 9433016738 Fax: 033-24006893, Email: zsi@envis.nic.in, tkpal51@rediffmail.com	Faunal Bio - diversity
7	Prof. Gurdeep Singh, ENVIS Coordinator Centre for Mining and Environment(CME) Indian School of Mines Dhanbad-826004, Jharkhand	Phone: 0326-2206372, 2202486 Fax: 0326-2206372, 2203042 Email: ism@envis.nic.in	Environmental Problems of Mining
8	Dr. S. Devotta, Director Dr. T. Chakraborty, ENVIS Coordinator National Environmental Engineering Research Institute(NEERI) Nehru Marg, Nagpur-440020, Maharashtra	Phone: 0712-2226026,2226071 Fax: 0712-2225191 Email: neeri@envis.nic.in	Hazardous Waste
9	Dr. L.M.S. Palni, Director Dr. P.P. Dhyani, ENVIS Coordinator G.B. Pant Institute of Himalayan Environment and Development Kosi - Katarmal Almora-263643, Uttarakhand	Phone: 05962-241041,241153 (Extn.54), 241015, Mobile: 09412092188, 09720335427, Fax: 05962-241150, 241153, Email: gbpihed@envis.nic.in, imenvis@gbpihed.nic.in, lmpalni@rediffmail.com, psdir@gbpihed.nic.in	Himalayan Ecology
10	Dr. M. Sanjappa, Director Dr. M.S. Mondal, ENVIS Coordinator Botanical Survey	Phone: 033-26683235, 26680667 Fax: 033-26686226, Email:bsi@envis.nic.in	Floral Biodiversity

Sl.No.	Address	Communication Linkages	Subject Area
	of India(BSI) ENVIS Centre on Floral Diversity CNH Building, 3rd Floor, Indian Botanic Garden, Howrah-711103 West Bengal	bsi_headquarter@rediffmail.com, envis@cal2.vsnl.net.in, m.sanjappa@nic.in, m_sanjappa@yahoo.co.in,	
11	Shri Jagdish Kiswan, Director General Shri Shalendra Kaushik, ENVIS Coordinator Forest Research Institute(FRI) Indian Council of Forestry Research Education New forest - P.O.Dehradun-248006, Uttarakhand	Phone: 0135-2756414 Fax: 0135-2756865, Email: fri@envis.nic.in	Forestry
12	Dr. P.R. Sinha, Director Dr. V.B. Mathur, ENVIS Coordinator Wildlife Institute of India(WII) PO Box NO. 18, Chandrabani Dehradun-248001, Uttarakhand	Phone: 0135-2640910 Fax: 0135-2640117 Email: wii@envis.nic.in	Wildlife and Protected Area Management
13	Shri. O.P. Singhi, Secretary, Dept. of Science & Technology Shri D.T. Bhutia Member Secretary & ENVIS In-charge State Council of Science and Technology for Sikkim (SCSTS) Deorali, Gangtok-737 102, Sikkim	Phone: 03592-229703, 205551 Fax: 03592-228764 Email: scsts@envis.nic.in	Eco-Tourism
14	Dr. K.P.R. Vittal, Director Dr. D.C. Ojha, ENVIS Coordinator Central Arid Zone Research Institute (CAZRI) Dr. Raheja Library Jodhpur-342 003, Rajasthan	Phone: 291-2740931, 2740706 Fax: 291-3000361 Email: cazri@envis.nic.in	Desertification
15	Dr. Paul P. Appasamy, Director Dr. K.S. Kavi Kumar, ENVIS Coordinator Madras School of Economics(MSE) Gandhi Mandampam Road Chennai-600 025, Tamil Nadu	Phone: 044-22352157 Fax: 044-22352155 Email: mse@envis.nic.in	Environmental Economics

Sl.No.	Address	Communication Linkages	Subject Area
16	Prof. N. Munuswamy Hon. Director/ ENVIS Coordinator Department of Zoology - University of Madras Life Science Building, Guindy Campus, Chennai-600 025, Tamil Nadu	Phone: 044-22300899 Mobile: 09884171947, 09444895145 Fax: 044-22300899 Email: munuswamym@ yahoo.com enviscoordinator@gmail.com, dzum@envis.nic.in,	Micro-organisms and environmental management
17	Dr. A. Jaygovind, Director Dr. O.V. Nandimath, ENVIS Coordinator National Law School of India University(NLSIU) Nagarbhavi, P.O.Box – 7201 Bangalore-560 072, Karnataka	Phone: 080-23213160, 23211303 Fax: 080-23217858 Email: nlsiu@envis.nic.in	Environmental Law
18	Prof. R. Ramesh, Director Institute for Ocean Management (IOM) and Anna University, Chennai-600 025, Tamil Nadu	Phone: 044-22330108, 22200159, 22203408, Mobile: 9840966299 Fax: 044-22200158 Email: iom@envis.nic.in, rramesh_au@yahoo.com, ramesh@annauniv.edu	Coastal Management Regulation Zone Coastal Shelter Belts
19	Dr. B.N. Goswami, Director Dr. Gufran Beig Scientist & ENVIS Coordinator Indian Institute of Tropical Meteorology (IITM) Dr. Homi Bhabha Road, Pashan, Pune-411 008, Maharashtra	Phone: 020-25893600 (Extn. 261, 212) Mobile: 09423018580 Fax: 020-25893825 Email: iitm@envis.nic.in, pollution@tropmet.res.in, goswami@tropmet.res.in, beig@tropmet.res.in	Acid Rain and Atmospheric Pollution
20	Dr. J.S. Yadav, Director Dr. U.Suryanarayana Murthy ENVIS Coordinator Indian Institute of Chemical Technology(IICT) Habsiguda, Uppal Road Hyderabad-500 007, Andhra Pradesh	Phone: 040-27193134 Fax: 040-27193227 Email: iict@envis.nic.in	Bioinformatics - Vector Control
21	Dr. M.O. Garg, Director Dr. L.P. Singh, ENVIS Coordinator Central Building Research	Phone: 01332-283442, 272391, 2722432, Mobile: 09837031050 Fax: 01332-272272, 272543	Fly Ash

Sl.No.	Address	Communication Linkages	Subject Area
	Institute (CBRI) Roorkee-247 667, Uttarakhand	Email: Ipsingh@cbri.in, cbri@envis.nic.in, singh_cbri@yahoo.co.in, director@cbrimail.com	
22	Dr. R. Tuli, Director Dr. Nandita Singh, ENVIS Coordinator National Botanical Research Institute (NBRI) Rana Pratap Marg, Lucknow-226 001, Uttar Pradesh	Phone: 0522-2205842(303), 2205839 Mobile: 09415110314 Fax: 0522-2205847 Email: nbri@envis.nic.in, n.singh@nbri.res.in	Indicators of Plant Pollution
23	Shri. Bharat P. Jain, Member Secretary Gujarat Cleaner Production Centre (GCPC) Block No.4, 3rd Floor, Udyog Bhawan, Sector-11, Gandhi Nagar-382 017, Gujarat	Phone: 079-3243211, 3225811-14 Fax: 079-3244306 Email: gcpc@envis.nic.in	Cleaner Production & Technology
24	Prof. Arabinda Kumar Das, Vice Chancellor Prof. S.C. Santra, ENVIS Coordinator Department of Environmental Sciences (DES) Kalyani University, Kalyani Distt. Nadia West Bengal - 741235	Phone: 033-25808749 Fax: 033-25828282 Email: scsantra@yahoo.com	Environmental Biotechnology
25	Prof. Shoben K. Saha, Director Prof. Subir Saha, Director School of Planning and Architecture (SPA) 4, Block, Indraprastha Estate New Delhi-110002	Phone: 011-23702393, 95 Fax: 011-23702383 Email: spa-env@nic.in; epohd@vsnl.net	Human Settlement
26	Prof. V.K. Jain, ENVIS Coordinator School of Environmental Sciences Jawaharlal Nehru University, New Delhi-110067	Phone: 011-26704315 Mobile: 9810908489 Email: envis@mail.jnu.ac.in, cchatterjee@mail.jnu.ac.in	Biogeochemistry

Sl.No.	Address	Communication Linkages	Subject Area
27	Prof. Deepak Kumar Bagchi, Vice Chancellor Prof. Subrata Maity, ENVIS-In-charge Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia – 741252, West Bengal	Phone: 03473 223256/7 Extn. – 258, 033-25879772 Fax: 033 25828460, 03473 222275 Email: dk_bagchi@yahoo.com; maity@vsnl.com	Biosphere Reserve
ENVIS NGO Centres (Subject Specific)			
28	Dr. R.K. Pachauri, Director General Shri P.K. Bhattacharya, ENVIS Coordinator The Energy Resources Institute(TERI) Darbari Seth Block, Habitat Centre, Lodi Road, New Delhi-110 003, Delhi	Phone: 011-24682100, 24682111 Fax: 011-24682144 Email: teri@envis.nic.in	Renewable Energy and Environment
29	Mr. Ravi Singh, Secretary General and CEO Shri G. Areendran, Director World Wide Fund for Nature - India(WWF) Indira Gandhi Conservation Monitoring Centre (IGCMC), 172-B, Lodhi Estate, New Delhi-110 003, Delhi	Phone: 011-41504791, 41504793 Mobile: 9968061056 Fax: 011-41504779, 24691226 Email: wwf@envis.nic.in, gareendran@wwfindia.net, ravisingh@wwfindia.net, rkumar@wwfindia.net	NGOs and Parliament
30	Shri. Kartikeya V. Sarabhai, Director Mr. Ramesh Savalia, ENVIS Coordinator Centre for Environment Education(CEE) Nehru Foundation for Development, Thaltej Tekra, Ahmedabad-380 054, Gujarat	Phone: 079-2684474526844780, 26858002-09, 26858011 Fax: 079-26858010 Email: cee@envis.nic.in, ceedo@ceeindia.org, ramesh.savalia@ceeindia.org cee.envis@ceeindia.org,	Environmental Education
31	Shri Inderjit Pal, Director General Shri S.H. Baquer, ENVIS Coordinator Environment Protection Training and Research Institute(EPTRI) 91/4, Gachibowli, Hyderabad-500 032, Andhra Pradesh	Phone: 040-23001242, 23000489, 23001707(D), Fax: 040-23000361 Email: eptri@envis.nic.in	Eastern Ghats

Sl.No.	Address	Communication Linkages	Subject Area
32	Dr. N. Baskara Rao, Chairman Ms. Alka Tomar, ENVIS Coordinator Centre for Media Studies(CMS) Media Research House, B-34, Community Centre, Saket, New Delhi-110 017, Delhi	Phone: 011-26851660, 26856429 Fax: 011-26968282 Email: cms@envis.nic.in	Communication and Electronic
33	Dr. Asad R. Rahmani, Director Bombay Natural History Society(BNHS) Hornbill House, Dr. Salim Ali Chowk Shaheed Bhagat Singh road Mumbai-400 001, Maharashtra	Phone: 022-22821811 Fax: 022-22837615 Email: bnhs@envis.nic.in, envis@bnhs.org	Avian Ecology
34	Shri Kalyan Bose, Hon. Director (Admn.) Mr. Jose Emmanuel, ENVIS Coordinator Consumer Education and Research Centre (CERC) Suraksha Sankool, Thaltej, Sarkhej-Gandhinagar Highway, Ahmedabad-380 054, Gujarat	Phone: 079-27489945-46, 27450528, 27451097, Fax: 079-27489947 Email: cerc@envis.nic.in	Eco-Labeling and Eco-Friendly Products
35	Dr.(Mrs.) Nanditha C, Krishna, Hon. Director CPR Environmental Education Centre (CPR) 1 Eldams Road, Alwarpet, Chennai-600 018, Tamil Nadu	Phone: 044-24346526, 24337023 Fax: 044-24320756 Email: cpreec@envis.nic.in	Conservation of Ecological Heritage and Sacred Sites in India
36	Dr. D.K. Ved, Director Foundation for Revitalization of Local Health Traditions (FRLHT) 74/2, Jarakbande Kaval, Yelahanka, via Attu PO, Bangalore-560 064, Karnataka	Phone: 080-28565890, 28565873 Fax: 080-28565895 Email: frlht@envis.nic.in	Conservation of Medicinal Plants
37	Dr. Amiya Kumar Sahu President/ ENVIS Coordinator National Solid Waste Association of India (NSWAI) B-703, Customs Colony A, Marol,	Phone: 022-29207577 Telefax: 022-29202951 Email: nswai@envis.nic.in, econpcpl@gmail.com, econpcpl@vsnl.com,	Municipal Solid Waste Management

Sl.No.	Address	Communication Linkages	Subject Area
	Military Road, Andheri (E), Mumbai – 400 059	sahu_amiya@rediffmail.com	
38	Dr. Bindeshwar Pathak, Founder Dr. S. Nath Chairman cum Medical Director Kumar Rajnish, Envis Coordinator Sulabh International Institute of Health and Hygiene (Sulabh) Sulabh Bhawan, Mahavir Enclave, New Delhi-110 045, Delhi	Phone: 011-25031243, 25058941 Fax: 011-25034014 Email: sulabh@envis.nic.in	Hygiene, Sanitation, Sewage Treatment Systems and Technology
39	Shri. K.G. Ramanathan, President Shri. T.K. Bandopadhyay ENVIS Coordinator Indian Centre for Plastic in the Environment (ICPE) OLYMPUS House, 2nd Floor, 25, Raghunath Dadaji Street (Near Fort House - Formerly Handloom House) Fort, Mumbai – 400 001	Phone: 022-22617137, 22617165, 40022491 Fax: 022-22617168 Email: icpe@envis.nic.in	Management of Plastic, Polymers and Biopolymers
40	Dr. K.P. Nyati, Director Environment Management Division – Confederation of Indian Industries (CII) India Habitat Centre 4th Floor, Core4A, Lodhi Road New Delhi-110 003, Delhi	Phone: 011-24682230-35 Fax: 011-24682229, 24682228 Email: cii@envis.nic.in	Industry - Government Environmental Interface
41	Dr. K.V. Swaminathan, Chairman Mr. S.R. Adige ENVIS Coordinator Waterfalls Institute of Technology Transfer (WITT) J-29, NDSE Part-I New Delhi-110 049	Phone: 011-24642269 Fax: 011-24619083 Email: witt@envis.nic.in, witt_waterfall@yahoo.com	Environmental Audit and Accounting
42	Dr. P.A. Azeez, Director Dr. S. Narendra Prasad ENVIS Coordinator Salim Ali Centre for Ornithology	Phone: 0422-2657101-105, 2657086, 2657096 Fax: 0422-2657088 Email: sacon@envis.nic.in	Wetland Ecosystem (including inland)

Sl.No.	Address	Communication Linkages	Subject Area
	and Natural History(SACON) Anaikatty P.O. Coimbatore-641 108, Tamil Nadu		wetlands)
43	Dr. F. Ram, Director Dr. R.B. Bhagat, ENVIS Coordinator International Institute for Population Sciences(IIPS) Govandi Station Road, Deonar, Mumbai-400 088, Maharashtra	Phone: 022-25563254, 55, 56 (Extn.112, 173), 25573943, 25562062, Fax: 022-25563257 Mobile: 09869947264 Email: iip@envis.nic.in, popenvis123@rediffmail.com, director@iips.net, rbbhagat@iips.net	Population, Human Settlement and Environment
44	Prof. B. Bhaskara Rao, Director Dr.(Mrs.) Papia Lahiri ENVIS Coordinator Centre for Symbiosis of Technology, Environment and Management (STEM) Pocket B-10, Flat No. 7077, Vasant Kunj, New Delhi – 110070	Phone: 011-26122841, Mobile: 9350532857 Email: stemdel@gmail.com, papia12@yahoo.com	Women and Environment: their role in preservation and conservation of environment
45	Shri George C. Varughese President Ms. Sushmita Das ENVIS Coordinator Development Alternatives 111-Z/9, Kishangarh, Vasant Kunj, New Delhi – 110070	Phone: 011-26967938,26851158 Fax: 0111-26130814 Email: daenvis@sdalt.ernet.in, amrita@sdalt.ernet.in	Environmentally Sound & Appropriate Technologies
46	Dr. Desh Bandhu President Indian Environmental Society (IES) Vidhata House, Vikas Marg, Shakarpur, Delhi-110092	Phone: 011-22046823,22450749 Fax: 011-22523311 Email: iesenro@del2.vsnl.net.in	Role of Panchayats in Environment

ENVIS Government Centres (State Government)

47	Mr. Rajeshwar Tiwari, IAS Director Shri. S.H. Baquer ENVIS Coordinator Environment Protection Training and Research Institute(EPTRI)	Phone: 040-23001241, 23001242, 23000489 (Extn. 17), 23001707(D) Mobile: 9849020033 Fax: 040-23001241 Email: ap@envis.nic.in,	Status of Environment and Related Issues
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Sl.No.	Address	Communication Linkages	Subject Area
	91/4, Gachibowli, Hyderabad-500 032, Andhra Pradesh	baquer@eptri.com, info@eptri.com	
48	Shri Niraj Verma, IAS Director Shri Jaideep Baruah ENVIS Coordinator Assam Science, Technology and Environmental Council Bigyan Bhawan, G.S. Road, Guwahati-781005, Assam	Phone: 0361-2464619 Mobile: 09435032706, 09435102089 Telefax: 0361-2464617 Email: asm@envis.nic.in, astec-asam@nic.in, nverma2000@gmail.com, j.baruah@nic.in	Status of Environment and Related Issues
49	Shri. S.N. Rao Member Secretary Bihar State Pollution Control Board Beltron Bhawan, 2nd Floor, Lal Bhadur Shastri Nagar, Patna-800 023, Bihar	Phone: 0612-2281250, 2291709, 2281050 Fax: 0612-2291709, 2281050 Email: bh@envis.nic.in	Status of Environment and Related Issues
50	Shri Anil Kumar Sharma Member Secretary Mr. A.P. Savant ENVIS Coordinator, Asstt. Public Relation Officer Chhattisgarh Environment Conservation Board Nanak Niwas, Civil Lines, Raipur-492 001, Chhattisgarh	Phone: 0771-2425523 Fax: 0771-2425585 Email: cht@envis.nic.in	Status of Environment and Related Issues
51	Mrs. Naini Jayaseelan Secretary Environment Dr. B.C. Sabata Senior Scientific Officer Department of Environment - Govt. of NCT of Delhi Level-6, Wing-C, Delhi Secretariat, New Delhi-110 002, Delhi	Phone: 011-23392032, 23392029 Fax: 011-23392034 Email: del@envis.nic.in	Status of Environment and Related Issues
52	Dr. N.P.S. Varde Director/Jt. Secy. (STE) Dr. Mohan R. Girap	Phone: 0832-2407186 Fax: 0832-2407186 Email: goa@envis.nic.in	Status of Environment and Related Issues

Sl.No.	Address	Communication Linkages	Subject Area
	ENVIS Coordinator Department of Science, Technology and Environment Saligao Plateau, Saligao Bardez-403 511, Goa		
53	Shri C.H. Pandya Director Shri Nischal Joshi Sr. Project Manager Gujarat Ecology Commission (GEC) Government of Gujarat, Block No.18/1, Udyog Bhavan, Sector-11, Gandhinagar-382017 Gujarat	Phone: 079-23257658, 23257659 Mobile: 09825030698 Fax: 079-23257656 Email: guj@envis.nic.in, gec_icef@rediffmail.com	Status of Environment and Related Issues
54	Dr. R.K. Sood Head of the Organisation Dr. Alka Sharma ENVIS Coordinator State Council for Science, Technology and Environment (SCSTE) B-34, SDA Complex, Kasumpti, Shimla-171 009, Himachal Pradesh	Phone: 0177-2622490, 2620998, 2622923, 2633923 Fax: 0177-2620998 Email: hp@envis.nic.in	Status of Environment and Related Issues
55	Mrs. M.A.W. Deva ENVIS Coordinator Directorate of Environment and Remote Sensing SDA Complex, Bemina, Srinagar Phone: 0194-2490823 (May to October) 1-D, Gandhi Nagar, Jammu Phone: 0194-2438994 (November to April)	Phone: 0194-2438994 Telefax: 0194-2490823 Email: jk@envis.nic.in	Status of Environment and Related Issues
56	Shri. A.K. Mishra Chief Conservator of Forests –cum- Chief Wildlife Warden	Phone: 0651-2480655 Fax: 0651-2480655	Status of Environment and

Sl.No.	Address	Communication Linkages	Subject Area
	Shri Dharmendra Kumar Conservator of Forest Working Plan and Research Council, Ranchi-834 002, Jharkhand	Email: jhar@envis.nic.in	Related Issues
57	Mr. B. Basappa Director General Shri Chakravarti Mohan ENVIS Coordinator Environment Management & Policy Institute (EMPRI) Department of Forests, Environment and Ecology, Govt. of Karnataka, Hasiru Bhawan, Doresanipalya, Forest Campus, Vinayaka Nagar Circle, J.P. Nagar, 5th Phase, Bangaluru-560078, Karnataka	Phone: 080-26490746, 26490747 22254377, 22092445 Fax: 080-26490745, 22254377 Email: kar@envis.nic.in, empri_bangalore@yahoo.co.in	Status of Environment and Related Issues
58	Dr. E.P. Yesodharan Executive Vice President Dr. Kamalakshan Kokkal Principal Scientific Officer & ENVIS Coordinator Kerala State Council for Science, Technology and Environment (KSCSTE) Sasthra Bhawan, Pattom P.O., Thiruvananthapuram-695 004, Kerala	Phone: 0471-2543701-05 Fax: 0471-2543558, 2540085 Email: ker@envis.nic.in, kscste@gmail.com, drkokkal@yahoo.com, krishnan.sabu@gmail.com	Status of Environment and Related Issues
59	Shri S.N. Mishra Executive Director Dr. Rakesh Dubey Director Disaster Management Institute(DMI) Housing and Environment Department, Paryavaran Parisar, E-5, Arera Colony, P.B.No.563,	Phone: 0755-2466715, 2461538, 2461348, 5293592 Fax: 0755-2466653 Email: mp@envis.nic.in	Status of Environment and Related Issues

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	Bhopal-462 016, Madhya Pradesh		
60	Dr. B.N. Patil ENVIS Coordinator Environment Department New Administrative Building, 15th Floor, Madam Cama Marg, Mantralaya, Mumbai-400 032, Maharashtra	Phone: 022-22854707, 22855082 Fax: 022-22025946 Email: mah@envis.nic.in, envis.maharashtra@gmail.com	Status of Environment and Related Issues
61	Dr. M. Homeshowor Singh Senior Scientific Officer Dr. Y. Nabachandra Singh ENVIS Coordinator Environment and Ecology Office - Dept. of Environment and Forests, Government of Manipur, Porompat, Imphal (East)-795 010, Manipur	Phone: 0385-2227625 Mobile: 09862063880, 09436038970 Fax: 0385-2227625, 2446670 Email: man@envis.nic.in, brajakumar_t@yahoo.com	Status of Environment and Related Issues
62	Mr. C. Lalduhawma Member Secretary & ENVIS Coordinator Mizoram Pollution Control Board, Silver House, Tuikhuatlang, Aizwal-796 001, Mizoram	Phone: 0389-2316590, 2326173, 231184, 09436142012 Fax: 0389-2316591, 2316590 Email: miz@envis.nic.in, duhawma15@yahoo.com, mpcb_azl@yahoo.com	Status of Environment and Related Issues
63	Dr. Seyiekhareipuo John Executive Director Dr. Inakhe Sumi Senior Programme Officer Nagaland Institute of Health, Environment and Social Welfare (NIHESW) Moses Complex, S-2, N.S.F., Martyr's Park, Upper PWD Kohima-797 001, Nagaland	Phone: 0370-2245619, 2245566 Mobile: 09436001470 Fax: 0370-2240626, 2245615, 2240180 Mob: 09436010783 Email: nag@envis.nic.in, nihesw@yahoo.com	Status of Environment and Related Issues
64	Shri Bhagirathi Behera Director Shri Pravat Mohan Dash	Phone: 0674-2551853, 2390920, 2551853 Mobile: 09437011837,	Status of Environment and Related Issues

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	ENVIS Coordinator Centre for Environmental Studies (CES)Forest & Environment Department, Government of Orissa, N-1/247, IRC Village, Nayapalli, Bhubaneswar-751 015, Orissa	09438186037 Fax: 0674-2553182 Email: ori@envis.nic.in, cesorissa@rediffmail.com, bhagirathibehera2002@yahoo.co.in, pravatmohandash@yahoo.com	
65	Mr. N.S. Tiwana Director Ms. Neelima Jerath ENVIS Coordinator Punjab State Council for Science and Technology(PSCST) MGSIPA Complex, Second Floor, Adj. Sacred Heart School, Sector-26 Chandigarh-160 019, Punjab	Phone: 0172- 2793600 Fax: 0172-2793143 Email: pun@envis.nic.in, neelimajerath@pscst.com	Status of Environment and Related Issues
66	Mr. Ashok Jain Chairperson Mr. Vijai Singhal ENVIS Coordinator Rajasthan State Pollution Control Board 4, Institutional Area, Jhalana Doongari, Jaipur-302 004, Rajasthan	Phone: 0141-2705731, 2707285,2711263 Fax: 0141-2709980 Email: raj@envis.nic.in	Status of Environment and Related Issues
67	Shri S.T. Lachungpa PCCF-cum-Secretary Shri C. Lachungpa Conservator of Forests & ENVIS Coordinator ENVIS Centre Sikkim, Forests, Environment & Wildlife Management Department, Government of Sikkim Forest Secretariat Annex-II, Ground Floor, Room No.1101/1102, Deorali, Gangtok-737 102, Sikkim (East)	Phone: 0359-2280381, 2281778 Fax: 0359-2280381, 2281778 Email: sik@envis.nic.in, pccfcumsecretary@gmail.com, st_lachungpa@hotmail.com, c_lachungpa123@hotmail.com, shrestha_kewal@yahoo.com	Status of Environment and Related Issues

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68	Dr. R. Annamalai IFS, Director Dr. C.Thomson Jacob Senior Programme Officer Department of Environment, Government of Tamil Nadu #1, Jeenis Road, 4th Floor Down, Panagal Building, Saidapet, Chennai-600 015, Tamil Nadu	Phone: 044-24331243, 24336421 Mobile: 09443243846, 09003071833 Fax: 044-24336594 Email: tn@envis.nic.in, tn DOE@eth.net, tomson09@yahoo.co.in	Status of Environment and Related Issues
69	Prof. Mihir Deb Chairman Shri. Manas Mukherjee Executive Engineer & Project Co-ordinator Tripura State Pollution Control Board Vigyan Bhawan, Pandit Nehru Complex, Gorkhabasti, P.O. Kunjaban, Agartala-799 006, Tripura	Phone: 0381-2225421, 2328792, 2300368® Fax: 0381-2225421 Email: trp@envis.nic.in	Status of Environment and Related Issues
70	Shri. Yashpal Singh Director Shri R.K. Sardana ENVIS Coordinator Environment Directorate - Uttar Pradesh Vinit Khand-1, Gomti Nagar, Lucknow-226 020, Uttar Pradesh	Phone: 0522-2300541 Fax: 0522-2300543 Email: up@envis.nic.in	Status of Environment and Related Issues
71	Dr. T.B. Singh Chief Environment Officer Shri Amarjeet Singh Oberai Chief Environment Officer Uttarakhand Pollution Control Board E-115, Nehru Colony, Hardwar Road, Dehradun-248 011, Uttarakhand	Phone: 0135-2668922 Fax: 0135-2668092 Email: utr@envis.nic.in	Status of Environment and Related Issues
72	Shri M.L. Meena Secretary Shri Meena Senior Environment Officer	Phone: 033-22141357 Fax: 033-22145592, 22141356 Email: wb@envis.nic.in	Status of Environment and Related Issues

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	Department of Environment – Govt. of West Bengal Block 'G', 2nd Floor, 2nd Floor, Writers' Buildings, Kolkata-700 001, West Bengal		
73	Deputy Secretary Shri R.S. Sinha DCF, ENVIS Coordinator Department of Environment and Forest - Andaman and Nicobar Van Sadan, Haddo P.O. Port Blair-744 102, Andaman and Nicobar	Phone: 03192-233233 Fax: 03192-230113 Email: an@envis.nic.in	Status of Environment and Related Issues
74	Mr. Richard D'Souza Chairman Mr. Santosh Singh Member Secretary Daman Pollution Control Committee - Moti Daman, Daman-396 220, Daman and Diu	Phone: 02638-2230963, 2230524 Fax: 02638-2230804 Email: dd@envis.nic.in	Status of Environment and Related Issues
75	Shri. Ishwar Singh Director, Environment Chandigarh Administration Off: Old architect Building, Sector 19-B, Madhya Marg, Chandigarh, 160 019 Phone: 782645, 775951 Mr. P.J.S. Dadhwal ENVIS Coordinator Department of Environment – Chandigarh Chandigarh Administration, Addl.Town Hall Building, 2nd Floor, Sector 17-C, Chandigarh-160 001, Punjab	Phone: 0172-2700284 0172-2700065 0172-3295436 Fax: 0172- 2700149 Email: ch@envis.nic.in, dcf@chd.nic.in, dadhwalpjsd@gmail.com	Status of Environment and Related Issues

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76	Shri M. Arunachalam Member Secretary Dr.K.Sundaravadivelu ENVIS Coordinator Pondicherry Pollution Control Committee, IIIrd Floor, Housing Board Building, Anna Nagar, Puducherry-605 005, Pondicherry	Phone: 0413-2201256 Mobile: 09443716026, 09442524264 Fax: 0413-2203494 Email: pon@envis.nic.in, ppcc.pon@nic.in, dste.pon@nic.in, drksundardste@rediffmail.com	Status of Environment and Related Issues



