



ANNUAL REPORT 2010-2011

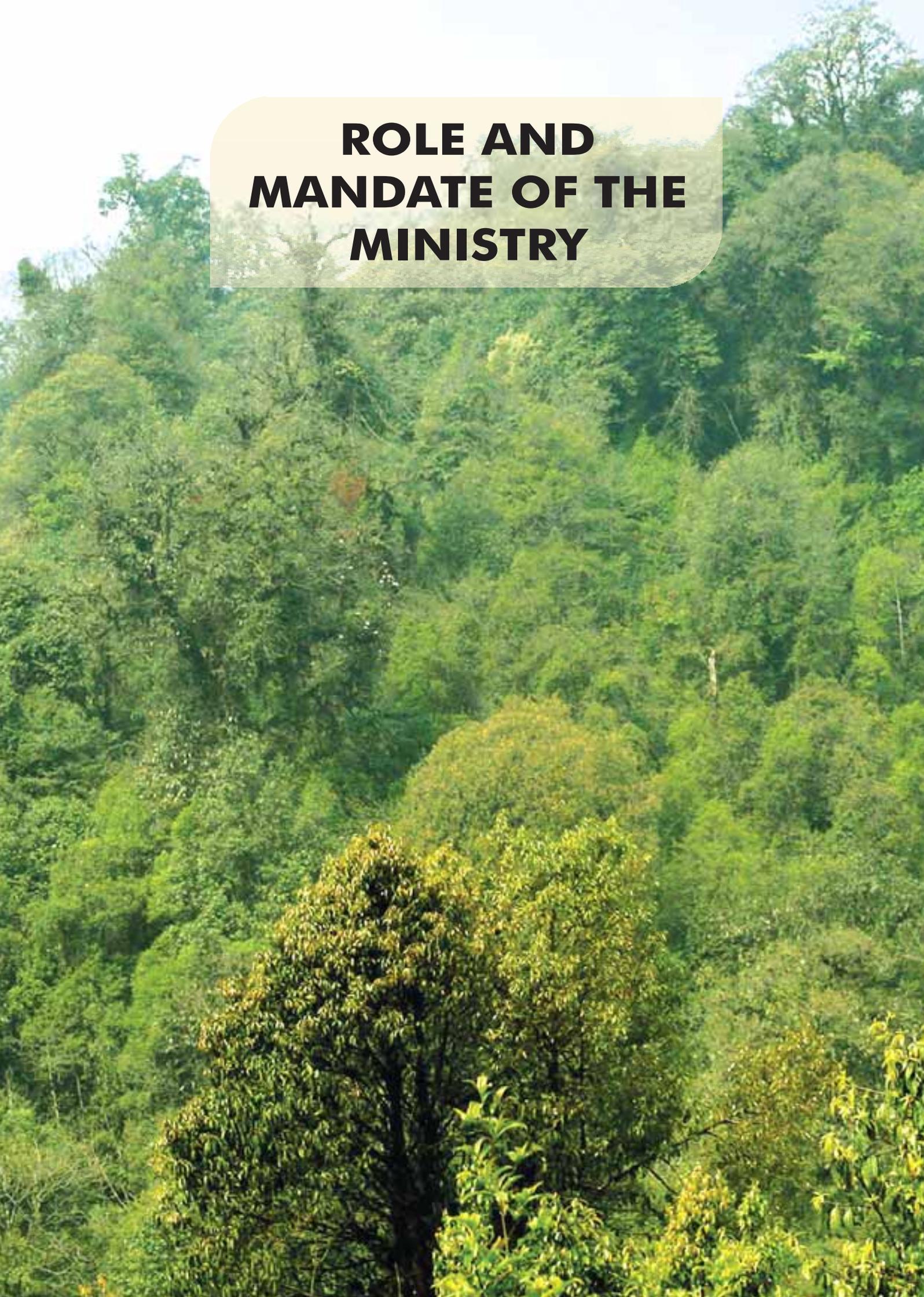


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वहाँ है खुशहाली ॥

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

CONTENTS

Sl.No.	Chapter	Page No.
	Role and Mandate of the Minsitry	v
1.	Natural Resources - Survey and Exploration	1
2.	Conservation	29
3.	Environmental Impact Assessment	91
4.	Abatement of Pollution	99
5.	Conservation of Water Bodies	141
6.	Regeneration and Eco-Development	153
7.	Research	161
8.	Education and Awareness	189
9.	Centres of Excellence	217
10.	Fellowships and Awards	231
11.	Environmental Information	237
12.	Legislation and Institutional Support	245
13.	International Cooperation and Sustainable Development	249
14.	Administration and Civil Construction	277
15.	Plan Coordination and Budget	289
	Annexures	



ROLE AND MANDATE OF THE MINISTRY

Role and Mandate of the Ministry

Role of the Ministry

The Ministry of Environment & Forests (MoEF) is the nodal agency in the Central Government for planning, promotion, coordination and overseeing the implementation of India's environmental and forestry policies and programmes.

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.

The Ministry is also the nodal agency for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and the United Nations Conference on Environment and Development (UNCED). The Ministry also coordinates with multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment

Facility (GEF) and regional bodies such as 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 also guide the Ministry's work.

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

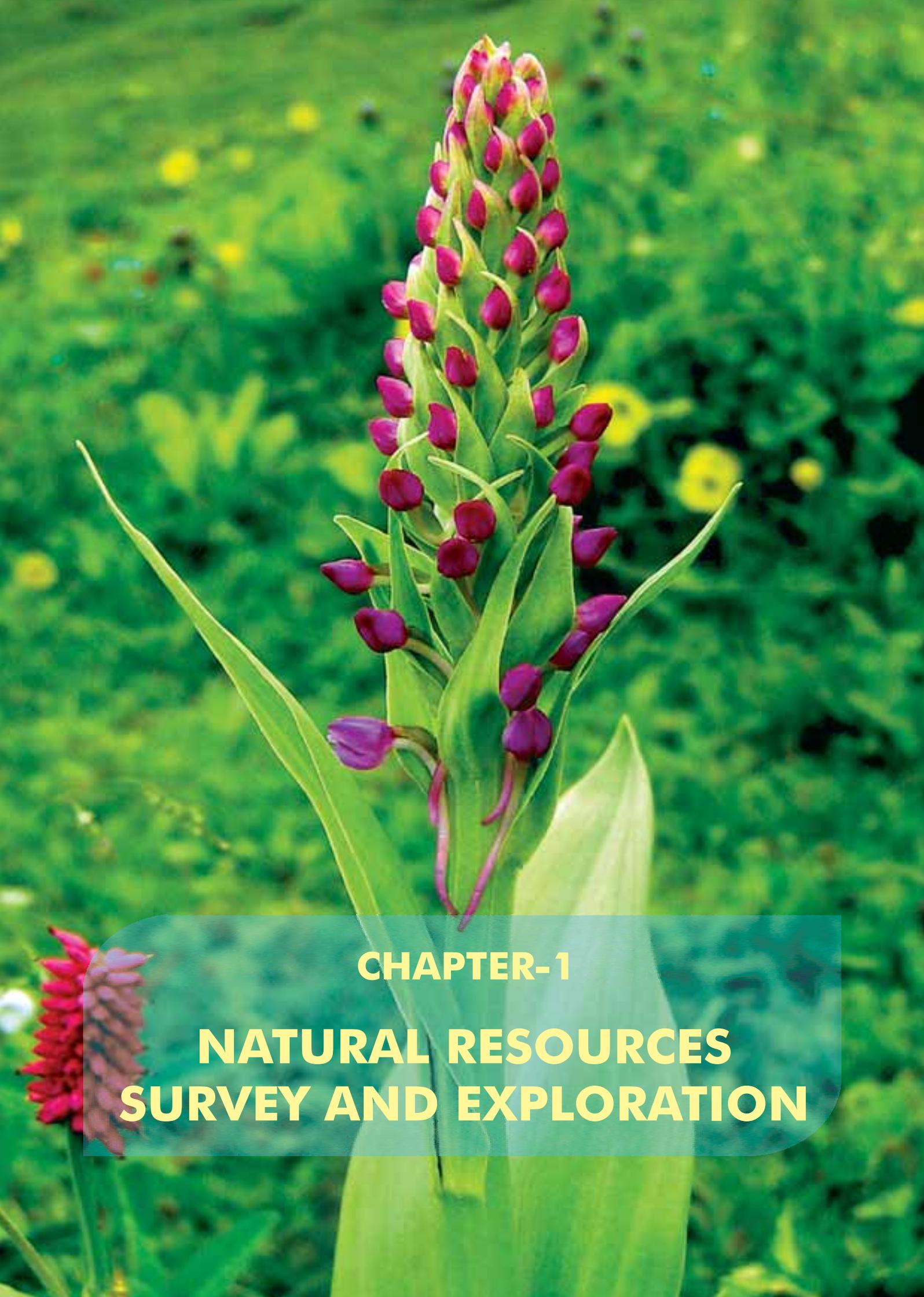


Mandate of the Ministry

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, Govt. of India for carrying out taxonomic and floristic studies on wild plant resources of the country. It was established on 13th February, 1890 with the basic objective to explore the plant resources of the country and to identify the plants 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 BSI 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 specimens/live collections/botanical paintings/illustrations, plant distribution and nomenclature, 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



Fig-1. Allamanda cathartica, a flowering plant, commonly known as Golden Trumpet Vine

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 of Environment and Forests, New Delhi.

- 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-three field tours were undertaken for floristic/ethnobotanical studies on flowering and non-flowering plants by different regional centres and units of BSI covering the following areas

- Western Himalaya: Tropical and Subtropical Zones of Siwaliks; Masartal, Binakkhal, Kandikhal and Chandrabadni; Sukhi-Jhala, Dharali-Sattaland, SiyanGad-Khaga Glacier valley and Govind Pashu Vihar National Park of Uttarkashi District
- Eastern Himalaya: Sikkim (West and South districts)
- North – East India: Arunachal Pradesh (Kurum Kumey, Anjaw and West Siang districts, Dihang Dibang Biosphere

Reserve), Assam (Gibbon Wildlife Sanctuary, Pani Dihing Wildlife Sanctuary, Pabha Wildlife Sanctuary, Barnadi Wildlife Sanctuary), Mizoram (Aizawl and Kolasib districts and Pualreng Wildlife Sanctuary), Meghalaya (East and West Garo Hills districts)

- Arid – Semi Arid: Gujarat (Rajkot, Bhavnagar, Patan districts); Rajasthan (Darrah Wildlife Sanctuary)
- Gangetic Plains: Uttar Pradesh (Ranipur Wildlife Sanctuary, Katerniyaghat Wildlife Sanctuary, Chambal Wildlife Sanctuary), Jharkhand (Dalma Wildlife Sanctuary, Koderma Wildlife Sanctuary), West Bengal (Buxa National Park, Gorumara National Park)
- Deccan Peninsula: Madhya Pradesh (Govindsagar Dam, Halali Dam, Mod Dam, Upper Lake)
- Western Ghats: Karnataka (Mookambika Wildlife Sanctuary), Goa (Netravali, Cotigaon, Madei-Bondla Wildlife Sanctuaries and Dr. Salim Ali Bird Sanctuary), Kerala (Wayanad Wildlife Sanctuary, Idukki, Chitteri Hills), Tamil Nadu (Vellingiri, Siruvani and Anakkatti Hills)
- A & N Islands: Middle Andaman (Interview Islands WLS), Nicobar (Little Nicobar)



Fig-2. Cineraria an ornamental flower in bloom

During these field tours, ca 6,375 specimens have been collected. 4,340 of these collected specimens belonging to ca 872 species were identified by scientists of different regional centres and units which resulted in discovery of one genus, 15 species, four varieties as new to science and 19 species as new to India.



Fig-3. *Sesbania grandiflora*, commonly known as 'agati', an important medicinal plant

Genus new to Science

- *Stapletonia* P. Singh, S. S. Dash & P. Kumari (Poaceae - Bambusoideae)

Species new to science

- *Actephila excelsa* (Dalz.) Muell. Arg. var. *brevifolia* N. Balach. & T. Chakrab. (Euphorbiaceae)
- *Bhesa andamanica* N. Balach. & T. Chakrab. (Celastraceae)
- *Corydalis vaginans* var. *jadhgangensis* Pusalkar & D. K. Singh (Fumariaceae)
- *Desmos chinensis* Lour. var. *jarawae* T. Chakrab. & Diwakar (Annonaceae)
- *Impatiens badrinathii* Pusalkar & D. K. Singh (Balsaminaceae)
- *Impatiens devendrae* Pusalkar (Balsaminaceae)
- *Impatiens leggei* Pusalkar & D. K. Singh (Balsaminaceae)
- *Lepidozia kashyapii* D. Singh & D. K. Singh (Lejeuneaceae)
- *Leptolejeunea mirikana* M. Dey & D. K. Singh (Lejeuneaceae)
- *Leptolejeunea udarii* M. Dey & D. K. Singh (Lejeuneaceae)
- *Lindera sanjappae* M. K. Pathak, Bhaumik & T. Chakrab. (Lauraceae)
- *Lindera varmae* M. K. Pathak, Bhaumik & T. Chakrab. (Lauraceae)
- *Medinilla balakrishnanii* J. Jayanthi, K. Karthigeyan, R. Sumati & Diwakar (Melastomataceae)

- *Milium caudatum* N. Balach. & T. Chakrab. (Annonaceae)
- *Neolitsea sanjappae* M. K. Pathak, Bhaumik & T. Chakrab. (Lauraceae)
- *Notoscyphus darjeelingensis* var. *sikkimensis* D. Singh, D. K. Singh & A. Kumar (Jungermanniaceae)
- *Phyllanthus rangachariarii* Murugan, Kabeer & G. V. S. Murthy (Euphorbiaceae)
- *Sageretia devendrae* Pusalkar (Rhamnaceae)
- *Sageretia santapau* Pusalkar & D. K. Singh (Rhamnaceae)

New Records for India

Genus new to India

- *Tuyamaella* S. Hatt.

Species new to India

- *Cololejeunea aequabilis* (Sande Lac.) Schiffn. (Lejeuneaceae)
- *Cololejeunea dozyana* (Sande Lac.) Schiffn. (Lejeuneaceae)
- *Cololejeunea macounii* (Spruce ex Underw.) A. Evans. (Lejeuneaceae)
- *Cololejeunea occlata* (Horik.) Benedix. (Lejeuneaceae)
- *Cololejeunea serrulata* Steph. (Lejeuneaceae)
- *Corydalis swatensis* (Kitam.) Jafri (Fumariaceae)
- *Cotynus coggygria* var. *glaucocephala* C. Y. Wu (Anacardiaceae)
- *Eria lacei* Summerh. (Orchidaceae)
- *Globba wardii* (B. L. Burtt & R. M. Sm.) K. J. Williams (Zingiberaceae)
- *Jubula pennsylvanica* (Steph.) A. Evans. sub.sp. *pennsylvanica* (Jubulaceae)
- *Leptolejeunea apiculata* (Horik.) S. Hatt. (Lejeuneaceae)

- *Lindera cercidifolia* Hemsl. (Lauraceae)
- *Medinilla speciosa* Blume (Melastomataceae)
- *Rhododendron hylaeum* Belf.f & Farrer (Ericaceae)
- *Ruellia brittoniana* Leonard (Acanthaceae)
- *Ruellia elegans* Hook. f. (Acanthaceae)
- *Sinocrassula indica* A. Berger var. *viridiflora* K. T. Fu (Crassulaceae)
- *Tuyamaella serratistipa* S. Hatt. (Lejeuneaceae)

Species Records for State

- *Appendicula cornuta* Blume (Orchidaceae) – Recorded from Meghalaya
- *Eria arunachalensis* A. N. Rao (Orchidaceae) – Recorded from Meghalaya
- *Eryngium foetidum* L. (Apiaceae) – Recorded from Uttar Pradesh
- *Mastixia euonymoides* Pram (Cornaceae) – Recorded from Tamil Nadu
- *Riccia melanospora* Kashyap – Recorded from West Bengal
- *Riccia perssonii* Sultan Khan – Recorded from West Bengal
- *Riccia stricta* (Lindenb.) Perold – Recorded from West Bengal

Species collected after 50 years or more

- *Canscora stricta* Sedgw. (Gentianaceae)
- *Ginalloa andamanica* Kurz (Viscaceae)
- *Heritiera papilio* Bedd.
- *Juncus tenuis* Willd. (Juncaceae) – collected from Meghalaya

Documentation of Phytodiversity

National Flora (Flora of India)

- Taxonomic description of 42 species of Aspidiaceae (Pteridophyte) and 116

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Fig-4. *Costus speciosus*, popularly known as Crepe Ginger

species of Rubiaceae (Angiosperm) completed

- Palynotaxonomic studies on 80 species of Lauraceae of India completed.

Regional/State Flora

- Taxonomic description of 928 species towards (a) Flora of Jammu & Kashmir, (b) Flora of Gujarat, (c) Flora of Cold Desert of North West Himalayas (d) Ericaceae of Arunachal Pradesh, (e) Flora of Manipur Vol. III and (f) Flora of Kerala Vol. III completed.
- Editing of Flora of West Bengal, Vol. IV, Moss Flora Tawang District, Arunachal Pradesh and Checklist of Xanthophyceae in India completed.
- Taxonomic description of 160 species for Endemic and Threatened Pteridophytes of North West Himalaya, 78 species of Macrofungi of Siwalik Himalaya,

37 species of Aspidiaceae of north East India and 37 species of Bryoflora of Mizoram completed.

Protected Areas

- Taxonomic description of 398 species towards Flora of Gibbon Wildlife Sanctuary, Pani Dihing Wildlife Sanctuary, Pabha Wildlife Sanctuary, Ranipur Wildlife Sanctuary Chambal Wildlife Sanctuary, Katerniaghat Wildlife Sanctuary, Darrah Wildlife Sanctuary, Cotigao Wildlife Sanctuary, Netravali Wildlife Sanctuary, Wayanad Wildlife Sanctuary, Dalma Wildlife Sanctuary, Koderma Wildlife Sanctuary, Palkot Wildlife Sanctuary completed.

Documentation of Indigenous Knowledge of Plant Resources

- During this period three field tours to Jharsuguda, Angul and Kandhamal districts of the Orissa state were undertaken and 116 plants with 200 ethnobotanical uses from Jharsuguda, 195 plant species with 248 ethnobotanical uses



Fig-5. Bell Rhododendron, a wild species of Himalayan alpine region

from Angul district and 104 plant with 175 ethnobotanical uses from Kandhamal district were collected.

Studies of Nutritional Values of Wild Edible Plants of Meghalaya

- Analyses of the nutritional composition, mineral contents and antioxidant activity of the leaves of *Bauhinia purpurea*, *Clerodendron colebrookianum*, *Diplazium esculentum*, *Fagopyrum cymosum*, *Ficus clavata*, *Ficus geniculata*, *Ficus pomifera*, *Gentiana pedicellata*, *Oenanthe linearis*, *Sonchus arvensis*, *Zanthoxylum acanthopodium*, the fruits of *Docynia indica*, *Elaeagnus latifolia*, *elaegnus pyriformis*, *Flemingia vestita*, *Meynia laxiflora*, *Morus indica*, *Myrica esculenta*, *Myrica nagi*, *Perkia roxburghii*, *Prunus nepalensis*, *Solanum gilo*, *Solanum kurzii*, *Terminalia bellirica*, *Viburnum foetidum*, roots of *Houttuynia cordata*, *Potentilla lineate*, seeds of *Castanopsis indica*, *Gynocardia odorata*, *Perila ocimoides*, and the flowers of *Dillenia pentagyna* collected from different markets of Meghalaya state, India were carried out.

Ex-situ Conservation in Botanic Gardens

- Twenty eight plants of orchids (17 species), 100 plants of *Trachycarpus fortunei*, 15 plants of *Cycas rumphii*, five plants of *Cycas circinalis*, 36 plants of *Cycas beddomei*, four plants of *Cycas revolutea*, four plants of *Dion spinulosa*, one plant of *Encephalartos gratus* and one plant of *Ginkgo biloba* have been introduced in the Botanic Garden of Indian Republic, NOIDA
- Eighty nine rare plants collected from Assam, Meghalaya and Andaman & Nicobar Islands have been introduced in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah

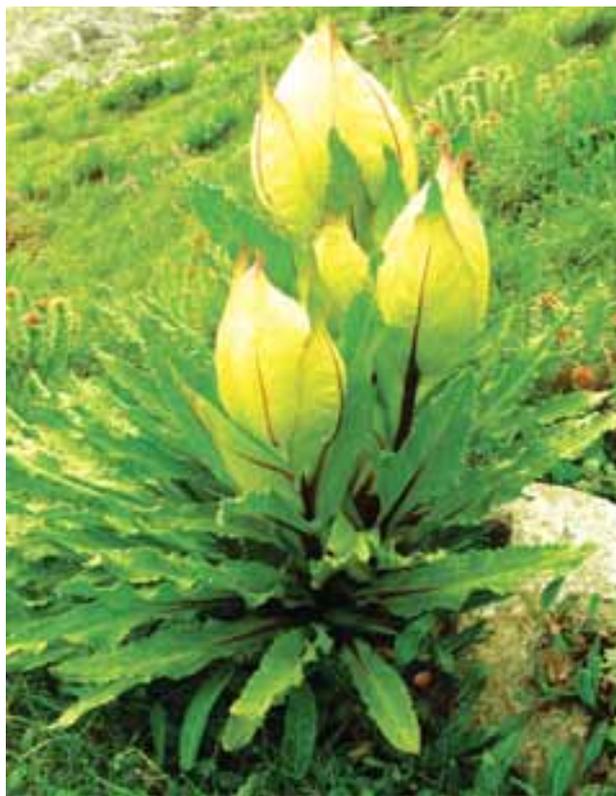


Fig-6. Saussuri obvallata (Brahma Kamal), sacred flower Himalaya

- Twenty five rare and endangered species have been introduced in other associated botanic gardens of different Regional Centres of BSI

Monitoring of Botanic Gardens

During the period BSI monitored the status of conservation of threatened species in the following botanical gardens under "Assistance to Botanic Gardens Scheme" funded by MoEF.

- Botanic Garden of KMCH College of Pharmacy, Coimbatore, Tamil Nadu
- Botanic Garden of Shi Prasakthi College of Women, Courtallam, Tamil Nadu
- Botanic Garden of Thanthai Hans Roever College, Perambalur, Tamil Nadu
- Botanic Garden of Assam Bio-Resource Centre of Assam Science & Technology, Assam
- Botanic Garden of Junagarh Agricultural University, Junagarh, Gujarat

- Botanic Garden of University of Agricultural Sciences, Srinagar, Jammu & Kashmir
- Botanic Garden of D. M. College of Sciences, Imphal, Manipur
- Twenty two proposals, received for funding under 'Assistance to Botanic Garden' scheme of MoEF, were reviewed.

Miscellaneous

Public Services rendered

- BSI disseminated scientific information to public and also assisted scientists, students and researchers in their pursuit of taxonomic research on plants. During the period scientists, students and visitors, including 19 VIPs, have visited the Botanic Gardens, Herbaria and Museums of BSI; 185 requests for information and supply of plant materials have been attended. Identified 180 plant materials and supplied 1125 pages of photocopied literature.

Report of the Indian Botanical Liaison Officer, Royal Botanic Gardens, Kew, UK

- Indian Botanical Liaison Officer identified

34 species for the botanists from India. The images of the type specimens of 68 species and photocopies of 21 protologues were provided to scientists of different institutes in India.

Maintenance and enrichment of Herbaria in Botanical Survey of India

- During the period 1258 specimens were mounted and 8,789 herbarium specimens were remounted. 20,359 herbarium sheets were dusted and fumigated. 14,268 herbarium sheets have been poisoned and 4,569 sheets have been incorporated in different herbaria of BSI.

Publication:

During the period BSI published the following books and Journals:

- Bulletin of BSI (Nelumbo), Vol.: 51; Vanaspati Vani, Vol. 19; Plant Discoveries 2009; Flowering Plants of India – Dicotyledons, Vol. 1; Indian Lichens – An Annotated Checklist; Vanaspati Anveshan 2009; Ferns and Fern- Allies of Sikkim.

– Scientists of BSI have also published more than 185 research papers in different peer reviewed journals in India and outside during the period.

Visit of Parliamentary Committees

– The Parliamentary Committee on Official language reviewed the status of implementation of official language in Arid Zone Regional Centre, Jodhpur on 9th February, 2010 and in Southern Regional Centre, Coimbatore on 22nd October, 2010.



Fig-7. *Callicarpa rubella*, an ornamental plant with flower



Fig-8. Amazon Blue - *Otacanthus caeruleus*, an evergreen shrub that blooms most of the year

Award Lectures

- Dr. M. Sanjappa, Director, BSI delivered the G. B. Deodikar memorial lecture at Agharkar Research Institute, Pune on 17th November, 2010 and Prof. A. R. Chavan Memorial lecture at M. S. University, Baroda on 17th December, 2010.
- Dr. D. K. Singh, Scientist 'F' delivered Probir Chatterjee memorial Lecture at Vishwa Bharti University, Santiniketan on 3rd December, 2010.

Revenue earnings

- During the period BSI earned ₹25,20,023/- through (a) Entry Fee, Car Parking and Outsourcing of Boating and Battery Driven Vehicle in AJC Bose Indian Botanic Garden, Howrah, (b) Sale of departmental publications and (c) identification of plant specimens and supply of photocopied literature, etc.

Survey of Fauna

Zoological Survey of India

Introduction and Objectives

Zoological Survey of India (ZSI),

established in 1916, is a pre-eminent research institution under Ministry of Environment and Forests. This institution is tasked with the survey and exploration of faunal resources of the country. The ultimate goal is the taxonomic identification and documentation of the country's biodiversity.

Primary Objectives

The current mandate of ZSI is survey, collection documentation (including the traditional knowledge associated with animals) and *ex situ* conservation of wild animal diversity of the country. High priority areas include:

- Digitization of present collections, preparation of fine scale distribution maps based on primary occurrence data and making it available in a searchable format.
- Publication of National and State faunas.
- Taxonomic studies, revisionary/monographic studies on selected animal groups.
- Identification of Red list species and species rich areas needing conservation and focus on data deficient species to collect more information on populations.
- Development of a National database of Indian animals including Museum specimens, live specimens, paintings, illustrations etc. and maintenance of already existing collections with modern facilities and as per international standards of collection management.
- Developing and maintaining Museums and using such facilities for conservation education for people especially students.

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Fig-9. Chital in Pench National Park

- *Ex situ* conservation of critically threatened taxa.
- Capacity building in taxonomy, nomenclature, specimen collection, preservation and maintenance through training programmes.

Secondary Objectives

- To establish a panel of experienced and active taxonomists and obtain their consent to participate in fauna project.
- To prepare annotated checklist of different groups of animals, museum collections, based on published documents giving local names if any with locality and habitat. Make available the electronic version of checklist to the general public; and circulate it among the panel of zoologists who would, in turn, check for omissions, ambiguities, localities and habitat through active consultation with other local zoologists.
- The State faunas are to be published electronically giving correct names, localities, habitats, sketches and photographs of important species on an interactive Fauna of India Website. This will act as an outreach programme for

all the biologists, and other interested public.

Activities undertaken during the year

Faunal Exploration & Inventorisation of Animal Diversity

Scientists of ZSI surveyed States, Union Territories, Biosphere reserves, Conservation Areas and made Status Surveys. A total of 129 surveys were carried out during the period under report from the areas stated below.

States and UT's	26
Biosphere Reserve	11
Conservation Area	32

In addition to the above 10 surveys were also carried out to find out the status of specified animal groups.

Some Important Research Studies undertaken

- Status survey of Chinkara and Desert cat in Gujarat.
- Status survey of Swamp Deer *Cervus duvaucelii* in Dudwa National Park (U. P.).
- Status survey of scheduled Mollusc, *Trochus niloticus* and *Turbo marmoratus* as per requirement of MoEF as well as Andaman and Nicobar Administration.
- Status survey of the Khasi Hills Rock Toad (*Bufoides meghalayana*) from Cherrapunjee, East Khasi Hills, Meghalaya.
- Animal Species in Convention and Act (an Ad-hoc assignment)
- Red-data book on the Fishes of India.
- Feasibility Study regarding re-introduction of Pygmy Hogs at Gorumara Wildlife Sanctuary, in Jalpaiguri district, West Bengal.



Fig-10. Barheaded Geese (*Anser indicus*) in their natural habitat

- All India net work programme on Blue tongue disease.
- Animal Fossil studies from Disang Group of rocks of Cenozoic era from Nagaland and from the Cretaceous rock beds of Narmada Valley, Madhya Pradesh.
- Studies on the fauna of cold desert of Ladakh.
- Studies on the fauna of Antarctica.
- Survey and monitoring the health of coral reefs of India (sponsored by MoEF).
- Diversity and distribution of coral and their associated fauna of Rani Jhansi Marine National Park (sponsored by MoEF).
- GIS based mapping and analysis of ecological variables of reefs around the little Andaman Island (sponsored by MoEF).
- Survey and Monitoring of Coral reefs of Andaman and Nicobar Islands (sponsored by Dept. of Environment and Forests, Andaman & Nicobar Islands).
- Lead Institution: Great Nicobar Biosphere Reserve (sponsored by MoEF).
- Studies on the faunal diversity of Great Nicobar Reserve (sponsored by MoEF).
- Census of spotted deer and birds in Mount Harriet National Park in collaboration with

MoEF and Andaman and Nicobar Administration.

- Study of impact of Lignite mining on fauna in Hadla Rawaletan, Hadla Bhatiyen and Mokha Lignite Mining Blocks District Bikaner (Rajasthan).
- Environmental impact assessment studies in Katchal and Teressa Islands for the construction of Jetty as requested by Port Management Board, Andaman and Nicobar Administration.
- Monitoring of Marine mammals stranding incidences.
- Study of Ecto-parasites in ornamental fishes.
- Study of Spawning of Horse-shoe crabs in captivity.



Fig-11. Peacock (*Pavo Cristatus*), our national bird

- Over 1000 point locations of endemic amphibians of the Western Ghats were georeferenced and preliminary mapping of 132 species were completed by Western Regional Centre, Pune and Western Ghat Regional Centre, Kozhikode (Calicut) and Study of DNA material for evolutionary studies.

- Collaboration with Centre for Cellular & Molecular Biology (CCMB)

Bone powder from the holotype of *Balaenoptera edeni* (a Whale species) and extinct Indian Cheetah *Acinonyx jubatus* were provided to CCMB scientists. In addition to this MOU made for molecular studies on birds.

- An MOU between ZSI/ANRC, Port Blair and Central Agricultural Research Institute (-CARI) (ICAR), Port Blair has been signed for the collaborative study on 'Marine Sponges Barcoding'.

Field tours with outside experts

- One of the scientists of ZSI participated in the butterfly survey of Aralam, and Malabar Wildlife Sanctuaries, Kottiyur Reserve Forest as well as the Thusaragiri, and Kakkavayal areas of southern Western

Ghats along with a team of butterfly experts including Dr. Krushnamegh Kunte of Harvard University, U.S.A

- A survey for amphibian studies was conducted in the Kempholay forests, Gundia and Charmadi Ghats of Karnataka along with a team of outside amphibian experts, in search of "Lost Amphibians".

Genus new to Science

- One new genus of order Hymenoptera identified.
- One new genus of order Arachnida discovered.

Species new to Science

- Two species of Protozoa, One species of Nematode, Six species of Trematodes, One species of Leech, Two species of Scleractinian corals, 54 species of Insects, Two Arachnids, Six species of Fishes, Five species of Amphibians are described as new to science.

Genus new to India

Fish Genus, *Brachysomophys* (Pisces: Ophichthidae) and *Anuorphorus* are recorded for the first time from India.

New Records to India

Eight species of Sponges, 95 species of Scleractinian corals, Five species of Gorgonids, 10 species of Nematodes, 43 species of Molluscs, 15 species of Polyclads, 13 species of Crustaceans, Six species of Echinoderms, Two species of Nemertean, 18 species of Insects, Nine species of Arachnids, Six species of Ascidians, 50 species of fishes



Fig-12. Red Panda (*Ailurus Fulgens*), needs conservation

and One amphibian species are recorded for the first time in India.

Species incorporated in the IUCN Red list

Fourty four species of Odonata, and 48 species of freshwater fishes were assessed by ZSI scientists and were incorporated in the IUCN Red List (www.iucnredlist.org).

Documentation of Animal Diversity

- Four hundred research papers/books have been published by ZSI scientists.
- Publication Division of ZSI published 38 books/Journals. Sale of departmental publication gone up to ₹6,50,000/-
- Dispatch of publications to exchange partners in India and Abroad /Regional Stations/H.Q./Book sellers up to 20,000 books.
- Mrs. Margaret Alva, the Hon'ble Governor of Uttarakhand released three volumes of the *Fauna of Uttarakhand* and a publication entitled '*Nematodes Associated with Insect Pests and Soil of Teak and Sal Forests of Dehra Dun*' in the auditorium of the Raj Bhawan at Dehra Dun.
- As required by the Ministry, a scholarly article on the 'Great Nicobar Biosphere Reserve An daman and Nicobar Islands' has been submitted for the publication in the 'Indian Biosphere Reserves: Progression during two decades of conservation'.

Electronic Documentation

The following have been electronically documented and hyperlinked with the departmental website www.zsi.gov.in.-

- Checklist of Diptera: Sphaeroceridae dealing with 63 species under 28 genera prepared. Advertisement call of the frog, *Raorchestes glandulosus*.



Fig-13. Nilgai (*Boselaphus tragocamelus*)

- Checklist of Orthoptera.
- Checklist of the Microlepidoptera of India
- Checklist on Sarcophagidae, Calliphoridae and Rhiniidae (Diptera: Insecta) of India.
- Videograph of the reddish burrowing frog.
- Videograph of the Red-necked Keelback snake.
- Videograph on Common Bronzeback tree snake.
- Videograph on Himalayan Marmot.
- Videograph on the freshwater eel, *Monopterus digressus*.
- Videograph on the Tibetan Wild Ass (Kiang)
- Advertisement call of the frog, *Pseudophilautus amboli*.
- Advertisement call of the frog, *Raorchestes bombayensis*.

In addition to the above a report on "Biodiversity and Status of Riverine Ecosystem

of the Western Ghats” for the Western Ghats Ecology Expert Panel, MoEF prepared and uploaded to <http://westernghatsindia.org/com>.

Miscellaneous

Public Services Rendered

- Zoological galleries of the Indian Museum at Headquarters Kolkata and of Regional Centres mainly Marine aquarium of ZSI Digha, Marine aquarium of MBC Chennai and Museum of Western Ghats Regional Centre (WGRC), Kozhikode attracted large number of students.
- The ZSI made its mark in the ‘Pride of India’ Exhibition 2010 by setting up a pavilion during the 97th Indian Science Congress at Thiruvananthapuram.
- An exhibition was set up by the Museum and Taxidermy Section of Headquarters at the International seminar on “Darwin and Human Evolution” on the occasion of 200 years of the birth of Charles Darwin and 150 years of the publication of the book “Origin of Species”, organised by the Asiatic Society, Kolkata.
- Scientists of ZSI delivered lectures at National, Regional and Local level to

create awareness about Animal Conservation.

- Zoological Survey of India celebrated the “95th Anniversary of Foundation Day of Zoological Survey of India”. During the celebration, a photography exhibition on biodiversity was organized by ZSI in collaboration with the Indian Museum, Kolkata.
- Information on Fauna of Conservation Areas in Chhattisgarh was provided to the Director, Rajiv Gandhi Institute of Media Technology, Jabalpur.

Maintenance and enhancement of National Zoological Collections

- Compact Insect Storage System installed in Headquarters and Regional Centers of ZSI. Valuable Zoological collections were added to the National Zoological Collections regularly.

Distinguished visitors

- The Honorable Union Minister for Environment and Forests, Shri Jairam Ramesh visited ZSI Headquarters and interacted with the staff of ZSI. On this occasion, the visiting dignitary released the following books. (i) Fauna of Nal Sarovar, Gujarat (ii) Annotated Checklist of Indian Land Molluscs (iii) Faunal diversity of Pong Dam and its Catchment Area (iv) List of valid Rodent Taxa from Indian Subcontinent including Myanmar.

– Dr. P. J. Dilipkumar, Director General of Forests and Special Secretary, Ministry of Environment and Forests, New Delhi visited different sections of the Headquarters office and



Fig-14. Indian Spot-billed Duck & Eurasian Coot

during his visit, following publications of ZSI were released. (i) Records of Zoological Survey of India, Vol. 109 Part 3 & 4. and (ii) A pictorial guide to Amphibians of North East India.

- Mr. Anuar Kasman, Consul General of Malaysia and his wife Mrs. Maryani Majeed accompanied by ten officials of the Consulate General of Malaysia visited the marine aquarium and marine museum of the Marine Biological Regional Centre, Chennai.
- Dr. Mark Wilkinson, Head of the Reptile, Amphibia and Fish Section of the Natural History Museum, London, visited Western Ghats Regional Centre (WGRC), Calicut to study the type specimens and other collections of caecilians (Amphibia) in the faunal holdings of the Centre.

Notable lectures by distinguished scientists

- Dr. Allan Kellehear, Professor of Sociology at the University of Bath, UK, an internationally known researcher and author in the social issues related to death, dying and palliative care, delivered a lecture on the topic of his specialization at WGRC Kozhikode. Dr. Allan Kellehear is also an active entomologist and had been the President of Australian Entomology Society for seven years.
- An eminent scientist Dr. J. H. Cooper, Bird Group, Department of Zoology, Natural History Museum, London, delivered a lecture on “Pigeon post: Contributions from India to Charles Darwin’s domestic bird research” at ZSI Headquarters.
- Prof Y. Ranga Reddy, Acharya Nagarjuna University Andhra Pradesh delivered lecture during one day seminar on Recent Trends in Taxonomy and Biodiversity conservation in India at ZSI, Kolkata.

Identification and Advisory Services

- Identification services rendered for several organizations specially on wild life material including crocodile skins, elephant’s tusks, sea cucumbers, fishes sharks and wild pigs. Forty one lots of seized wild life materials were identified at Headquarters Kolkata and report sent to the competent authority which were pertaining to different court cases. Advisory services were also provided to Researchers/Institutions as per their need, when ever required.
- Confiscated goods (foot wear) received from the Deputy Director, Wildlife Crime Control Bureau, New Delhi, were identified as articles made of Python skin.
- Two deer skulls with antlers received from the Forest Depart Govt. of West Bengal and two seized wildlife materials from the Maharashtra Police and a flat skin along its skull received from the crime Branch, Maharashtra were identified.
- Confiscated broken bony shells of the semi aquatic turtle *Melanochelys trijuga* (Schweigger), received from the



Fig-15. Painted Stork (*Mycteria leucocephala*) in search of prey

Deputy Conservator of Forests, North Goa Division, were identified and the report submitted.

- Confiscated meat and teeth samples of a crocodile were identified for the wildlife range of Little Andaman and the skin sample of crocodile identified for wild life range of Port Blair on request.
- Nine hundred thirty four bird skins received from the Crime Control Bureau, MoEF, Kolkata were identified.
- Two detained export shipment materials of molluscan shells received from the Regional Deputy Director, Wildlife Crime Control Bureau, Northern Region, New Delhi and a sample of molluscan shell received from Regional Deputy Director, Wildlife Crime Control Bureau, Eastern Region, Kolkata were identified.
- Confiscated Schedule-I holothurians,

Holothuria leucospilota (Brandt, 1835) and *Actinopyga mauritiana* (Quoy & Gaimard, 1833) and the confiscated fins of Schedule I shark, *Glyphis gangeticus* (Muller and Henle, 1839), was identified.

- Confiscated elephant tusks and six species of spiders were identified for Wildlife Division of Andaman and Nicobar Administration.
- Identification report on confiscated specimen of common Palm Civet, *Paradoxurus hermaphroditus* was rendered to forest officials of Kerala.
- Two deer skulls with antlers received from the Forest Dept., Govt., of West Bengal, two seized wildlife materials received from Maharashtra Police, and a flat skin along with skull received from the Crime Branch, Maharashtra for identification, were identified and reports submitted.
- Confiscated skins of saltwater crocodile *Crocodylus porosus* were identified, based on the requests received from the Deputy Conservator of Forest (WL), Port Blair and the Assistant Wildlife Warden, Little Andaman
- Dr. A.U. Choudhury, Honorary Chief Executive of the Rhino foundation for Nature in Northeast India visited the Mammal & Osteology section for study of Buffalo Horns.
- Eminent scientist Dr. Allen David and Dr. Kevin Smith from the Freshwater Biodiversity Unit, IUCN, Cambridge, U. K. visited the Mollusca section.
- Dr. Geraldine Veron and Dr. Andy Jennings from Museum National d'Histoire Naturelle, Paris, France,



Fig-16. Spotted Deer (*Axis axis*), needs proper habitat

visited to study the skin sample of the Malabar Civet.

Conferences/Seminars/Training Courses/ Meetings

ZSI scientists regularly organized and participated in various conferences, training programmes etc. The following are some among them.

- Training and extension division of ZSI, Kolkata organized 10 Training courses/ Lectures and celebrated International Days.
- On the occasion of Golden Jubilee Celebration of Desert Regional Centre (DRC), Jodhpur "National Seminar on Impact of Climate Change on Biodiversity and Challenges in Thar Desert"
- Scientists attended the training programme on "Technology Diplomacy" organized by the Consumer Unity and Trust Society (CUTS) Centre For International Trade, Economics and Environment at Jaipur.
- Dr. Ramakrishna, Former Director received the "Janaki Ammal Award for Taxonomy" from His Excellency Dr. A.P. J. Abdul Kalam, Former President of India.
- Scientists of Headquarters attended the International seminar on "Darwin and Human Evolution" organised by the Asiatic Society, Kolkata, and during this occasion, Dr. Ramakrishna, Director, Zoological Survey of India acted as the Chairperson of the fifth academic session.
- Scientists of ZSI participated in IUCN Western Ghats Freshwater Biodiversity Assessment evaluation workshop at Coimbatore, presented an overview on the faunal diversity of Northern Western Ghats before the IUCN World Heritage committee at Pune and represented ZSI for a consultation meeting on ecologically sensitive zones of Northern Western Ghats.



Fig-17. *Astropecten indicus*, commonly known as star fish

- Scientists of ZSI attended the training on "Technology Diplomacy" at New Delhi.
- A seminar on "Faunal Diversity and Climate Change" was organized at Headquarters, Kolkata. During this occasion a book entitled "*Biography and Bibliography of Dr. Thomas Nelson Annandale (1876 -1924)*" was released.
- On the occasion of the Golden Jubilee Celebration of DRC, ZSI, Jodhpur, a National seminar on 'Impact of climate change on biodiversity and challenges in Thar Desert' was organized
- A five member's team participated in "Bharat Nirman Jan Suchana Abhiyan" organized by Press Information Bureau (Ministry of Information & Broadcasting, Govt. of India), Jodhpur at Chohtan, District-Barmer, Rajasthan and DRC, Jodhpur received a Certificate of appreciation and Trophy.
- Scientists of ZSI attended the Trainers Training Program on SEM at Singapore.
- Scientists attended workshop on Conservation of river Dolphin and awareness campaign jointly organized by the Department of Forests and Environment, Govt. of Bihar and ZSI on the banks of river Ganga.

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Fig-18. Wild dogs, need protection

- *In situ* training for employing LIT method to monitor the health of the corals through SCUBA diving has been imparted to two forest dept. officials of Andaman & Nicobar islands.

Forest Resources and Survey

Survey and Utilisation (SU) Division

Survey & Utilization Division deals with the matter related to Forest Survey of India, Dehradun, Andaman & Nicobar Forest & Plantation Development Corporation Ltd., Port Blair, Export & Import of wood and wood products, Forest Certification, Sustainable Forest Management, Non-Timber Forest Products (NTFP) Management, International Tropical Timber Organization etc.

Beside the above, there is a plan scheme in SU Division - 'Strengthening of Forestry Division' under its administrative control. This scheme has five components which are as follows:-

- Forest Survey of India
- Network of Regional Offices
- National Forestry Data Base Management System (NFDMS)/ National Forestry Information System
- Sustainable Forest Management, Certification, Trade etc./ Certification

Programme for Wood and Non-wood Forest Resources

- National Coordinated Programme for Assessment of Non-Timber Forest Products Resources

Forest Survey of India

Introduction

Forest Survey of India (FSI) is a subordinate office of the Ministry of Environment & Forests, Government of India and is responsible for the national forest resource assessment. Established on 1st June, 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) and United Nations Development Programme (UNDP). 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. Major activities of FSI are 'Forest & Tree Cover Assessment' and Estimation of Growing Stock of wood within and outside the country's forests. FSI is also engaged in providing training to state forest department personnel in application of Remote Sensing & Geographical Information System (GIS) in forest resource assessment. The main objectives of FSI are as follows:

- To prepare a comprehensive State of the Forest Report (SFR) including National Vegetation Map (NVM) once every two years. It will also prepare thematic maps through use of remote sensing data with minimum essential ground-truth verification (most ground-truth verification would be done by the respective state governments) on a ten year cycle.
- To collect, store and retrieve necessary forestry and forestry-related data for national and state level planning and to create a computer based National Basic Forest Inventory System (NBFIS).

- To design methodologies relating to Forest Surveys and subsequent updating. This includes methodologies for
 - Vegetation mapping including thematic maps through use of satellite imageries / aerial photographs.
 - Ground-truth verification
 - Growing stock and volume assessment.
- To undertake work in regard to preparation of Forest Inventory in selected States /UTs on agency basis until establishment of their own resources survey units.
- To impart training in modern forest survey techniques to foresters at various levels of responsibility in the States/UTs/ Government of India.
- To advise the States/UTs on design and development of regional NBFIS.
- To support and oversee techniques/ inventory work undertaken by States/UT Forest Departments.

Major activities

The major activities of FSI are:

- Forest Cover Assessment every two years using Remote Sensing technology.

- Inventory of Forest and Trees Outside Forests (Rural & Urban areas).
- Methodology Design for carrying out various types of survey & inventory.
- Training and Extension
- Projects and Consultancies

Organizational Set-up

The Forest Survey of India has its headquarters at Dehradun. It has four zonal offices which are located at Shimla, Kolkata, Nagpur and Bangalore. The organisation is headed by a Director General; assisted by two Joint Directors at the headquarters who are responsible for the National Forest Data Management Centre (NFDMC) and the Training & Forest Inventory (TFI) respectively. There are Deputy Directors, Assistant Directors and other technical & ministerial staff. Each zonal office is headed by a Regional Director supported by Deputy Director(s) and other technical & ministerial staff. The Headquarters as well as the zonal offices work in close coordination to carry out the various mandated and additional activities of FSI.

Besides administration and overall control, the activities at the headquarters includes forest cover assessment, producing maps, designing methodology for national inventory, data processing, producing State of Forest Reports, conducting training, coordination and monitoring the activities of Zonal offices. The major activity of the zonal offices is field inventory. In a phased manner the zonal offices are also being assigned the work of forest cover mapping.

The Forest Survey of India, with its four regional centres located at Shimla, Kolkata, Nagpur and Benghaluru has



Fig-19. Semi-deciduous forest in Sikkim

continued the mandated activities of this organisation viz. assessment of the forest cover on a two-year cycle and publishing the findings in the India State of Forest Report; Inventory of forest and trees outside forest; imparting training to forestry personnel in the field of application of Remote Sensing/ GIS/GPS in forest resource assessment; conducting special studies and other R&D works.

Forests & Tree Cover

Forest Survey of India (FSI) assesses forest cover of the country by interpretation of satellite data on a two-year cycle and presents the information in the form of 'India State of Forest Report'. With the release of the 'India State of Forest Report 2009' so far 11 cycles of forest cover assessment have been completed since 1987. Work for the 12th cycle is underway. Over the years, with the advancement of technologies of image processing and data quality of remote-sensing, the methodology of forest cover assessment has improved to provide more accurate data products for better operational management and planning. In addition to forest cover, assessment of tree cover of the country is also being carried out using the Trees Outside Forest (TOF) inventory data.

Over the years the scale of interpretation has improved from 1: one million (SFR 1987) to 1:50,000 bringing down the minimum mappable area to one hectare from 400 ha. The spatial resolution of the sensor has come down from the coarse resolution of 80 m x 80 m to a fine resolution of 23.5 m x 23.5 m. The improvement of scale of interpretation and sensor resolution on one hand means increased capability in delineating smaller and smaller areas of forests (and blanks inside forests) on the other hand, a multiplication of work load for the technical personnel of FSI.

Forests & TOF inventory

Inventory of forests and Trees Outside

Forests (TOF) is the second major activity of FSI. Forest growing stock (wood volume) has traditionally been a key indicator of forest wealth and its estimation has formed a major activity of forest resource assessment/inventory. In India, systematic forest inventory began in 1864 when the preparation of working plan started and has remained central to the forest management at divisional/district level.

After the creation of the FSI the field inventory remained the primary activity with a modified design covering the whole country. The total forest area inventoried until the year 2000 was about 69.2 million ha which included some areas inventoried twice. Thus, more than 80 percent forest area of the country was inventoried comprehensively in a period of 35 years.

A new National Forest Inventory (NFI) has been designed and adopted by FSI since 2002. The country has been divided into 14 physiographic zones and 60 districts randomly selected from these zones on probability proportional to size are inventoried in two years. About 8,000 sample plots are laid in forest areas distributed over the country in each cycle for field inventory. It has now been possible to generate a national estimate of growing stock on a two-year cycle. The first such estimate was published in 'SFR 2003'. As per design the accuracy of the estimate in subsequent cycles will improve by integrating the data of previous cycles. In addition to inventory of forests, Trees Outside Forests (TOF) resources are also inventoried concurrently to provide a national estimate of growing stock of TOF on a two year cycle. In this case also about 8,000 sample plots are laid out in TOF areas. In the recent past TOF resources have gained importance because of their increasing role in meeting the needs of wood based industries and society. A total target of 30 districts have been fixed for inventory of forest and TOF to be completed during the year 2010-2011.

Training

Forest Survey of India (FSI) has been imparting training since 1981 to forestry personnel through short term courses (one/two weeks) on the modern techniques applied in forest inventory and surveys. During the current financial year, 163 personnel from the various State Forest Departments have been trained in the training courses run by the FSI till 31st December, 2010 on the following themes. Since its inception, more than 3,300 forestry personnel from State Forest Departments have been trained at FSI. FSI has also trained about 500 forestry personnel at various outreach customized training courses for the State Forest Departments

- Application of Remote Sensing and GIS in Effective Forest Planning and Management
- Application of Remote Sensing and GIS in Working Plan Preparation
- Advanced Course on Application of GIS in Forest Resource Management
- Inventory Techniques, Image Processing and GIS Applications in Forestry
- GPS in Forest Surveys & Demarcation

Projects

In addition to the above, during the period of this report, the FSI is also working on various projects assigned by Government of India, some of which are as follows.

- National Forest Type Mapping
- Monitoring of Area Coverage & Survival Percentage of Plantations/ Afforestation under National Afforestation Programme (NAP)
- Mapping of change in land use in Aravalli hills of Haryana
- Assessment of Coral Reefs in India
- Near real time monitoring of active Forest Fires using MODIS Web Fire Mapper

- Analysis of eligibility of lands for afforestation and re-afforestation projects under Clean Development Mechanism (CDM)
- Assessment of Mangroves in India
- Coastal Zone Studies project

Major Achievements

GDP for Forestry and Logging sector

The GDP estimates on 'current prices' for the "Forestry and Logging" sector was ₹29,069 crores for the year 2007-08 which was 0.67% of the total GDP of the country. The main share (about 84.4%) was attributed to fuelwood which was properly estimated by National Sample Survey Office (NSSO) for household sector, industrial wood (about 9.8%) and MFP (about 5.8%) were contributing very less.

The quick estimates of GDP released by National Accounts Division of Central Statistical Organization (CSO) on 29th January, 2010 shown a sharp rise in GDP estimates of the sector at 'current prices' as ₹88,000 crores for the year 2008-09 (on this basis CSO has revised estimates of earlier years also) which is 1.70% of the total GDP of the country. This is because the contribution of 'Trees outside forests' could now be quantified by FSI. Proper estimation of 'timber from TOF' and 'fodder from forests' has increased the contribution of the sector from 0.67% to 1.7%.

Forest Fire Monitoring

It is an ongoing service, which started in November 2005. Under the service, forest fire data generated by MODIS satellite system is overlaid on the forest cover map made by interpretation of satellite images. The coordinates of the forest fire points are listed and uploaded on the FSI website (www.fsi.nic.in). In March 2010 an sms/email alert service was launched under which if any internet user gets registered on the FSI website

with mobile number and email address then the user gets an sms/email alert every day summarizing the forest fire points detected in his area of interest in the last 24 hours. The service has been received well and preliminary feedback suggests over 95% accuracy level.

Biomass Study

This study was conducted as a part of National Communication-II (NATCOM-II). The national forest inventory data gives only growing stock of all trees above 10 cm dbh and branches upto five cm dbh. Thus, the biomass and consequently the carbon stored therein is available only for such trees. This leaves aside the biomass of foliage of trees above 10 cm dbh, biomass of all trees below 10 cm dbh, biomass of shrubs, herbs and climbers, dead wood and litter. To estimate this missing component of biomass, FSI has launched a special study in 14 districts, one each from all 14 physiographic zones. The desired data has already been collected and processed. The results of this study were combined with National Forest Inventory estimates to develop estimate of total biomass in the India's forests. The preliminary estimate of total biomass in India's forest is 6,709 million tonnes. Out of this, 4,785 million tonnes comes from plant lives above ground, 1,509 from below ground and 461 million tonnes from dead trees.

Carbon Estimation

This work is being conducted under NATCOM-II in collaboration with NFDMC Unit of FSI. Using forest cover layer and forest type layer, thirty strata have been identified. In these strata, the forest inventory points were marked by overlaying. For each strata, biomass factor for different components have been estimated

using forest inventory and biomass study mentioned above. Using the carbon content percentage, the biomass is converted to carbon and the total carbon stock in India's forest has been estimated. The preliminary estimate indicates that total carbon stock in India's forest is 7,328 million tonnes.

Global Forest Resource Assessment 2010

Food and Agriculture Organization (FAO) carries out assessment of global forests in every five years based on country reporting system. For India, Forest Survey of India is the nodal agency for compilation and sending the country's data to FAO in the prescribed formats. FSI has already sent the country report to FAO for FRA 2010.

CEC Assignments

The Central Empowered Committee (CEC) of Hon'ble Supreme Court on India assigned the task of mapping the mining areas of Aravali hills of Haryana to the Forest Survey



Fig-20. A view of Temperate Forests in Arunachal Pradesh

of India. The work assigned from time to time, till date has been completed.

Financial details for 11th Plan Period

Under the scheme Survey and Utilization of the Forest Resources, the approved outlay for 11th Plan period is ₹28.60 Crore.

'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 labelled 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.

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 under the Chairmanship of Prof. Maharaj Muthoo, Ex-Executive Director, FSC with the approval of Hon'ble MOS (F&WL).

Six meeting of the above committee was held during the period from 2008 to 2010 has already held. In the last meeting, it was decided that Chairman will submit a report on forest certification. The Chairman has submitted his report. As per the report, it is recommended to establish a multi-stakeholder

non-State Indian Forest Certification Council with due policy and resource support of the Govt. *ab-initio*. The goal should be focused on adopting an appropriate Certification Scheme in order to delay no more to get into the arena of forest certification and to holistically leverage the forest and related resources, products and services through a full-fledged sustainable forest management certification system in place.

Further, it is also stated in the report that Forest Certification governing body is to be established with a clear mandate to develop and govern the Indian scheme. Resources should be guaranteed for the start-up period in the form of corpus fund or seed money & after few years should be self-financing. The institutional mechanism should be such that there is ready access to existing knowledge in the country on the development of standards and scheme governance, sovereignty for the forest certification board and its stakeholders, equitable choice of the members of the governing board from the government and non-governmental organization, civil society including academic and research institutions, eminent persons with expertise and knowledge of forest certification, apart from representatives from industry, traders, local communities and forest dwellers. India has taken steps to develop its own national certification scheme which will be fully governed in India and "owned" by Indian stakeholders. Not only this guarantees India and Indians that they will be making decisions about their forests and related resources, but also that they will be mutually recognized partners to other certification schemes rather than a "subsidiary" or a "branch" of an international organization. The report has been submitted to the Ministry for its consideration.

The report has submitted the following decision for consideration of MoEF:

- Setting up of an Indian Forest Certification Council, as a non state multi-stakeholder independent entity.

- The Government of India may consider to provide corpus core funding which could be around ₹10crores.
- Meanwhile
 - A suitable organization may be assigned to host the Secretariat of the proposed IFCC at the earliest and initiate work for setting up of the National Forest Certification Scheme.
 - The NFCC Core Group, duly re-nominated, based on its expertise may continue to facilitate the process of setting up IFCC and NFCS related work.

The above report was circulated to all the State Forest Departments to furnish their comments on the report. Further, the Ministry has also constituted a Core Committee under the chairmanship of Director General of Forests & Special Secretary in the Ministry to undertake one-on-one consultation with stakeholder and firm up the concept of the envisaged Indian Forest Certification Council.

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. In the current year, a National Preparatory Workshop for Forestry Information System was conducted by Centre for Forest and Natural Resource Management Studies, Government of Andhra Pradesh at Dulapally, Hyderabad on 8th & 9th April, 2010 to exchange and document the information and knowledge gained by Government of India and State Forest Department and prepared a detailed proposal for implementing

NFIS in the framework of the approved 11th Plan with the financial help of Ministry of Environment & Forests. In this workshop all the state representative had participated.

In the current year, the Ministry has also reviewed the progress of the project proposal 'Survey of Status, Current Utilization and Potential for Sustainable Utilization of Biodiversity resources in Andaman & Nicobar Islands' sanctioned to Andaman & Nicobar Islands Forest & Plantation Development Corporation Ltd. (ANIFPDCL), Port Blair. Further, the balance amount of ₹20.64 lakhs was also sanctioned to Andaman & Nicobar Islands Forest & Plantation Development Corporation Ltd. (ANIFPDCL), Port Blair for carry out the balance work of above project proposal.

National Coordinated Programme for Assessment of Non-Timber Forest Products Resources

A Committee was constituted under the Chairmanship of Inspector General of Forests (NAEB), Ministry of Environment & Forests for evolving a mechanism for Minimum Support Price to the collectors of NTFP's. After due deliberations & consultations with stakeholders involved in NTFP's sector, the committee has submitted a report identifying the issues and future course of action. In the report, it has been proposed that for overall coordination of issues relating to NTFP, a national body should be constituted which, apart from policy and programmatic initiatives may provide financial resources for the management and development of the NTFP sector. An apex level body set up at the national level would help and guide the NTFP sector through the critical phase that it is passing through. The Ministry had circulated the report to concerned stakeholders and a meeting was convened on 24th July, 2009. In this meeting, the representative from Agricultural and Processed Food Products Export Development Authority (APEDA), Chhattisgarh Minor Forest Produces

(MFP) Federation, Chhattisgarh Rajya Van Vikas Nigam, Winrock, FRI were present. In this meeting, it was decided that the discussion in the matter would be carried forward by involving all concerned stakeholders

The Ministry during the current year has sanctioned a project proposal on "National Study on Commercial Production of Non Timber Forest Products for Ensuring Fair Returns to Primary Collectors" to Forest Research Institute, Dehradun. A total amount of ₹11.66 lakhs was sanctioned for the above project during the current financial year. This project will help to prepare a database for nationalized and non nationalized (commercial) NTFP at the national level within a time frame of two years.

The Ministry organized a meeting on 16th June, 2010 under the chairmanship of Dr. P. B. Gangopadhyay, ADG (FC) to discuss various issues related to NTFPs. The Ministry held another meeting on 9th August, 2010 under the chairmanship of Dr. P. B. Gangopadhyay, ADG (FC) to discuss various issues related to NTFPs. In this meeting regarding minimum support price it was decided that this will have to be state specific, MFP specific and even season specific. The basic objective should be to protect the collector from the exploitation of various level intermediates and the fair price should be ensured to them. Hence, unlike agricultural produce, no national level fixation of Minimum Support Price (MSP) is advisable for Minor Forest Produces (MFP). It has to be decided by the state organizations or Government. A national level body of NTFP is needed to give state specific, commodity specific support in case of loss in MSP operation in MFP. The Ministry with the approval of Hon'ble Minister of Environment & Forests has issued advisory to AS/PS Department of Forests, Govt. of Andhra Pradesh, Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Chhattisgarh, West Bengal, Orissa and Uttar Pradesh regarding management of NTFPs.

Export & Import of forestry products and Tariff structure 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. The Core Group has recommended that certain items under ITC (HS) classification to be removed from the Negative List for the purpose of import and retained a few items under the sensitive (Negative List) necessary to safeguard the interest of farmers of agro-forestry and farm-forestry in particular and the overall health of the Forestry Sector in general. Moreover, the decisions regarding the tariff structure are being taken in view of the country specific bilateral/multilateral trade negotiations keeping the environmental and ecological sensitivity of the items under the ITC (HS) Codes on top priority.

The Division also deals with the issue of No-Objection Certificate (NOC) for grant of export license for export of wood and wood products for the application received through Directorate General of Foreign Trade, New Delhi. This includes Sandalwood, Red Sanders etc.

International Tropical Timber Organization (ITTO)

The International Tropical Timber Organization (ITTO) was established during 1983 and is governed by the International Tropical Timber Agreement (ITTA). The ITTO is a commodity organisation bringing together the producer and consumer member countries to discuss and exchange information and develop policies of all aspects of the World Tropical Timber Economy. The

Headquarter of ITTO is at Yokohama, Japan. There are 59 member countries, out of which 33 are Producer member countries and 26 Consumer member countries. India belongs to the group of the producing member countries. The ITTO's membership represents 90% of world trade in tropical timber and 80% of the world's tropical forests.

- 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.
- The International Tropical Timber Agreement (ITTA), 1994 is being replaced by a successor agreement, i.e. the ITTA 2006. India as a signatory to ITTA 1994 has ratified and deposited the instrument of ratification with the UN Secretary General in New York on 25th July, 2008.

International Tropical Timber Council (ITTC)

- The governing body of the ITTO is the International Tropical Timber Council, which is composed of all the organization's members.

The council is supported by four Committees namely:-

- Committee on Economic Information and Market Intelligence
- Committee on Reforestation and Forest Management
- Committee on Forest Industry
- Committee on Finance and Administration
- The 46th session of the International Tropical Timber Council (ITTC), the governing body of ITTO was held at Yokohama, Japan during 13th-18th December, 2010 and was attended by Sh. R. K. Goel, Inspector General of Forests and Sh. A. M. Singh, Deputy Inspector General of Forests as Indian delegates. Sh. A.M. Singh DIG (SU) has been nominated as member of the Expert Panel of ITTC for a period of two years after a consensus of Asian Producer Countries.

Sustainable Forest Management (SFM) Cell

- Sustainable Forest Management of Forests



Fig-21. Mixed vegetation at Kolasib, Mizoram

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 and is a signatory to the "Objective 2000" of the ITTO.

Committed to the goal of achieving Sustainable Forest Management, a National Task Force was constituted in November, 1999 by Government of India as Bhopal-India process. This recognized eight Criteria & 43 Indicators. The National set of C&I was refined in the year 2005 based on field experiences. Thereafter 8 Criteria & 37 Indicators have been adopted during the year 2008 for monitoring the directions of change at National level. These are suitable to all forest types and situation within the country and specifically designed for implementation and monitoring at local Forest Management Unit (FMUs).

In pursuance towards achieving sustainable forest management in the country, the following actions have been undertaken by the Government:-

- An SFM Cell has been constituted in the Ministry of Environment & Forests, Government of India. This would act as Nodal Body for policy matter at the Central level.
- An SFM Cell has also been created in all the State Forest Departments on the similar lines of Central level 'SFM Cell' headed by Working Plan in the respective States / UTs.

As per the decision taken in the second meeting of SFM Cell in the Ministry, in which all the members of the SFM Cell and the representatives from various State Forest Departments participated. The following four teams had been constituted:-

- 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 Ministry has sanctioned the following projects to Indian Institute of Forest Management, Bhopal:-

- Preparation of Criteria & Indicators for Sustainable Forest Management of Plantation in India
- Pilot Testing of the National Set of Criteria & Indicators for Sustainable Forest Management (SFM) in India.
- Development of Criteria & Indicators for Sustainable Management of Non-Timber Forest Produce (NTFP)

The final meeting to discuss the draft report of C&I for SFM has been conducted on 26th & 27th November, 2010 at IIFM, Bhopal in which PCCFs of various states and senior officials of the MoEF has participated. The

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report is in its final stage which will be submitted to Ministry by 31st March, 2011.

In addition to the above, another project was sanctioned to Forest Research Institute, Dehradun regarding revision of National Working Plan Code. Projects on estimation of Biomass, Role of wood carving, bamboo etc. have also been sanctioned to FRI, Dehradun.

During the current year the progress report of the above project was received from the concerned organization and same was reviewed in the Ministry.

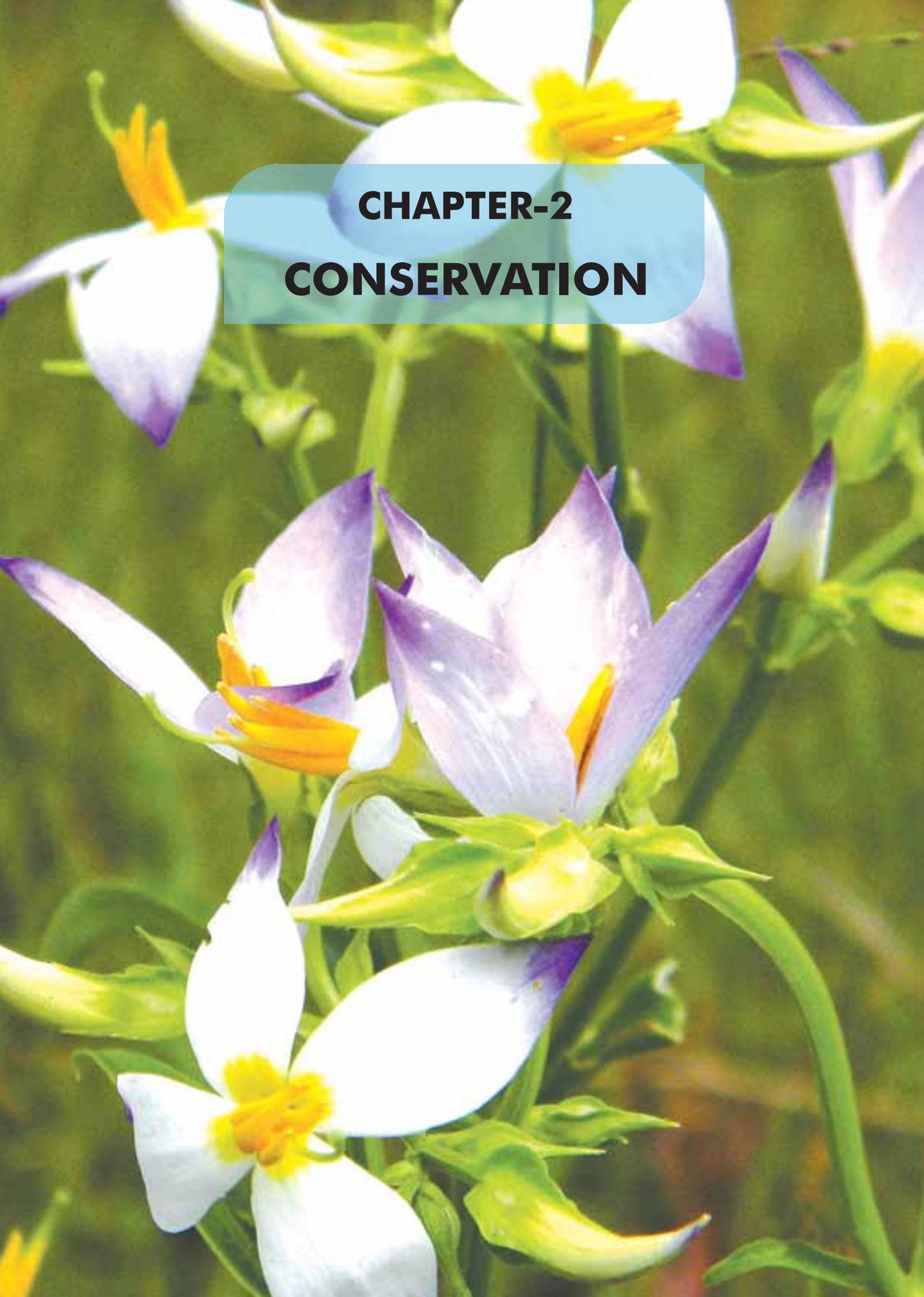
Andaman & Nicobar Islands Forest and Plantation Development Corporation Ltd.

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) and (iii) Katchal Rubber Project (KRP) in operation.

It is 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 2010-11, an amount of ₹11.00crore has been sanctioned and released to ANIFPDCL as an interest bearing loan for making payment of salaries, wages, etc. 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 VRS to its employees and closure of loss making units. After due examination, a committee under the Chairmanship of the PCCF and Secretary (Forests), Andaman & Nicobar Islands was constituted to look into matter and submit a self contained proposal regarding the revival of the Corporation. The Committee has submitted its detailed report to the Chief Secretary, Andaman & Nicobar Administration.

To solve the long pending issues about the future of ANIFPDCL, Port Blair, a meeting was called on 28th April, 2010 in the Ministry under the chairmanship of DGF&SS and issues regarding revival / restructuring of ANIFPDCL were discussed with PCCF and Secretary (Forests), A&N Administration and the Managing Director, ANIFPDCL along with the Senior Officers of the Ministry. In meeting, it was decided to put up a Cabinet Note containing the proposal of pay revision of the employees of the Corporation as also the closure plan for the Corporation. Accordingly, a draft Cabinet Note has been prepared and circulated after approval of Hon'ble MEF among the concerned Ministries for furnishing their comments. Draft Cabinet Note was also submitted to Integrated Finance Division (IFD) of the Ministry who has desired to prepare EFC Memo for the Cabinet Note. EFC memo has been prepared & submitted for necessary approval. As soon as the EFC Memo got approved, Draft Cabinet Note will be submitted to the Cabinet Secretariat for their approval.



CHAPTER-2
CONSERVATION

Environmental Conservation

Scheme on Conservation and Management of Mangroves & Coral Reefs

Introduction and Objectives

The Ministry of Environment & Forests is at the forefront in regard to conservation and management of mangroves & coral reefs. It accords high priority to the conservation and management of mangroves and coral reefs in the country.

Mangroves are plants that survive high salinity, tidal regimes, strong wind velocity, high temperature and muddy anaerobic soil – a combination of conditions hostile for other plants. The mangrove ecosystems constitute a symbiotic link or bridge between terrestrial and marine ecosystems. They are found in the inter-tidal zones of sheltered shores, estuaries, creeks, backwaters, lagoons, marshes and mud-flats. Mangrove vegetation has been reported in all the 12 coastal States/UTs. India is home to some of the best mangroves in the world. West Bengal has maximum mangrove cover in the country followed by Gujarat and Andaman & Nicobar Islands. However, not all coastal areas are suitable for mangrove plantation as mangrove requires an appropriate mix and saline & freshwater, and soft substrate like mudflats to be able to grow and perpetuate. The Government has identified 38 mangrove 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.

The Government seeks to sustain mangroves in the country by both regulatory and promotional measures. The Coastal Regulation Zone Notification (1991), as amended subsequently, recognizes the mangrove areas as ecologically sensitive and categorizes them as CRZ I(i), which implies that these areas are accorded protection of the highest order. The CRZ Notification, 2011 replaces and codifies the 25 amendments that were made to CRZ Notification, 1991, between 1991-2009. Under the promotional measures, as said before, the Government has identified 38 mangrove areas on a country wide basis for intensive conservation and management. During the financial year 2009-10, a sum of ₹7.10 crores were released to various Coastal States/UTs under the Centrally Sponsored Scheme for conservation and management of mangroves.

Mangroves

As per the biennial assessment done by Forest Survey of India since 1987 using remote sensing, the mangrove forests in the country have not undergone any large-scale destruction Table-2. On the contrary, many States/UTs have actually registered an increase. As would be noted, the latest assessment of Forest Survey of India (2007) shows that mangrove cover in the country is 4,639 sq km which is 0.14% of the country's total geographical area.

Compared with 2005 assessment, there has been an increase of 58 sq km in mangrove cover mainly because of the plantations and protection measures in the States of Gujarat, Orissa, Tamil Nadu and West Bengal mainly due to activities under the MoEF's Centrally Sponsored Scheme on Conservation & Management of Mangroves. Decrease in mangrove cover in Andaman & Nicobar Islands is attributed to after effects of tsunami.

Table-1. Mangroves Sites in India

State/Union Territories	Mangrove areas
West Bengal	1. Sunderbans
Orissa	2. Bhaitarkanika 3. Mahanadi 4. Subernarekha 5. Devi-Kauda 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 Andamans 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

2

Table-2. State/UT-wise Mangroves cover in India

(Area in km²)

S. No.	State/UT	Assessment Year										
		1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007
1	Andhra Pradesh	495	405	399	378	383	383	397	333	329	354	353
2	Goa	0	3	3	3	3	5	5	5	16	16	17
3	Gujarat	427	412	397	419	689	901	1031	911	916	991	,046
4	Karnataka	0	0	0	0	2	3	3	2	3	3	3
5	Kerala	0	0	0	0	0	0	0	0	8	5	5
6	Maharashtra	140	114	113	155	155	124	108	118	158	186	186
7	Orissa	199	192	195	195	195	211	215	219	203	217	221
8	Tamil Nadu	23	47	47	21	21	21	21	23	35	36	39
9	West Bengal	2,076	2,109	2,119	2,119	2,119	2,123	2,125	2,081	2,120	2,136	2,152
10	A&N Islands	686	973	971	966	966	966	966	789	658	635	615
11	Daman & Diu	0	0	0	0	0	0	0	0	1	1	1
12	Puducherry	0	0	0	0	0	0	0	0	1	1	1
	Total	4,046	4,255	4,244	4,256	4,533	4,737	4,871	4,482	4,448	4,581	4,639

In nutshell, there was an increase of 55 km² in mangrove cover of Gujarat, 16 km² in West Bengal, four km² in Orissa and three km² in Tamil Nadu. However, there was a loss of 20 km² in Andaman and Nicobar Islands, due to the effect of tsunami in December 2004. Table-3.

In general, the mangroves in India are well protected, due to the efforts of Government of India. In fact, India is one of the very few developing countries where mangrove cover continues to increase. This clearly reiterates our belief that rapid economic growth need not come at the cost of protection and growth of our core ecological assets. The Forest Department of Gujarat (Range Forest Office, Khambhat) has bagged the Indira Priyadarshini Vrikshamitra Award for 2008 in the institutional category for mangrove plantations.

Mangroves play an important role in coastal ecology and protecting the 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 are to help the coastal State Governments/Union Territories in rehabilitation of degraded Mangrove Areas and enhance Mangrove cover by replantation 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. 100% 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 & awareness.

On an average, an annual target of 3,000 hectares on a country wide basis. The areas supported are among the 38 areas as already identified by MoEF for intensive

Table-3. Mangroves cover in India as per State of Forest Report 2009(Area in km²)

Sl. No.	States/UT	Mangrove Cover (2007)	Change w.r.t. 2005 assessment
1.	Andhra Pradesh	353	-1
2.	Goa	17	+1
3.	Gujarat	1046	+55
4.	Karnataka	3	0
5.	Kerala	5	0
6.	Maharashtra	186	0
7.	Orissa	221	4
8.	Tamil Nadu	39	3
9.	West Bengal	2152	16
10.	Andaman & Nicobar	615	-20
11.	Daman & Diu	1	0
12.	Pondicherry	1	0
	Total	4639	58

conservation. During 2009-10, financial assistance to the tune of ₹7.10/- crores has been distributed among West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa and Gujarat for Conservation & Management of Mangroves in these coastal States.

The project entitled “Mangroves for Future (MFF): a strategy for promoting investment in Coastal Ecosystem Conservation” is being coordinated by the International Union for Conservation of Nature (IUCN) and Natural Resources covering, initially, eight 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. Till date, India has a total of nine small grant projects (six completed and three ongoing projects). The details are provided in (Table-4).

In addition to the above, India also has a large grant project in the Sundarbans Mangroves with the West Bengal Forest Department for 300,000 USD. The project is under formalization and the focus of the project is the reduction in anthropogenic pressures on the mangrove forest resources through the provision of alternative livelihoods and income generating options and seeks to pilot disaster preparedness initiative and reduce the risk of damage to lives and livelihoods



Fig-22. Mangroves, home of variety of species, need conservation

from flooding and other related natural disasters that the area is prone to. Institutional building/strengthening is also a key component of the project.

India also participated and presented the MFF India activities and achievements for 2010 in the recently concluded Regional Steering Committee 7 held in Colombo between the 1st and 4th of November 2010. Dr. V. Selvam, MSSRF and Mr. Satish Trivedi of TCSRDR participated in this meeting.

The children's book on mangroves titled "Mangroves - Soldiers of our Coast" and a document on MFF India activities titled "Resilient Coastal Ecosystems" have been duly prepared under the MFF (India) programme.

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 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 & 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.

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) is a partnership among governments, international organization, and non-governmental organizations throughout the world. India participated in the ICRI General Meeting in Monaco during 12th to 15th January, 2010.

Table-4. Nine Small Grant Project Under (UCN-MCF(India))

Name of the Project	Institution	Grant Amount (USD)	Current Status
Sustainable Coastal Livelihood: Integrated Mangrove-Fishery Farming System	M.S. Swaminathan Research Foundation, Chennai, Tamil Nadu	25000	Completed
Status of Shelter Belts in Southern India Coastal line	Environment Protection Training & Research Institute, Hyderabad, Andhra Pradesh	24500	Completed
Mangrove Conservation and Regeneration at Mithapur	Tata Chemicals Society for Rural Development, Mithapur, Gujarat	8000	Completed
Critical Evaluation of Alternate Livelihood Programmes Implemented for Reducing Dependence on Sundarbans Mangroves and Its Eco-system	Sundarbans Biosphere Reserve, West Bengal	15000	Completed
Study of floristic diversity and natural requirement of mangrove species in selected mangrove habitats of south Gujarat	Gujarat Ecological Education and Research Foundation, Gandhi Nagar, Gujarat	15000	Completed
National brainstorming workshop on current status, threats and conservation measures of coral reefs in India	Suganthi Devadason Marine Research Institute, Tamil Nadu	12000	Completed
Mangrove restoration and afforestation: Participatory assessment of current practices	M.S.Swaminathan Research Foundation, Chennai, Tamil Nadu	16000	Ongoing
Demarcation of area for edibility and non edibility of edible bivalves in region influenced by Mangrove habitats along central west coast of India (CWCI) by determination of trace metal concentration in it and action thereof	National Institute of Oceanography, Goa	12000	Ongoing
Sustainable freshwater Aquaculture in mangrove dominated Indian Sundarbans	Department of Marine Science, University of Calcutta, Kolkata	12000	Ongoing

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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 on 29th – 30th March 2010. 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



Fig-23. Damsels, marine ornamental fish, stay close to coral formation

- 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.
- A National Training Programme for Conservation of Mangroves for Managers and Researchers held from 1st to 5th April, 2010 sponsored by MOEF at GEER Foundation, Gandhinagar, Gujarat. Over 30 foresters and researchers were trained.
- Further, a Regional Training Course on Project Cycle Management for 37 participants from 10 countries under MFF Programme in November, 2010 was held at Chennai.

Biosphere Reserves

Introduction and Objectives

Biosphere Reserves are areas of terrestrial and coastal ecosystems which are internationally recognized within the framework of Man and the Biosphere (MAB) programme of UNESCO. 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 the 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 these representative landscapes and their immense biological diversity and cultural heritage, foster economic and human development 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. The aim is to designate one representative site as Biosphere Reserve in each of the Bio-geographic regions for long term conservation.

Activities undertaken

The programme was initiated in 1986 and till date, 17 sites have been designated as Biosphere Reserves (BRs) in different parts of the country. Some potential sites have also been identified. The Ministry provides financial assistance to the concerned 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 the apex body to oversee the programme, provide policy guidelines and review the programme.

Out of the 17 Biosphere Reserves designated nationally, so far seven viz., Nilgiri (Tamil Nadu, Kerala and Karnataka); Gulf of Mannar (Tamil Nadu), Sunderbans (West

Bengal), Nanda Devi, (Uttarakhand), Pachmarhi (Madhya Pradesh), Similipal (Orissa) and Nokrek (Meghalaya) have been included in the World Network of Biosphere Reserves of UNESCO. The nominations in respect of Khangchendzonga (Sikkim), Great Nicobar (Andaman & Nicobar Islands) and Achanakmar & Amarkantak (Chhattisgarh & Madhya Pradesh) 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.

Progress/Achievements made during the year

Management Action Plans (MAPs) submitted by the concerned States/UT were scrutinized and sanctioned for implementation of approved items of activities. A Workshop was organized in collaboration with DST and UNESCO at Munnar, Kerala for Biosphere Reserve Managers and Lead Institutions. 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.

Nomination of Achanakmar-Amarkantak biosphere reserve received from the Governments of Chattisgarh and Madhya Pradesh for inclusion in the world network of UNESCO was endorsed and forwarded to the MAB Programme of UNESCO. Periodic Review 2010 Report of Nilgiri Biosphere Reserve which has completed ten years after its inclusion in the World Network of Biosphere Reserves of UNESCO has been forwarded to the MAB Programme of the UNESCO, Paris. Based on the proposal submitted by the Government of

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Andhra Pradesh, hill ranges spread in parts of Chittoor and Kadapa districts of Andhra Pradesh covering an area of 4755.997 Km² have been designated as Seshachalam Biosphere Reserve in Andhra Pradesh.

List of Biosphere Reserves with date of designation, area and location in the State(s)/ UT is given in Table-5.

Comparison of progress via-a-vis that achieved in previous years (in case of ongoing schemes is given below)

S. No.	Activity	2009-10	2010-11
1	Number of Management action plan sanctioned for implementation in the BRs	18	15
2.	Completed research projects	3	9
3	Ongoing research projects	12	14
4	New BRs designated	1	1
5	Nomination sent to UNESCO for inclusion in the World Network of BRs	1	1

Budget Allocation for the Scheme

An amount of ₹11 crore was allocated during the year and the expenditure incurred till date is ₹10.00 crore.

Implementing organizations along with details of responsibilities

Implementing organizations are the concerned State(s)/UT Government Forest Departments and other line Departments for management of BR. The approved items of the activities by the Central Government from the recommended items by the State/UT Level Steering Committee chaired by Chief Secretary/ concerned Principal Secretary are being monitored by their monitoring Committee, the designated BR manager and the Eco development Committee/ JFM represented by the local communities.

Universities, Research Institutions, State Forest Research Institutions, Autonomous bodies are conducting research activities on the sanctioned research projects in the BR areas and the periodic progress and review reports are evaluated by experts and evaluation of the completed research projects is carried out by the designated committee.

Biodiversity Conservation

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.

Activities undertake so far

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 192 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 arising out of the use of genetic resources. India is a Party to the CBD.

Table-5. List of Biosphere Reserves

S. No.	Name of the BR & total geographical area (km ²)	Date of Notification	Location in the State /UT
1.	Nilgiri (5520)	1.8.1986	Part of Wynad, Nagarhole, Bandipur and Madumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka)
2.	Nanda Devi(6497.03)	18.1.1988	Part of Chamoli, Pithoragarh & Almora Districts and Valley of Flowers (Uttarakhand)
3.	Nokrek (820)	1.9.1988	Part of Garo Hills (Meghalaya)
4.	Manas(2837)	14.3.1989	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang Districts (Assam)
5.	Sunderbans(9630)	29.3.1989	Part of delta of Ganges & Brahmaputra river system (West Bengal)
6.	Gulf of Mannar(10500)	18.2.1989	Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)
7.	Great Nicobar(885)	6.1.1989	Southern most islands of Andaman and Nicobar (A&N Islands)
8.	Similipal (4374)	21.6.1994	Part of Mayurbhanj district (Orissa)
9.	Dibru-Saikhowa(765)	28.7.97	Part of Dibrugarh and Tinsukia districts (Assam)
10	Dehang Debang(5111.5)	02.09.1998	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)	03.03.1999	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 Pathanamthitta 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
16.	Cold Desert (7770)	28.08.2009	Pin Valley National Park and surroundings; Chandratat and Sarchu & Kibber Wildlife Sanctuary in Himachal Prachal.
17.	Seshachalam (4755.997)	20.09.2010	Parts of Chittoor and Kadapa districts of Andhra Pradesh

* Sites with bold letters have been included in the World Network of BRs of UNESCO.



Fig- 24. Common Mormon (male) (*Papilio polytes*), an indicator of biodiversity

- The United Nations General Assembly (UNGA) had proclaimed 2010 as the International Year of Biodiversity (IYB), to create awareness about the understanding of threats to and the need for conservation of biodiversity. The Ministry undertook a number of activities to create awareness about biodiversity issues during the celebration of IYB in 2010. The IYB was formally launched in India on 4th January, 2010, in which the Minister for Environment & Forests released a brochure on 'Achieving 2010 Biodiversity Target; India's Contributions', highlighting measure taken by India towards biodiversity conservation. A calendar for the year 2010 with 12 award-winning paintings by school children on the theme 'Our Rich Biodiversity', prepared by the National Museum of Natural History was also released on the occasion. A special session on 'Biodiversity and Sustainable Development' was organized on 7th January, 2010 during the 97th Indian Science Congress held in Thiruvananthapuram. A special event focusing on biodiversity was organized during the Delhi Sustainable Development

Summit in February, 2010. a special article on 'Biodiversity': We cannot afford its loss' was brought in the March, 2010 issue of 'Namaskaar', the inflight magazine of the national carrier, Air India. A commemorative stamp and cover on Biodiversity was brought out by the Department of Posts, and was released on 5th June, 2010 to mark the World Environment Day, the theme for which this year was 'Biodiversity: Connecting with Nature'. Plantation drives were taken up along the route of Queen's Baton Relay covering 20,000 km. in all 28 States and seven Union

- Territories for the Commonwealth Games held in Delhi in October, 2010. The National Biodiversity Authority supported awareness creation activities through State Biodiversity Boards, and other stakeholders including NGOs.
- In pursuance of various decisions of COP-9 to the CBD held in May 2008, India has been responding to various notifications being received from the CBD Secretariat, inter alia by making submissions, and nominating experts for various expert group meetings.
- During the year, the ongoing negotiations for a protocol on access and benefit sharing continued under the aegis of CBD. India as a megadiverse country rich in biodiversity and associated traditional knowledge has much stakes on the issue of ABS and was therefore one of the lead negotiators. In order to prepare for these negotiations, the Ministry regularly consulted the concerned Ministries / Departments, experts and other stakeholders, including through organization of a national consultation

in Chennai in April, 2010 and circulation of a draft Cabinet Note in September, 2010. India participated actively in the ABS negotiation meetings held in Montreal in July, 2010 and September, 2010 and in Nagoya in October, 2010. Two other important CBD meetings in which India participated actively were fourteenth meeting of SBSTTA and third meeting on review of implementation held in Nairobi in May, 2010.

- An Indian delegation led by Secretary (E&F) participated in the tenth biennial meeting of the Conference of the Parties (CoP-10) to the CBD, which was held in Nagoya in October, 2010. The main outcome of this meeting was adoption of the Nagoya Protocol on ABS, which sets out rules and procedures for implementing the third and the core objective of the CBD relating to ABS. The Protocol is expected to address concerns of India and other biodiversity-rich countries relating to misappropriation of their genetic resources and associated

traditional knowledge.

- CoP-10 also endorsed India's offer to host the CoP-11 to be held in October, in the year 2012, which also marks the 10th anniversary of Johannesburg World Summit on Sustainable Development, 20th anniversary of the Rio Earth Summit and 40th anniversary of Stockholm Conference. Considering that India would be hosting the next CoP, India had organized some additional activities, which successfully helped increase our visibility during CoP-10. These activities included: three side events, a display booth at the exhibition, and a Reception with cultural programme on the last day of CoP-10.
- The Nagoya Protocol on ABS has been opened for signature on 2nd February, 2011 at the UN Headquarters in New York.
- The Ministry is cohosting with UNEP an international meeting of ABS experts in

Chennai on 13-15 February, 2011 to review, analyse and interpret the provisions of Nagoya Protocol. This exercise would contribute to early signing and ratification of this Protocol by countries.

- The Ministry organized a Stakeholder Consultation on The Economics of Ecosystems and Biodiversity (TEEB) in India in New Delhi on 10-11 February, 2011, in which the Minister for Environment & Forests launched the preparation of India TEEB, based on the global study on TEEB.



Fig-25. Mixed Lichen Vegetation and Habitat

It is proposed to come out with an interim report of India TEEB during CoP-11 in October, 2012. It is envisaged that by 2015, value of biodiversity would be integrated in the national planning process.

- India as the incoming Presidency of CoP-11, has the opportunity to emerge as the world leader in conservation and sustainable use of biodiversity, and also to set the global agenda on biodiversity in the context of sustainable livelihoods, for the period 2011-2020, which is the UN Decade for Biodiversity. Considering that much more focus would now be required on biodiversity, attempts are being made to significantly enhance funding for biodiversity programmes through internal and external sources.

Biological Diversity Act

- Taking cognizance of the International Convention on Biodiversity (CBD), and to address the excessive pressure on biodiversity, the Government of India has enacted Biological Diversity Act, 2002 (BDA 2002). Accordingly, the national, state and local level mechanisms have been provided for implementation of the Act. At the national level, National Biodiversity Authority (NBA) has been established by Government of India in October, 2003 at Chennai (Tamil Nadu) under Section (8) of the Biological Diversity Act. The State Biodiversity Boards (SBB) have been established by the State Governments and Biodiversity Management Committees (BMC) constituted by the local bodies.
- The NBA is a body corporate established in accordance with the provisions of Sec.8 of the Biological Diversity Act, 2002, at Chennai w.e.f

1st October 2003. It is an autonomous, statutory and regulatory organization which is intended to implement the provisions of Biological Diversity Act, 2002. Twenty four States have so far set up State Biodiversity Boards. Eleven states viz. Andhra Pradesh, Gujarat, Rajasthan, Karnataka, Madhya Pradesh, Manipur, Sikkim, West Bengal, Tripura, Uttar Pradesh and Maharashtra have also notified the state specific rules in accordance with the provisions of the Act.

- So far, over 30,000 BMCs have been constituted by the local bodies in 14 states- Andhra Pradesh, Himachal Pradesh,

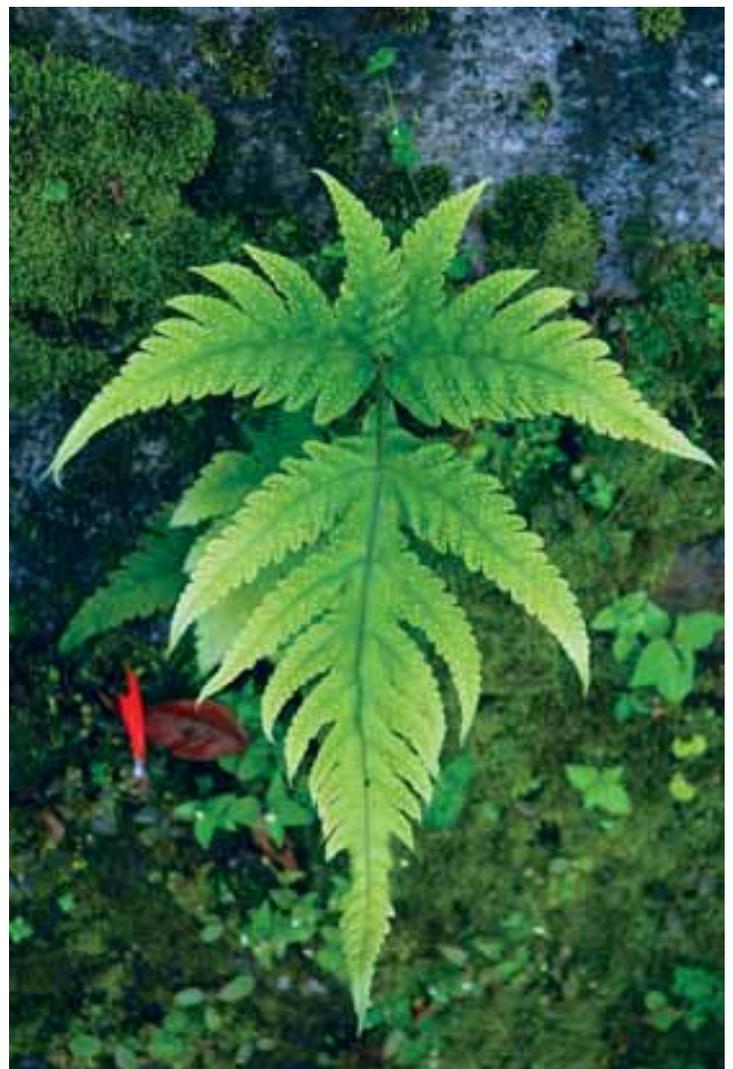


Fig-26. : *Tectaria coadunata*, a fern from South India, an important component of biological diversity

Karnataka, Madhya Pradesh, West Bengal, Kerala, Goa, Nagaland, Manipur, Uttar Pradesh, Gujarat, Punjab, Mizoram and Tripura. So far, 419 People's Biodiversity Registers have been documented in six states.

- During the year, one Authority meeting (17th) was held on 14th September 2010 and important decisions were taken on different matters. Thirty one applications for access to bioresources were received and are at various stages of processing during the period. Nine agreements were signed by NBA with applicants during 2010-11.
- Some of the Important actions taken up during the year to implement various provisions of the Act include the following:-
 - In pursuance of Section 38 of the Act relating to notification of threatened species, the Ministry has notified in the States of Goa and West Bengal on March 31, 2010, Karnataka on October 30, 2010.
 - In accordance with Section 37, the Government of Karnataka has notified the "Tamarind site" at Nallur in Devanahalli Taluk, Bangalore district as first Biodiversity Heritage Site in the country. This BHS spread over 54 acres comprising a population of nearly 300 trees, is a picture of dynamic pattern of plant diversity. The State has also notified "Hogrekan" which is having unique Shola vegetation and grass land with number of floral species which are unique and having lot of medicinal value, and University of Agricultural Sciences, "GKVK Campus", Bengaluru as 3rd BHS in the State which is considered as one of the greenest areas in Bengaluru. Biological diversity of this campus constitutes a critical repository of various forms of flora and fauna. Several states have identified the sites and process of notification is under progress.
- NBA has, for the first time channelized the royalty amount of ₹20,000/- to Amarchinta BMC in Mahboobnagar district of Andhra Pradesh for the export of neem leaves to Japan. This is the first case of benefit sharing in the country enabled through NBA which has been accomplished as per the provisions of Biological Diversity Act.
- NBA and MoEF organized a national consultation on international regime on Access and Benefit Sharing, evolving sui generis system for protection of Traditional Knowledge and amendments to Biological Diversity Act and Rules, held in Chennai in April 2010. A wide cross-section of stakeholders and experts was represented by the participants who included the chairmen and member secretaries of State Biodiversity Boards, representatives from biodiversity related research, development and legal organizations, educational institutes, industries, NGOs, etc. Discussions were held on the drafts that had been circulated earlier. Further the outcome of the consultation was utilized in various forums and negotiations.
- Two Meetings of State Biodiversity Boards (5th and 6th) were held on April 24, 2010 at Chennai and 6-8 Sep 2010 at Chandigarh respectively to review the progress and discuss the

2



Fig-27. Green Sea Turtle (*Chelonia mydas*), endangered and needs protection

issues in respect of functioning of SBBs, establishment of BMC, biodiversity fund, SBB rules, People's Biodiversity Register, selection of Biodiversity Heritage sites etc.

- The first day cover, commemorative postage stamp on 'biodiversity' to mark the International year of biodiversity were released on the eve of World Environment Day on June 05, 2010
- Brain storming session was organized with NBA and SBBs in June 16, 2010 at New Delhi to formulate a mega project to strengthen the institutional mechanisms for implementing the Biological Diversity Act.
- A task force (Expert Committee) on Biodiversity Management Committee has been constituted for preparation of guidelines on creating structures, running administration and maintaining of accounts and other related matters. Members undertook field visit to Karnataka on July 19, 2010 to ascertain the various matters relating to BMC formation and their administration.
- NBA and MoEF organized an exhibition and side events on Himalayan Biodiversity, TKDL and Implementation of BD Act in CBD-COP-10, in Oct 2010 at Nagoya, Japan. In the exhibition, panels, posters, charts and other information material highlighting India's efforts towards biodiversity conservation were displayed, and distributed. In addition, films relating to biodiversity programmes were screened. The hand made lac pens and pen drive with the inscription "CoP-11 – Welcome to India" were distributed to the visitors which have become quite popular. A film on "Incredible India-Incredible Biodiversity" was brought out and launched in CoP-10 at Nagoya.
- The MoEF and NBA with the funding support from UNDP has launched a pilot project entitled "Strengthening institutional structures to implement the Biological Diversity Act" in M.P and Jharkhand. Experiences and lessons learnt from M.P and Jharkhand in setting up State Biodiversity Boards and BMCs will also be shared with other states.
- The MoEF and NBA are working for the implementation of Global Environmental Facility (GEF) /United Nations Environment Programme (UNEP), supported project on strengthening the implementation of the BD Act with focus on benefit sharing provisions.
- Norwegian and Indian Government have signed a Letter of Intent (LoI) on November 19, 2010 in New Delhi, for the project which aims at technical



Fig-28. Indian grey mongoose (*Herpestes edwardsii*)

and institutional cooperation for establishment of a Centre for Biodiversity Policy and Law (CEBPOL) in Delhi, India. The developing of full scale project is under process.

- NBA sponsored / supported extended seven conferences / consultation/ Workshops / seminars to commemorate the International year of Biodiversity 2010 in a befitting manner.

Implementing organization

National Biodiversity Authority, Chennai

Budget Allocation of the Scheme

An allocation of ₹4.74 crore was made for the year 2010-11 against which an expenditure incurred of ₹3.43 crore has been incurred upto December, 2010.

Biodiversity Scheme / Genetic Engineering Approval Committee (GEAC)

The Ministry of Environment and Forests (MoEF), 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) to ensure that research and development and testing of LMOs prior to environmental release are conducted in a safe and scientific manner.

The Genetic Engineering Appraisal Committee, the apex body under the Rules, 1989 has the mandate to accord approval of activities involving (i) large scale use of GMOS in research and (ii) environmental release of GMOs.

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. Seven meetings of the GEAC have been held from April, 2009 till date.

Progress/Achievements made during the year

Commercial Release of Transgenic Crops

Bt cotton is the only transgenic crop approved for commercial cultivation in India. 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, cry 1Ac gene (Event-1) developed by M/s J. K. Agri Genetics Ltd, Cry 1AC gene (Dharwad event) developed by CICR and Cry 1C (event 9124) developed by M/s Metahelix Life Sciences.

During Kharif 2009, the Standing Committee constituted by the GEAC under the new ‘Event Based approval Mechanism’ has recommended 244 Bt cotton hybrids for commercial cultivation.

2

Status of approval of GM Food crops in India

BG-II RRF cotton expressing *cry-1 Ac* and *Cry-2 Ab* and *CP-4 EPS* (event MON 15985 X MON 88913) developed by M/s Mahyco and transgenic corn expressing *cry2Ab2*, *cry1A 105* (Event MON 89034) & *CP4EPS* (Event NK603) developed by M/s Monsanto have entered Biosafety Research Level-II trials with the approval of GEAC.

In addition, other GM crops such as brinjal, rice, okra, cauliflower, cabbage, castor, groundnut, tomato, sorghum, potato, maize rubber developed by both private and public sector institutions are under various stages of research and development / biosafety testing for generation of biosafety data.

Pursuant to the moratorium issued on February 10, 2010, review of Bt brinjal based on the outcome of the public consultation held during January to February 2010 has been initiated.

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 15th October, 2007 has been kept in abeyance till September 2011 or until the Food Safety and Standards Authority set up under the aegis of the Ministry of Health and Family welfare is made operational.
- Review of the existing national regulatory biosafety framework with a view to harmonize the obligations under Cartagena Protocol on Biosafety (CPB) is in progress.
- Draft guidance document for information/data generation and documentation for safety assessment of GE Plants during

biosafety research level trials -I (BRL-I) and biosafety research level trials -II (BRL-II) has been prepared and is awaiting GEAC approval.

- Ex ante assessment of socio-economic benefits of Bt brinjal has been initiated by NCAP with the financial support of MoEF. Final report is awaited.
- Biological documents for Cotton, Brinjal, Okra, Maize and Rice have been developed.

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. India has acceded to the Biosafety Protocol on 17th January 2003. The Protocol has come into force on 11th September 2003. As of date 157 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.

The main objective of the Protocol is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling of LMOs resulting from modern biotechnology that may have adverse effect on the conservation and sustainable use biological diversity, taking into account risk to human health.

Progress/achievements made during the year

Fifth Meeting of the Conference of Parties serving as Members of Parties (COP-MOP-5)

The fifth meeting of the Conference of Parties serving as Members of the Parties to

the Cartagena Protocol (COP-MOP) on Biosafety was held at Nagoya, Japan from 11-15, October, 2010).

Pursuant to the above meeting, the third and fourth meeting the 'Friends of the Co-Chairs' comprising of six representatives from Asia Pacific Group, Africa Group, Latin American countries, EU, Norway, Japan and New Zealand was held at Kula Lumpur in June 2010 and at Nagoya in October 2010 to finalize the Supplementary Protocol on Liability and Redress in the context of CPB.

COP-MOP 5 held at Nagoya during 11-15 October proved to be a milestone in the negotiations for a legally binding regime on liability and redress for damage caused by transboundary movement of LMO's. After six years of hectic negotiations, the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety was adopted in the plenary on October 15, 2010.

The Supplementary Protocol shall be open for signature at UN Headquarters in New York from March 7 2011 to March 6, 2012.

Capacity Building

The 'Full Scale Project' (FSP) document for capacity building on biosafety under the GEF program has been developed and will commence soon.

GOI-UNDP CCF-II project "Biodiversity Conservation through Community based Natural Resource Management"

This is one of the Externally Aided Projects (EAP), operational with the financial support of the United Nation Development Programme (UNDP). The project is supported under the Country Cooperation Framework-II (CCF-II) being implemented by UNDP for Biodiversity Conservation. The larger goal of the project is being achieved through Community based

Natural Resource Management (CBNRM) in four states namely Orissa, Chattisgarh, Jharkhand and Arunachal Pradesh wherein community participation is essential component of the project. The project was initiated in September 2008 at an estimated cost of ₹13.50 crores (US\$ 3 Million) and its tenure has been extended up to December 2012.

These four states are primarily tribal dominated and therefore forest dependent livelihoods will be largely benefited from interventions that are proposed under the project. These four states have large stretches of forest that are controlled and managed by the communities. In these states, development of alternative sources of income assumes importance as the communities depend mainly on the natural resources for their livelihoods.

The project aims to focus on component like conservation of species and habitats through responsible community-based management; Ecological restoration including species recovery programmes; 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. Keeping these issues in background, the project has following objectives:

- to facilitate the process of making the National and State-level policies and programmes more responsive to linkages between sustainable rural livelihoods
- to enhance the capacity of communities and institutions of decentralized governance for integrating sustainable

2

biodiversity based livelihoods through participatory micro planning, while ensuring equity, transparency and accountability.

Progress/Achievements made during the year

The details of state-wise physical progress made during the period are as follows:

Arunachal Pradesh

- Twenty two Village Biodiversity Conservation Councils (VBCCs) strengthened in both project sites i.e. Tawang-west kameng and Apatani Plateau.
- LPG set provided to 100 identified users of both the sites to reduce pressure on fuel and fire wood.
- Twenty training-cum workshops were organized in project villages involving the members of local communities on conservation and sustainable use of natural resources in both sites
- Sixty piglets were distributed to villagers in Apatani site as an alternate mean of livelihood.
- Six High Altitude Nurseries developed for raising medicinal & horticulture plants in both sites

Orissa

- In-situ Conservation completed in 250 ha and 100 acre area through forestry related activities in Sambhalpur and Berhampur site respectively.
- Plantation of 5000 saplings of Acacia and Eucalyptus completed at Khurda site under high density energy plantation.
- Fifteen gully plugging units constructed and 700 staggered trenches completed at Berhampur site.



Fig-29. A high altitude nursery at Apatani Plateau in Arunachal Pradesh

- Human Health camps and Poultry Vaccination camps organized in all project sites as entry level.
- Eight SHGs were strengthened to Link with other ongoing schemes of state government
- Twelve Trainings programmes on SRI method, poultry & livestock management , Backyard nursery, use of organic fertilizers, SHGs and cooperative group strengthening etc, imparted to local communities in all three sites and exposure visits conducted for members of village conservation committees (VCCs).

Chhattisgarh

- *In-situ* conservation of Biodiversity completed in 3000 ha area in all three sites through forestry related operations.
- Resource survey, ethno-botanical survey and documentation of flora of herbal health value and ITK completed in all three sites.
- Three numbers of four day Training cum workshops on Sustainable use of Natural Resources through NTFP based micro-enterprises organized for 141 villagers in all three sites. Two Numbers of five days



Fig-30. Excavation of pond at Khunti site in Jharkhand

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Trainings were organized to strengthen the SHGs and Co-operative working groups including 150 villagers of Bilaspur site.

- Herbal health care centres (Van Ausdhalaya) established and being maintained at all three sites.
- Mahul leaf molding unit; Imli, Giloy, Stawar, Lac and other NTFPs processing units being maintained at community level.

Jharkhand

- Eleven acre of sacred groove developed and 12 acres of village forest developed and maintained at Khunti site; Bamboo and other horticulture spp. Plantation completed in 53 acres at Bokaro river site.
- Cultivation of Medicinal Plants completed in 8 Acres at Tirkut site and two nurseries developed each at Khunti and Tirkut site for raising more than 70 thousand saplings.
- Plantation of Fuel-wood & Fodder spp

completed in 62 acres in Palajori, 7.5 acres in Tirkut site.

- Construction of Chuan (10 No) completed at Khunti site; construction of 41 No. of water harvesting structures and Lift irrigation system to irrigate 40 acres of land at Palajore site; Five ponds excavated to irrigate 76 Acre of land and one gravity flow pipeline completed to irrigate 25 acres of land at Tirkut site.
- Seed money provided to 114 families at Khunti site, 15 Self Helth Group (SHGs) each at Tirkut and Bokaro river basin site for NTFP purchase, rope making , goatry, poultry, piggery , Plate making and vegetable cultivation etc.,.
- Four training organized on SRI technique of paddy at Bokaro basin site and Five Training on "Alternate livelihood approaches" in Tirkut and Palajori sites.
- People Biodiversity Register (PBR) preparation and updating work is under progress in all sites.

Budget Allocation

A total sum of approx ₹13.50 crores (USD 3 Million@ ₹45/USD) is available under the project. A grant of ₹808 lakhs have been released till 31st December, 2010 (₹204.8 lakhs out of the total allocation of ₹300 lakhs during 2010-11) to four identified implementing agencies as per details given in (Table - 6)

Implementing organization along with details of responsibilities

The MoEF is the implementing agency of the project. At National level, a National Steering Committee (NSC) Under the chairmanship of Additional Secretary (Conservation) and an Empowered Project Steering Committee (EPSC) under the Chairmanship of Joint Secretary (Conservation) 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 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 review the progress by NSC.

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

Taxonomy occupies the position of a mother science in biology as it deals with the classification of all living and extinct organisms. Therefore, it is a key science to help ensure sustainable utilization, conservation of biological resources and implementation of the Convention on Biological Diversity (CBD). There is an overall decline in expertise in the taxonomy of several groups of living organisms. Moreover, the existing taxonomic base is eroding rapidly due to non-availability of professionals and lack of trained manpower to replace the retiring specialists. In other words, a wide gap exists between the magnitude of taxonomic expertise needed and the available limited taxonomic knowledge base. Further, many microbes, plants and animals are yet to be discovered and identified. To manage the biological resources and to meet the challenges of 21st century, the issue of 'taxonomic impediments' needs to be addressed urgently.

Table-6. Budget allocation under GOI UNDP CCF-II Project

(₹ in lakhs)

State	Coordinating Agency	Amount sanctioned for three years duration of the project	Amount released till 31 st Dec, 2010
Arunachal Pradesh	G.B. Pant Institute of Himalayan Environment & Development, N-E Unit, Itanagar	252.89	191.10
Jharkhand	Institute of Forest Productivity, ICFRE, Ranchi	250.00	214.17
Orissa	Regional Plant Resource Centre, Bhubaneswar	250.00	230.14
Chattisgarh	State Minor Forest Produce (T & D) Coop. Federation , Raipur	250.00	171.39

For devising effective conservation and management strategies, one needs to know: (i) what kind of species are found, (ii) where they occur, (iii) what are their characteristics or attributes, and (iv) how they are related to one another. These questions can be answered only by specialists. Besides the basic inputs needed for understanding biodiversity, the taxonomic studies also result in weaving the data obtained on the species into a system of classification which is used by the scientists and others.

Taxonomy is also central to and an integral part of the conservation and sustainable utilization of biological diversity. It is this aspect that led the Convention on Biological Diversity (CBD) to emphasize the role of taxonomy in its implementation at the national, regional and global level. As a signatory to the CBD, India stands committed to capacity building in taxonomy and to undertake exploration and preparation of an inventory of living organisms. India started building capacity in Taxonomy much before the Global Taxonomic Initiative (GTI) coming into existence, through overall strengthening of Botanical and Zoological surveys as well as launching a dedicated All India Coordinated Project on Capacity Building in Taxonomy (AICOPTAX).

So far around 91,000 species of animals and 45,500 species of plants have been identified and described but a large number of animals and plants are yet to be explored, identified and described.

To find out the ways and means by which the existing gaps in taxonomic knowledge could be filled, the Ministry of Environment and Forests (MoEF) – a nodal agency within the Government of India for environmental protection and conservation of biodiversity – organized a two-day national workshop on “Capacity Building in Taxonomy in India on 15th & 16th February 1996 at Jaipur. Sixty two leading taxonomists of the country

participated in the workshop, and after lengthy deliberations, made a number of action oriented recommendations for capacity building in taxonomy. One of the prioritized recommendations was to initiate an All India Coordinated Project on Capacity Building in Taxonomy, besides taking steps for strengthening education and training. This recommendation was endorsed by the then Task Force constituted by the MoEF. The Scientific Advisory Committee to the Cabinet (SAC-C) also endorsed the recommendation. Accordingly, an All India Coordinated Project on Taxonomy Capacity Building was launched in 1999, much before Global Taxonomic Initiative (GTI) came into existence.

The AICOPTAX has a sole mission – “Enhancement of country’s capabilities for inventorying, monitoring, conserving and utilizing biodiversity as well as for establishing leadership in the field of taxonomy at regional and global levels”. AICOPTAX, an active programme channelized at the national level to address the problems of inadequate taxonomic knowledge due to limited number of taxonomists available in the country, is fully funded by the MoEF. It has the following main objectives:

- Survey, collection, identification and preservation of elements of biodiversity of the country with emphasis on protected areas.
- Training research fellows and college teachers and building capacity in the field of taxonomy.
- Maintain collections and taxonomic data banks.
- Develop identification manuals.
- Generate information needed for decision making in conservation and sustainable use of biological diversity.
- Integration of taxonomic capacity into the national reporting process.
- Enhance local and regional capacity in taxonomy.

To start with, 30 thematic areas were chosen for investigation under the AICOPTAX. These were:

1. Plant viruses
2. Animal viruses
3. Pathogenic bacteria
4. Non-pathogenic bacteria
5. Pathogenic fungi
6. Non-pathogenic fungi
7. Fresh water phytoplankton/Algae(including blue green algae)
8. Fresh water zooplankton (including euglenoids/ciliates/rhizopods)
9. Lichens
10. Bryophytes
11. Orchids
12. Palms
13. Grasses and bamboos
14. Pteridophytes and gymnosperms
15. Research in plant biosystematics and advanced training in taxonomy
16. Helminthes and Nematodes
17. Crustacea
18. Mollusca
19. Insects: coleoptera
20. Insects: hymenoptera
21. Insects: blateria and tettigonids
24. Insects: miscellaneous order
25. Arachnida
26. Oomycetes and cellular slime moulds
27. Protozoa and sporozoa
28. Annelida
29. Meiofauna
30. Research in animal biosystematics and advanced training in taxonomy

Of the aforesaid 30 thematic areas, only 15 could be implemented so far. The work of the thematic areas of AICOPTAX was assigned to 15 coordinators along with 61 collaborators. The coordinators also oversee and monitor the activities for achieving the aims and objectives outlined in the thematic areas.

The remaining 15 thematic areas are in the process of being taken up for investigation under AICOPTAX in phased manner.

The important achievements of the 15 thematic areas include: discovery of species new to science, new records for India, floristic and faunal accounts, status of species, number of students training in taxonomy and enrolled for doctoral studies, etc. For brief reports on each theme, the reader may glean through the separate sheets enclosed in this folder. The MoEF has spent about ₹10 crores during X five year plan on AICOPTAX. Some significant achievements are given below:

Survey and exploration – Tours	:	1323
undertaken		
Number of collections added to national Reference collections	:	53715
Number of species identified/characterized/Described	:	12789
Documentation of flora and fauna (with descriptions)	:	6759
Human resource development /training in Biosystematics		
Number of persons trained in taxonomy	:	450
Number of students enrolled for Ph.D	:	105
New Discoveries		
Taxa new to science	:	570
Taxa new to India	:	449
Species collected after a gap of 50 years or more	:	189
Number of rare taxa recorded from new locations	:	1059

Publications

Books	:	7
Research Papers	:	333
Book chapters	:	61
Popular articles	:	14
Papers accepted for publication	:	118
Training/awareness Workshops organized	:	12

Under AICIOPTAX Scheme, several new records of wild flora and fauna have been made. Several new species have also been discovered. These are being documented and verified with voucher specimens for authenticity before publication during the XI Plan Period. Discovery of species new to science will be the major impact of the AICOPTAX Scheme.

The Ministry, with the technical support from BSI & ZSI, has brought out Programme Brief on Taxonomy Capacity Building: Indian Initiative (based on outcome of research work done under 76 projects between 1999-2007 embodying 570 species new to science), released as a showcase document by Government of India during the 10th Conference of Parties to the Convention on Biological Diversity held in October, 2010 at Nagoya, Japan.

The Steering Committee for the AICOPTAX Scheme has been reconstituted on 03.07.2008 along with the formation of a Project Monitoring Unit (PMU). A meeting of the Steering Committee was held on 13th February, 2009 during which the entire scheme was reviewed and following five new thematic areas were proposed for implementation during 2010-11:

- Crustacea
- Coleoptera
- Hymenoptera
- Arachnidae

- Floristic and Faunistic Surveys of North Eastern Region of the Country

Accordingly, three projects have been conceived under the thematic area Crustacea; six projects under Coleoptera; six projects under Hymenoptera; four projects under Arachnidae; fourteen projects under Floristic Surveys of North Eastern Region and one project under Faunistic Survey in the North East Region of the country. These are being processed in consultation with Integrated Finance Division of the Ministry for sanction & release of funds during the current financial year.

Assistance to Botanic Gardens

The scheme on Assistance to Botanic Gardens, Botanic sections in popular gardens and Centres of Ex-Situ Conservation of rare, endangered, threatened and endemic plants 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, 254 projects have been supported so far to various organization maintain 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 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, five projects have been sanctioned. The gardens shall be equipped

2

with modern facilities to enable them to perform their responsibilities.

During 2008-09, 24 gardens were supported under the scheme. Whereas during 2009-10, ten gardens have been supported and entire allocation of ₹2.20 crores have been spent.

An allocation of ₹2.20 crore have been made for year 2010-11 and the entire allocation will be spent by the end of the year. A total of five projects were sanctioned during the year.

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), NOIDA

The BGIR has framed certain programme activities to help address its mandate of

conservation research and education. A brief description of the programme activities carried out during April 2010 - January 2011 is as under:

Woodland Development Programme: About 3500 saplings belonging to about 94 genera and 100 species were procured for introduction in the various woodland sections and arboreta. Saplings of about 23 indigenous plant species, including *Pterocarpus santalinus*, *Sterculia hamiltoni*, *Madhuca indica*, *Terminalia bellirica*, etc., were introduced in the woodlands section. Similarly, about 10 species, including *Toona ciliata*, *Gardenia retusa*, *Michelia champaca*, *Erythrina arborescens*, etc., were introduced into the Economic Plants Arboretum. In the arboretum of fruit yielding trees saplings of about 100 seedlings of about 10 fruit varieties were introduced this year.

Conservation Research Programme: Multiplication of some of the endangered species such as *Frerea indica* was done. Endangered species such as *Cycas beddomei*, *Hildegardia populifolia*, etc., and vulnerable species such as *Pterocarpus santalinus* were maintained in the garden.

Work on the germination trials of selected species continued in BGIR's Seed Bank laboratory: seeds of more about 20 species of indigenous trees were procured for banking; germination trials on selected indigenous tree species and medicinal plants were carried out; experiments on breaking of seed dormancy on about 5 species were also carried out successfully. This work is critical for augmentation of germplasm holdings in the seed bank.

BGIR's *ex situ* conservation programme continued to enhance the germplasm collections of gingers, bamboos and other plant groups. Some interesting bamboos procured this year include *Bambusa*



Fig-31. Plantation-Education Programme at Botanical Garden of Indian Republic, NOIDA

vulgaris (Buddha's Belly Bamboo), *Gigantochloa nigrociliata*, *Dendrocalamus brandisii*, etc. The rare plant was *Ensete superbum* was procured from the W. Ghats. These would be introduced in the thematic conservation areas planned in the garden.

Herbarium Development Programme: Digitisation of the plant collections that were accrued from BGIR's project on the Digital Flora of NCT has been completed this year. A software also has been developed as part of the digitisation work. As part of the herbarium development work a special collection of medicinal plants in the BGIR has been initiated as a link to the Medicinal Plants Conservation Programme. A database on the live collections of medicinal plants at BGIR was initiated this year; information on agro-

techniques of about 84 species has been incorporated in the database so far.

Medicinal Plants Conservation Programme: The Medicinal Plants Section, called the *Ayur Vatica*, is repository of medicinal plants of the Indo-gangetic region. The *Ayur Vatica* is laid out thematically according to the therapeutic use of plants in the Ayurvedic system of medicine. This section continues to be the main attraction for visitors of the garden.

Education & Training programme: Orientation programmes for researchers/students from research institutes/universities/colleges are continued on a regular basis. More than 6000 students from about 50 schools visited the garden mostly during the winter months. BGIR conducted an environmental education programme during

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Fig-32. *Exacum bicolor*, an endangered herb with medicinal properties

February 2010 to commemorate the International Year of Biodiversity; the week long programme culminated on 28th February, the National Science Day. The theme of the programme was Biodiversity Conservation. The National Museum of Natural History (NMNH) conducted a summer camp for school students at BGIR during May 2010; the camp included slide shows/quiz by BGIR's resource persons/volunteers, nature trail, etc. Public/advisory services were also rendered for colleges/institutions in NCR.

Infrastructure development

As part of the enabling works of BGIR construction of a circular access road was completed. Civil work on construction of main entrance gate has been initiated this year and is expected to be completed before March 2011.

UNDP-GOI-CCF-II-Programme on Promoting Conservation of Medicinal Plants and Traditional Knowledge for Enhancing Health and Livelihood Security and UNDP-GOI-GEF Project on Mainstreaming Conservation and Sustainable use of Medicinal Plant Bio Diversity in three Indian States

The ever increasing demand of Medicinal & Aromatic Plants (MAPs) all over the world has led to an indiscriminate extraction and unregulated trade of these from its natural habitat i.e. the Forests. In India, over 90% of the medicinal plants are accessed from the wild. This has resulted into a degradation of this resource and has affected the major livelihood of a majority of the village population, thereby having a significant impact on the socio-economic as well as the environmental well-being of the country.

Realising the threat to the Medicinal Plant Bio-diversity and to livelihood security, a need was felt to conserve, protect, cultivate, propagate, improve harvesting and collection

practices of medicinal plants of the country. Besides this, a long-term strategy at the global, national and local levels for conservation of medicinal plant resources and using their rich associated traditional knowledge, for social, cultural and economic benefits was also felt necessary. With this objective, the Ministry of Environment and Forests and UNDP have taken up two projects namely 'GOI-UNDP-CCF-II Promoting Conservation of Medicinal Plant and Traditional Knowledge for Enhancing Health and Livelihood Security' and 'GOI-GEF-UNDP Project on Mainstreaming Conservation and Sustainable Use of Medicinal Plant Biodiversity in three Indian States.

UNDP-GOI-CCF-II-Programme on Promoting Conservation of Medicinal Plant and Traditional Knowledge for Enhancing Health and Livelihood Security

The project was initiated in May 2006 and has been completed on 30th June, 2010. The Project had an outlay of ₹12.90 crores. The Project was undertaken in nine States viz. Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu and West Bengal.

The main objective of the project was supporting conservation of medicinal plants and traditional knowledge for enhancing health and livelihood security. The key thrust of the project is to promote conservation of medicinal plants and related traditional knowledge with local people and mainstreaming these into the existing policies and programmes of the forestry and health sector. During the year 2010, all the activities under 14 components, details of which were given in the Annual Report 2009-10, were consolidated. One meeting of EPSC was held and the final report of the project was drafted. The report is being finalized.



Fig. 33 : *Ficus carica*, known as common fig, an important medicinal plant

UNDP-GOI-GEF Project on Mainstreaming Conservation and Sustainable use of Medicinal Plant Bio Diversity in three Indian States

Encouraged with the success of this phase, the Ministry with the support of UNDP and Global Environment Facility (GEF) has launched this project in the states of Arunachal Pradesh, Chhattisgarh and Uttarakhand. The total outlay of the project is US\$ 11,414,121 with 4.93 million \$ of GEF and 6.m Million \$ of Government contribution. The project is for seven years. The Joint Secretary, CS-III Division has been designated as the National Project Director (NPD) for the Project and FRLHT, Bengaluru has been designated as the National Project Management Unit (NPMU). The main objective of this project is mainstreaming conservation into the policies and rules. The interrelationship between various existing Acts and prevailing regulations on conservation of MAPs and their bearing on the traditional knowledge and livelihood will be elucidated. The project has an interesting component of replicating the activities in the neighboring States viz., J&K, Himachal Pradesh, Meghalaya and Sikkim.

During the year, over ₹1.25 crores was released by UNDP directly to the implementing partners and PMU. Sites for Medicinal Plants Conservation Areas (MPCAs) in three States have been finalized and Globally Significant Medicinal Plants (GSMPs) for conservation in these 21 identified MPCAs sites have been finalized. TORs have been finalized for studies to be awarded for Outputs 1.1 to 1.6 under the Outcome 1. Studies have been awarded for three outputs under Output 1.

States are also in process of awarding such studies under Outcome 2. Workshops have been organized in Chhattisgarh and Arunachal Pradesh to review the existing legal regime to mainstream conservation aspects and in Uttarakhand for selection of species for sustainable harvesting and developing protocols. As a part of capacity building exposure visits and trainings for field implementing staff and Project Managers were conducted for all the three states and Training modules for the Village Botanist Programme and for Local Management Committees (LMCs) for MPCAs and front line staff were prepared and training are being taken up. Likewise, training on preparation of Community Knowledge Registers (CKRs) and documentation of Local Health Traditions (LHT) has also been conducted for Chhattisgarh. A workshop for consolidating the activity plan for all the Outcomes was organized and detailed activity plan have been prepared.

Forest Conservation Objectives

The mandate of the Forest Conservation Division is to regulate the diversion of forest land for non-forestry purposes through effective

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implementation of the Forest (Conservation) Act, 1980, which was enacted on 25th October, 1980.

The proposals seeking approval of the Central Government for diversion of forest land for non-forestry purposes are examined by the Forest Advisory Committee (FAC). The Ministry keeping in view recommendations of the FAC makes decision on diversion of forest land for non-forestry purposes, stipulating appropriate mitigative measures. The considerations of the Forest (Conservation) Act, 1980 pertains to the floral and faunal significance of the forest land proposed to be diverted, feasible alternatives, number and nature of beneficiaries and nature and extent of the benefits likely to accrue from the proposed diversion.

Achievements made during the year

– During the year 2009-10, total 1507 proposals involving about 86,967 ha. Forest land have been accorded clearance under the Act. These includes 1043 projects involving about 76,253 ha. forest land for which Stage-I clearance under the Act has been accorded. Similarly, during first nine months of the financial year 2010-11, total 1700 proposals

involving about 35,530 ha. forest land have been accorded clearance under the Act. These includes 938 proposals involving about 19,204.32 ha. forest land for which Stage-I clearance under the Act has been accorded. The proposals for which clearance has been accorded under the Act include the projects for power generation, irrigation, construction of roads, railway lines, transmission lines, drinking water supply projects, schools, hospitals etc.

– During the financial year 2009-10, total 304 proposals were closed/ rejected/ returned/withdrawn owing to shortcomings from the established/ requisite requirements for granting clearance under the Forest (Conservation) Act, 1980. Similarly during first nine months of the current financial year 375 proposals have been closed/rejected/ returned/ withdrawn for the similar reasons.

– To facilitate objective, informed and transparent decision on diversion of forest land for coal mining projects, the Ministry of Environment and Forests on suggestion from the Ministry of Coal jointly undertaken a study in nine major coal fields to classify coal blocks into following

two categories:

(i) Unfragmented forest landscapes having gross forest cover (GFC) > 30% and weighted forest cover (WFC) > 10%, named as category-‘A’ or ‘No Go Area’.

(ii) Fragmented forest landscapes having FGC < 30% and WFC < 10%, named as category-‘B’ or ‘Go Area’.

– With the objective to achieve coal production target by causing least possible adverse impact on environment in general, and forests and wildlife in



Fig-34. Forest of Arunachal Pradesh possess a phenomenal range of biological diversity, both in flora and fauna

particular, the Ministry has decided that as of now, proposal seeking diversion of forest land for coal mining in category-B area shall only be considered.

- To boost the development of underdeveloped area including tribal areas, Ministry accorded general approval under Section-2 of the Forests (Conservation) Act, 1980 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. Validity of the general approval has been extended till further orders.
- As a special measures to boost development of basic infrastructure in 35 worst affected Left Wing Extremism (LWE) affected districts in nine States of the country, the general approval for diversion of the forest land for the said public utility development projects has been further relaxed upto 2 hectares in each case, for a period of five years i.e. till 31st December, 2015.
- Good practices have been adopted to ensure transparency in the system of forestry clearances. Monitoring mechanism for grant of the forestry clearances has been strengthened. Agenda and minutes of Forest Advisory Committee Meetings, important Guidelines and modifications are being regularly placed and updated on Ministry's website. The status of all proposals received in the Ministry is also available in the public domain.

Forest Establishment

The Forest Establishment division is handling the establishment matters in respect of the following organizations:-

- The Indian Council of Forestry Research and Education (ICFRE) an autonomous organization under the Ministry of Environment & Forests, and its Institutes/ Centers namely:-
 - Forest Research Institute, Dehradun
 - Arid Forest Research Institute, Jodhpur
 - Forest Research Centre, Hyderabad
 - Forestry Research & Human Resource Development Centre, Chhindwara
 - Himalayan Forest Research Institute, Shimla
 - Institute of Forest Genetics and Tree Breeding, Coimbatore
 - Institute of Forest Productivity, Ranchi
 - Institute of Wood Science and Technology, Bangalore
 - Rain Forest Research Institute, Jorhat
 - Tropical Forest Research Institute, Jabalpur
- Forest Survey of India (FSI), Dehradun and its following four Zonal Offices as indicated below:-
 - Central Zone, Nagpur
 - Eastern Zone, Kolkata
 - Northern Zone, Shimla
 - Southern Zone, Bangalore
- Wildlife Crime Control Bureau (WCCB) and its Regional Offices at ; -
 - Chennai, Southern Region
 - Kolkata, Eastern Region
 - Mumbai, Western Region,
 - Jabalpur, Central Region
 - New Delhi, Northern Region
- Directorate of Forest Education (DFE) including the following State Forest Colleges;-

2

- State Forest Service College, Dehradun
- State Forest Service College, Coimbatore
- State Forest Service College, Burnihat
- State Forest Service College, Kurseong
- National Zoological Park (NZP), New Delhi
- Indira Gandhi National Forest Academy (IGNFA), Dehradun

Forestry establishment matters relating to all the Union Territories of India (except Andaman & Nicobar Forest Plantation Development Corporation), and general references in respect of frontline staff of state forest Deptts.

The court cases, RTI applications and Parliament Matters pertaining to the above.

Progress/Achievements made during the year

- The Report of the Committee headed by Sh Hem Pande, Joint Secretary, to look into the demands of the All India Forest Officers Federation (AIFO) relating to filling up of vacant frontline posts, their training, modernization, and cadre management etc. was submitted on 3rd October, 2010 and its recommendations were forwarded to all States/UTs for their Consideration/implementation.
- With a view to having uniformity in the service conditions of forest personnel (ACF and below) in the Union Territories, [Forests being a Concurrent subject under the Constitution, the Centre's role with regard to the States is only advisory in nature] the Ministry of Home Affairs/ Cabinet Secretariat have been approached for making suitable modifications in the Allocation of the Business Rules for allocation of the subject 'Forests' in respect of all the Union Territories to this Ministry.

Strengthening of Forests Division

Introduction

The Ministry of Environment & Forests has six Regional Offices located at Bangalore, Bhopal, Bhubaneswar, Lucknow, Shillong and Chandigarh with its Headquarter in the Ministry at New Delhi. Details are given in the Annexure-11A 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 Forest (Conservation) Act, 1980 (FCA) and Environment (Protection) Act, 1986 (EPA).

Progress of Activities undertaken

The Regional Chief Conservator of Forests is empowered to grant approval for diversion of forest land for non-forestry purposes up to the extent of five hectare (except mining and regularization of encroachment) and to process cases between five hectare and 40 hectare 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. A statement showing the number of cases received and number of cases cleared under the Forest (Conservation) Act, 1980 during the year 2010-11 (upto 31 December 2010) is given in Table-7.

Other Activities undertaken

Some of the important activities undertaken/ meetings held by the Regional Offices are as follows:

- Western Regional Office, Bhopal has undertaken IIFM internship project for ten students entitled "Monitoring and Evaluation of Forest Area Diversions including the Status of Compliance of Conditionalities of Forest Diversion Cases

Table-7. Statement showing the number of cases received and number of cases cleared under the Forest (Conservation) Act, 1980 during the year 2010-11 (upto 31 December, 2010)

S. No.	Name of the Regional Office	Number of cases received	Number of cases cleared (upto 31.12.2010)
1.	Bangalore	74	79
2.	Bhopal	172	124
3.	Bhubaneswar	50	109
4.	Lucknow	519	615
5.	Shillong	89	39
6.	Chandigarh	800	772
	Total	1704	1738

on the Forest and Wildlife- Coal Mining, Metal and Mineral Mining, Multipurpose Water project, Thermal Power Plants, Rehabilitation and Resettlement”.

- Due to the persuasion of the Eastern Regional Office, Bhubaneswar to start immediate use of the low grade ore i.e. up to 45% which is the new threshold limit of IBM and for this purpose, Regional Office, Bhubaneswar has encouraged the project proponent to make appropriate arrangement for beneficiating the ore. Accordingly, many user agencies have given projects to the Institute of Minerals and Materials Technology (IMMT) to develop cost effective beneficiation technologies and two technologies viz. column floatation technology and magnetic separation have been found to be quite successful.
- Regional Office, Bhubaneswar’s initiation of mandatory DGPS mapping for boundary demarcation of diverted forest land and compensatory afforestation land has now been adopted by IBM, which has made DGPS survey mandatory for all

mines.

- The special management drive of Regional Office, Bhubaneswar has facilitated Notification of non forest land identified for compensatory afforestation in Orissa since last year which has reached 60 in number. This year, West Bengal has also notified one PF and initiated action for mutation of land in other cases.
- A special drive has been made by the Regional Office, Bhubaneswar for initiation/ revision of Working Plans as per National Working Plan Code, especially for Jharkhand and Bihar, where existing working plans are as per old norms & are due for expiry. Responding to the drive and guidance, Jharkhand State has submitted six Working Schemes for short duration approval so that Regular Working Plans could be prepared in 2/3 years time.
- At the instance of the Regional Office, Bhubaneswar, a Committee was constituted by the Ministry to look into the elephant electrocution deaths in the State of Orissa to find out the causes and

suggest remedial measures. Field inspections were conducted and the report has been submitted to the Ministry in December, 2010. The major finding was that electrical safety system in transmission (distribution lines) of 22 KV and below are found to be totally inadequate.

- To develop expertise in different categories of the projects that have been accorded environmental clearance by the Ministry, Regional Office, Bhubaneswar has identified important sectors such as Aluminium & Bauxite sector, Thermal Power Projects, Oil, Gas & Petroleum sector, Steel & Sponge iron sector and Nodal Scientists have been nominated for each sector. The concerned scientists are encouraged to specialise in each of the allotted sectors.
- An interactive meet on environmental issues for Iron & Steel Sector was organised at Bhubaneswar on 6th May, 2010. Road map was drawn during the interactive meeting to facilitate closer interaction between industries and institution to a) establish R&D Funds under the control of R&D Fund Executive Committee, b) establish a think-tank by drawing 4–5 experts from the industries for technical guidance and for setting up long-term and short-term targets and c) set up of a centre from consortium funds for R&D in one the campuses of leading institutes like IITs, NITs, etc.
- A follow-up action on the outcome of the interactive meeting has been initiated to ensure implementation of environmental safeguard measures including R & D support to industries for environmental management as recommended.
- The interactive meetings also facilitated in exchange of information by the participating industries on the best practices being adopted in conservation of raw materials, minimisation of wastes generation, utilisation of wastes, techniques of water and energy conservation. There is, thus, increased interaction and awareness to support R & D activities by the projects to the Research Institutions and progress achieved for extending funding to specially identified projects.
- Monthly meetings are conducted in the Regional Office, Bhubaneswar and presentations on various Forestry and Environmental topics of local, national and global significance are made by the officers. Each officer is given a target to deliver two presentations in a year.
- Regional Office, Bhubaneswar also made an Inventorization of bird species on the campus during summer and 22 bird species have been listed. The work is continued through winter and two more species have been added to the list and the total bird species so far is 24.
- A small garden dedicated to indigenous fragrant plants has been developed in the office complex; 35 species of fragrant plants are being maintained in the garden.
- Vermi-composting facility set up in the campus of the Regional Office, Bhubaneswar for utilising the domestic wastes is being continued. The manure generated from the vermi-composting is used in the campus gardens.
- Regional Office, Lucknow conducted inspection of illegal mining sites in Uttar Pradesh as member of the committee constituted by Hon'ble High Court, Uttar Pradesh. The mining sites in eight districts (Jalaun, Hamirpur, Allahabad, Banda, Jhansi, Sonebhadra, Kaushambi and Faizabad) were visited during April and May 2010. The report of the committee has been submitted to Hon'ble High Court (Lucknow Branch). In addition, site inspections of Srinagar Hydro Electric

Project, Uttarakhand and Tanda Thermal Power Plant, Faizabad were conducted and reports have been submitted to the Ministry.

- Apart from monitoring activity, the environment wing of the Southern Regional Office, Bangalore has enquired into various issues like (i) Mangrove destruction in Cochin-Kerala, (ii) Power plant – Sompeta, Andhra Pradesh, (iii) Power plant – Bhavanapadu, Andhra Pradesh, (iv) Aluminium Refinery by JSW, Visakhapatnam, Andhra Pradesh, (v) Garnet Sand Mining, Trichy, Tamil Nadu and (vi) Special Economic Zone, Mangalore, Karnataka.
- The Ministry of Environment and Forests had constituted a Committee under the Chairmanship of the Regional Chief Conservator of Forests (Central), Bangalore to examine whether the Forest Conservation Act, 1980 has been violated by encroachment in Munnar, Kerala and there is any need for the Central Government to get involved to ensure that the forests are protected. The inspection report of the Central Team has been submitted to the Ministry.
- The Hon'ble Supreme Court vide Order dated 22nd March, 2010 in SLP (C) Nos. 7366-7367 of 2010 has constituted a Committee headed by Senior Representative/ Officer of the Survey of India, Dehradun with representatives from the Ministry of Environment and Forests, Mining Department, Forest Department

and Revenue Department of Andhra Pradesh State for survey of six mining leases in Bellary RF for demarcation of boundaries. The Regional Chief Conservator of Forests (Central), Bangalore was nominated to represent in the above Committee. The Committee has submitted interim report to the Hon'ble Supreme Court.

- The Regional Office, Bangalore has organised an Interactive meeting on 18th May, 2010 to improve the status of environmental management in mining projects in Goa.

Financial Achievement

A statement showing financial targets and achievements for the year 2010-11 is given in Table - 8.

Intensification of Forest Management Scheme (IFMS)

While aiming to expand forest cover in the country, it is equally important to improve the state of existing forests and protect them against various threats. This centrally sponsored 'Intensification of Forest Management Scheme' aims at strengthening forest protection machinery of the State/UT Governments and providing support for area-specific forest management interventions. The financial assistance is provided on cost share basis. All the North-Eastern States including Sikkim and special categories States, namely, Jammu & Kashmir, Himachal Pradesh and Uttarakhand share 10% of the cost, while the rest of the States/UTs share 25% of the cost of the annual plans of operations.

Table-8. Financial targets and achievements for 2010-11 (₹ in crore)

Revenue head		Capital head	
Target 2010-11 (upto 31.12.2010)	Achievement	Target 2010-11	Achievement (upto 31.12.2010)
10.50	7.03	0.50	0.38

The major components of the scheme include:

- Forest fire control and management.
- Strengthening of Infrastructure.
- Survey, Demarcation and Working Plan preparation.
- Protection and Conservation of Sacred Groves.
- Conservation and Restoration of Unique Vegetation & Ecosystems.
- Control and Eradication of Forest Invasive Species.
- Preparedness for Meeting Challenges of Bamboo Flowering and Improving Management of Bamboo Forests.

While the first three components have been under implementation since the X Plan period under the erstwhile 'Integrated Forest Protection Scheme', the remaining four components have been introduced from the year 2009-10 after obtaining the CCEA approval.

The scheme has helped the State/UT forest departments in modernising the forestry sector by way of creating infrastructure, such as, field offices, forest stations, residential facilities for frontline staff; construction of roads and patrolling paths; introduction of modern technology including use of PDS for field surveillance and reporting; providing field vehicles, arms and ammunitions.

Introduction of advanced technology helped in bridging the backlog in preparation of working plans. Forest fire control has become progressively effective by

way of creation and maintenance of firelines, early detection, reporting and quick mobilisation of force for forest fire control. Modern technology has also helped in improving planning for forest fire control and management.

This scheme has also provided incentives for involvement of local people through Joint Forest Management Committees in forest protection. Presently, there are more than one lakh JFMCs managing an extent of 22 mha involving more than 23 million people residing within the periphery of forest area.

The XI plan outlay for the scheme is ₹600.00 crores. The allocation for the year 2010-11 is ₹65.00 crores.

Forest Policy

Forest Policy Division of Ministry of Environment & Forests (MoEF) coordinates the National Forest Policy, 1988 and its implementation issues, Forest International Cooperation besides examining and coordinating the State Forest Policies, State Forest Acts/Amendments etc. In addition Forest Policy Division has been made Nodal Division



Fig-35. A typical rainforest in North East India

regarding Climate Change in Forestry Wing of MoEF. The details of the major activities coordinated by the Forest Policy Division during the year are as follows:

Constitution of Joint committee of Ministry of Environment and Forests (MoEF) and Ministry of Tribal Affairs (MoTA) to study the implementation of "Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights Act), 2006"

This Ministry constituted a Joint Committee of MoEF and MoTA in April 2010 under the Chairmanship of Dr.N.C. Saxena to study the implementation of "Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights Act), 2006".

- (i) The Ministry has been proactively involved in coordinating the implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Certain complaints were being received from different stakeholders regarding implementation of the said Act on the ground. As a consequence, Ministry constituted a Joint Committee of MoEF and MoTA to study the factors responsible for poor implementation of the Act, and suggest various ways for its speedy implementation. Ministry of Environment and Forests also participated in discussions of various meetings of the said Committee. The Committee has submitted its final report in January, 2011. The recommendations made by the committee in its report are under examination in this Ministry.
- (ii) An Advisory to all the States/UTs regarding withdrawal of court cases relating to forest offences against tribals has been issued.

Institutional Linkages between Forests and Institutions of Local Self Governance

The Ministry has given its comments on Draft Cabinet Note regarding amendment to PESA Act, 1996, and Model Rules under PESA and submitted to Ministry of Panchayati Raj (MoPR). The issue of linking JFM Committees with Panchayats has been resolved by issuing an advisory to State Governments under which JFMCs are to be treated as organs of Gram Sabha and they shall work under the overall guidance and supervision of Gram Sabha. The main points of the Advisory are:

- (i) Existing JFMCs should function under the overall guidance and supervision of the Gram Sabha and where new JFMCs are to be set up they should be done by the GramSabhas.
 - (ii) JFMCs should be recognized as organs of the Gram Sabha under the relevant state Acts relating to Panchayati Raj Institutions.
 - (iii) JFMCs should function as Standing Committees of Gram Panchayats for item 6 (social forestry and farm forestry) and item 7 (minor forest produce) listed in the Eleventh Schedule to the Constitution.
 - (iv) The manner in which the development funds of the JFMCs are used should be approved by the Gram Sabha.
- Amendment of Section 68 of Indian Forest Act, 1927
- Under the present provision of IFA, 1927, where the power to compound forest offences is extremely limited, even petty cases are often referred to courts for prosecution leading to harassment of Tribals and other people living in proximity

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of forests, who may sometimes unknowingly commit a petty forest violation. Hence, to ensure that in instances of such petty forest violations, the local people are not put to undue harassment through prosecution which entails litigation in courts, it is proposed to amend Section 68 (3) of Indian Forest Act, 1927 to enhance power vested with forest officials to compound a forest offence up to a limit of ₹10,000 (Rupees Ten Thousand only). The proposed draft Cabinet Note and draft Amendment Bill, 2010 has now been moved to the Ministry of Law for legal vetting.

Visits of Indian Delegation to neighbouring countries

High level Indian delegation headed by Dr. P.B. Gangopadhyay, Additional Director General of Forests visited China from 18 to 23 April, 2010. It was second meeting of China-India Forestry Working Group held in State Forestry Administration, Beijing-China. Both sides agreed for cooperation in the field of Forestry especially on cooperation in Remote Sensing technology, forest resource management, exchange among officials, technicians, and training institutions.

Indian delegation participated in the 23rd Session of Asia Pacific Forestry Commission held at Thimpu, Bhutan from 9th to 11th June, 2010. In the Commission India brought out the fact that India has capacity to impart training to the officials from Countries of the Asia Pacific Region with specific reference to the following:

- a. Application of remote sensing technology in forestry
- b. Management of natural forest system/working plans
- c. Assisted Natural Regeneration System (ANR)

- d. Community Forestry/Joint Forest Management
- e. Forest Genetic Resources
- f. Governance Structure of Forestry in India, Legal Frameworks and policies
- g. Agroforestry models for different species/zones
- h. Ecology and Biodiversity Conservation
- i. NTFP models in India -- people involvement in collection, marketing and processing
- j. Forestry research and education

Committee on Forestry (COFO)

Indian delegation Participated in the 20th Session of the Committee on Forestry (COFO) held at FAO Headquarters, Rome, Italy from 4th to 8th October, 2010. The Committee discussed various issues related to forestry. Prominent among them are:

1. Forest Biodiversity in the context of Climate Change
2. Forest Health and Forest Fire in the context of Climate Change
3. Forest and water in the context of the Climate Change
4. Strengthening public and private sector financial support for Sustainable Forest Management
5. Forest Governance
6. Emerging opportunities and challenges in the context of Climate Change including REDD+.

Wildlife Conservation

Introduction

Government of India provides technical and financial support to the State/ UT Governments for wildlife conservation under the various Centrally Sponsored Schemes -



Fig-36. *Athene brama*, spotted owl

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, Dehradun. 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 100 National Parks and 515 Wildlife Sanctuaries, 43 Conservation Reserves and four 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 ₹70.00 crore allocated during the

year 2010-11 under the Scheme, of which around 57.01 crore has been disbursed to various State/UT Governments till date. State-wise release of funds under the scheme is given in the (Table - 9)

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 (CITES) of Wild fauna and flora.

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.

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 2010-11 is ₹6.00 crores of which ₹3.34 crores has been utilized till date.

The Scheme also supported wildlife research activities/projects envisaged in the National Wildlife Action Plan (2002-2016). Grant 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

2

Table-9. State-wise release of fund under CSS- 'Integrated Development of Wildlife Habitats' 2010-11 (upto 31.12.2011)

(₹. in lakhs)

S. No.	Name of States/UTs.	Amount. Released
1	Andaman & Nicobar Island	87.872
2.	Andhra Pradesh	64.341
3.	Bihar	0
4.	Chandigarh	0
5.	Chhattisgarh	206.59
6	Daman & Diu	0
7.	Dadar Nagar Haveli	0
8.	Goa	32.879
9.	Gujarat	337.52
10.	Haryana	11.204
11.	Himachal Pradesh	229.64
12.	Jammu & Kashmir	537.336
13.	Jharkhand	48.13
14.	Karnataka	325.15
15.	Kerala	246.01
16.	Madhya Pradesh	523.84
17.	Maharashtra	290.95
18.	Orissa	241.51
19.	Punjab	18.36
20.	Rajasthan	279.71
21.	Tamil Nadu	278.33
22.	Uttar Pradesh	243.82
23.	Uttarakhand	134.90
24.	West Bengal	184.42
25	Delhi	0
	Total:	4322.492
	North-Eastern States	
26	Arunachal Pradesh	168.95
27	Assam	156.54
28	Manipur	88.32
29	Meghalaya	58.03
30.	Mizoram	6923.47
31	Nagaland	29.595
32	Sikkim	183.78
33	Tripura	0
	Total:	1378.685
	GRAND TOTAL:	5701.177



Fig-37. Wild Buffaloes in Pobitora Wildlife Sanctuary, Assam

supported inter alia include taxonomy, population estimation, wildlife conservation & management, restoration of degraded ecosystems, etc. About 15 projects in various disciplines of wildlife management are under various stages of consideration/implementation.

Regulatory Acts/Rules governing the programme and promulgation of new Acts

Wildlife Crime Control Bureau

The Wildlife Crime Control Bureau (WCCB) has been created under provision of the Wild Life (Protection) Act, 1972. The mandate has been specified under Section 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.

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.

The Wildlife Crime Control Bureau has five Regional Offices located Delhi, Mumbai, Kolkata, Chennai and Jabalpur and three Sub-regional offices at Amritsar, Guwahati and Cochin.

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



Fig-38. Nilgiri Thar (*Hemitragus hylocrius*), need conservation

2

of the Board include Members of Parliament, Member of Planning Commission, Chief of the Army Staff, representatives of Non Governmental Organizations, eminent conservationists/ecologists/environmentalists, Secretaries of various Ministries, and heads of Scientific institutions, State Governments 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. It has recently been again reconstituted on 4th September 2010. The 5th meeting of the NBWL was held on 18th March 2010 under the Chairmanship of Hon'ble Prime Minister.

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. It was again reconstituted on 14th September 2010. The Standing Committee had met 20 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



Fig-39. Tufted Grey Langurs (*Semnopithecus priam*) in Mudumali National Park, Tamil Nadu

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.

Central Zoo Authority

The Central Zoo Authority is a statutory autonomous body 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 healthcare of animals in Indian zoos and to control mushrooming of unplanned and ill-conceived zoos that were cropping up in the country as adjuncts to public parks, industrial complexes and waysides.

The Central Zoo Authority is a twelve member body headed by a Chairman. Minister of State for Environment & Forests (Independent Charge) is presently the *ex-officio* Chairman of the Central Zoo Authority. Member Secretary is the Chief Executive Officer of the Authority.

The Authority was reconstituted last (7th time) in October 2010 for a period of three years vide Gazette Notification No. 2177 dated 18th October 2010.

Zoos in India are regulated under the provisions of the Wild Life (Protection) Act, 1972 and are guided by the National Zoo Policy, 1998. The Central Zoo Authority, Government of India formulated Recognition of Zoo Rules, 1992 amended in 2009 and fixed standards and norms for management of zoos in the country. Central Zoo Authority oversees the functioning of zoos in the country and provides them technical and other assistance for their improvement. The functions assigned to the Authority under Section 38 (C) of the Wild Life (Protection) Act, 1972 are:

- (a) to specify the minimum standards for housing, upkeep and veterinary care of the animals kept in zoos;
- (b) to evaluate and assess the functioning of the zoos with respect to the prescribed standards or norms;
- (c) to recognise or derecognise zoos;
- (d) to identify endangered species of wild animals for purposes of captive breeding and assigning responsibility in this regard to a zoo;
- (e) to coordinate the acquisition, exchange and loaning of animals for breeding purpose;
- (f) to ensure maintenance of studbooks of endangered species of wild animals bred in captivity;
- (g) to identify priorities and themes with regard to display of captive animals in zoos;
- (h) to coordinate training of zoo personnel in India and outside India;
- (i) to coordinate research in captive breeding and educational programmes for the purposes of zoos;

- (j) to provide technical and other assistance to zoos for their proper management and development on scientific lines;
- (k) to perform such other functions as may be necessary to carry out the purposes of this Act with regard to zoos.

24th and 25th meetings of the Central Zoo Authority was chaired by the Hon'ble Minister of Environment & Forests (IC) Sri Jairam Ramesh on 10th June 2010 and 11th November 2010 respectively.

Expert Group on Zoo Designing of CZA had its 14th, 15th, 16th, 17th, 18th and 19th Meetings on 5th April, 26th April, 17th June, 9th August, 18th December 2010 and 1st February 2011 respectively. 54th, 55th, and 56th Meetings of the Technical Committee of the CZA were held on 24th June, 24th September and 22nd December 2010 respectively wherein the recommendations made by the Expert Group on Zoo Designing in addition to attending to other agenda were considered.

Evaluation of zoos

The Central Zoo Authority has evaluated 18 Mini zoos, six Medium zoos, 10 Small categories of zoos and five Rescue Centre till January 2011.

Recognition/ de-recognition of zoos

The Central Zoo Authority granted renewal of recognition to nine Circus, 27 Mini zoos, seven Medium zoos, six Rescue Centre and 12 Small categories of zoos till January 2011.

Conservation Breeding Programme

The Central Zoo Authority is coordinating planned Conservation Breeding Programme of 73 identified critically endangered wild animal species in Indian zoos. During the financial year 2010-11, the Central Zoo Authority has approved financial assistance of ₹5.4 lakh each for *Mouse deer* and *Vulture* species at Nehru Zoological Park Hyderabad

2



Fig-40. Indian Sarus Cranes (*Grus antigone*)

and Rs. 3.0 lakh for the conservation breeding programme of *King Cobra* at Pilikula Biological Park, Mangalore. The Central Zoo Authority has also 'in principle' approved for providing financial assistance for establishing conservation breeding centre to Biological Park, Itanagar for Hoolock gibbon, Zoological Park, Kohima for Blyth tragopan, and Sepahijala Zoological Park, Agartala for Clouded leopard, Pig tailed macaque, Binturong, and Phayre's langur.

Exchange/Transfer of animals by zoos

Thirty seven exchange proposals of animals between Indian zoos and four exchange proposals between Indian and foreign zoos have been approved by the authority during the year 2009-10.

Maintenance of Studbooks

The Wildlife Institute of India, Dehradun as assigned by the CZA; has prepared and

updated the national studbooks of 10 out of 14 identified wild animal species in captivity in Indian zoos. The Central Zoo Authority has also compiled the National studbooks/animal profiles of around 44 species taken up under the conservation breeding programme.

Theme/ Planning in zoos

The Central Zoo Authority has approved eight Master plan and 33 Master layout plan of the zoos till date.

Human Resource Development

The Central Zoo Authority in collaboration with Sanjay Gandhi Biological Park, Patna organized a workshop on "Conservation education and zoos" for the Educators working in the zoos at Patna from 6th April – 9th April 2010.

A workshop on "Ex-situ conservation, marketing, fund raising and resource management" was organized for Zoo directors at Kolkata in collaboration with Zoological Garden, Alipore Kolkata from 27th April- 30th April 2010.

The Central Zoo Authority in collaboration with National Institute of Animal Welfare, Ballabgarh organized a training programme on "Different aspects of animal welfare in zoos" for the lower level of personnel working in the zoos at Ballabgarh from 28th June – 2nd July 2010.

The Central Zoo Authority organized training programme on "SPARKS software" at Chennai from 22-26th November 2010, and Guwahati from 30 November – 4th December 2010 for the record keepers of zoos in collaboration with Arignar Anna Zoological Park and Assam State Zoo Guwahati respectively for better record keeping in zoos.

A workshop for the zoo Biologists on "Endangered Species Management" was organized at Bhubaneshwar in collaboration

with Nandankanan Zoological Park, Bhubaneswar from 14-17th December 2010.

A training programme for the zoo Veterinarian on "Protocol on safety & veterinary care of wild animals during transportation with special reference to deer species" was organized at Chennai in collaboration with Madras Veterinary College and Arignar Anna Zoological Park Chennai from 24-28th January 2011.

The Central Zoo Authority provided financial assistance to zoos at Sarahan, Mysore, Guwahati and Ahmedabad for organizing two week training programme for the Zoo Keepers on "Management of birds in captivity with special reference to pheasants" on regional basis.

The Central Zoo Authority has executed an MoU with Wildlife Reserve Singapore on human resource development, animal exchange, capacity building and cooperation on conservation issues. To this effect, Shri K.S.S.V.P. Reddy, Director Arignar Zoological Park and Shri A.K Bhowmick, Director Sepahijala Zoological Park, Agartala were sponsored by Wildlife Reserve, Singapore in its training programme on "Animal Enrichment" held from 4th -7th October 2010 whereas the CZA has sponsored Dr. Abraham Mathew, Veterinarian of Singapore Zoo in its Biologist training programme held from 14th - 17th December 2010 at Bhubaneswar.

The Central Zoo Authority sponsored Dr. Sudarshan Panda, Director Nandankanan Zoological Park, Bhubaneswar and B. K. Gogoi, Pathologist, Assam State Zoo, Guwahati for attending the Endangered Species Recovery Course organized by the Durrell Wildlife Conservation Trust, Jersey, UK from 12th - 30th July, 2009.

Shri. B.S. Bonal Member Secretary, Central Zoo Authority attended 65th meeting

of the WAZA & CBSG held at Cologne, Germany from 14-21st October 2010.

Research & Education

The Central Zoo Authority has awarded small grant research project to Madras Crocodile Bank Trust, Mammalapuram for conducting study on the anti-venom requirement vis-à-vis handling of the snakes with the grant of ₹2.845 lakh for the duration of the 5 months.

The Central Zoo Authority has also approved a grant of ₹3.4 lakh to Association of Indian Zoos and Wildlife Veterinarian, Bareilly for the publication of Book in Hindi on "Indian Endangered Wildlife-Management and Conservation" with the duration of the ten months.

Improvement of zoos

For the improvement of zoos, the Central Zoo Authority has approved grants of ₹39.5 lakhs for Children's Park, Guindy, Chennai, ₹33.23 lakhs for Lucknow Zoological Park, ₹92.0 lakhs to Arignar Anna Zoological Park, ₹58.30 lakhs for Aizawl Zoological Park, Aizawl, ₹68.3 lakhs for Assam State Zoo, ₹101.82 for Biological Park, Itanagar, ₹36.4 lakhs for Rajiv Gandhi Zoo, Pune, ₹0.89 lakh for Chennai Snake Park and ₹23.50 for Darjeeling zoo.

Financial matters

During the financial year 2010-11, total ₹1735 lakhs has been allotted to Central Zoo Authority as Grants-in-Aid from Ministry of Environment & Forests, Government of India. Out of this, ₹1301 lakhs have been received by CZA till January 2011.

Other activities carried out during the year

The Central Zoo Authority has provided an amount of ₹489.52 lakhs to 7 Nos. rescue centres created at Bangalore, Chennai, Tirupathi, Visakhapatnam, Bhopal, Jaipur and

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South-Khairabari (West Bengal) for maintenance (including feed and medicines etc.) and rehabilitation of Lions and Tigers rescued from the circuses.

Wildlife Institute of India, Dehradun

Wildlife Institute of India (WII) was established in 1982, a premier training and research institution in the field of wildlife and protected area management in South Asia, 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.

The Institute conducted various research projects, academic and training programmes during the year. The details of research and education programmes are given in Chapter-7 and 8 respectively.

National Tiger Conservation Authority (NTCA)

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".

Milestone achievements

Legal Steps

- Amendment of the Wild Life (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.
- Enhancement of punishment in cases of offence relating to a tiger reserve or its core area.

Administrative steps

- Strengthening of antipoaching activities, including special strategy for monsoon patrolling, by providing funding support to Tiger Reserve States, as proposed by them, for deployment of antipoaching squads involving ex-army personnel / home guards, apart from workforce comprising of local people, in addition to strengthening of communication / wireless facilities.

-Constitution of the National Tiger Conservation Authority with effect from 4th September, 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



Fig-41. *Neophron percnopterus*, Egyptian vulture, population decline has to be checked

the Chairmanship of Chief Ministers and establishment of Tiger Conservation Foundation.

- Constitution of a multidisciplinary Tiger and Other Endangered Species Crime Control Bureau (Wildlife Crime Control Bureau) with effect from 6th June, 2007 to effectively control illegal trade in wildlife.
- The “in-principle” approval has been accorded by the National Tiger Conservation Authority for creation of four new tiger reserves, and the sites are: Biligiri Ranganatha Swamy Temple Sanctuary (Karnataka), Pilibhit (Uttar Pradesh), Ratapani (Madhya Pradesh), Sunabeda (Orissa) and Mukundara Hills (including Darrah, Jawahar Sagar and Chambal Wildlife Sanctuaries) (Rajasthan). Besides, the States have been advised to send proposals for declaring the following areas as Tiger Reserves: (i) Bor (Maharashtra), (ii) Suhelwa (Uttar Pradesh), (iii) Nagzira-Navegaon (Maharashtra) and (iv) Satyamangalam (Tamil Nadu)
- 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 ₹1 lakh/family to ₹10 lakhs/family), rehabilitation/ resettlement of communities involved in traditional hunting, 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 31407.11 sq. km. has been notified by 16 Tiger States (out of 17) as core or critical tiger habitat under section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006 (Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Orissa, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal). The State of Bihar has taken a decision for notifying the core or critical tiger habitat (840 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).

Financial Steps

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

International Cooperation

- India has a 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 3rd to 15th June, 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,

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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.

- Based on India's strong intervention during the 58th meeting of the Standing Committee of the CITES at Geneva from 6th to 10th July, 2009, the CITES Secretariat has issued a notification to Parties to submit reports relating to compliance of Decisions 14.69 and 14.65 within 90 days with effect from 20th October, 2009 (Progress made on restricting captive breeding operations of tigers etc.).

Reintroduction of Tigers

- As a part of active management to rebuild Sariska and Panna Tiger Reserves where tigers have become locally extinct, reintroduction of tigers / tigresses have been done.
- Special advisories issued for in-situ build up of prey base and tiger population through active management in tiger reserves having low population status of tiger and its prey.

Creation of Special tiger Protection Force (STPF)

- The policy initiatives announced by the Finance Minister in his Budget Speech of 29th February, 2008, inter alia, contains action points relating to tiger protection. Based on the one time grant of ₹50.00 crore 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. ₹93 lakhs

each has been released to Corbett, Ranthambhore & Dudhwa Tiger Reserve for creation of STPF during 2008-09. Since then, the guidelines of the STPF have been revised for deploying forest personnel in place of Police as an option-II, with scope for involving local people like the Van Gujjars.

- In collaboration with TRAFFIC-INDIA, an online tiger crime data base has been launched, and Generic Guidelines for preparation of reserve specific Security Plan has been evolved.

Recent initiatives

- Implementing a tripartite MOU with tiger States, linked to fund flows for effective implementation of tiger conservation initiatives.
- Rapid assessment of tiger reserves done.
- Special crack teams sent to tiger reserves affected by left wing extremism and low population status of tiger and its prey.
- Chief Ministers of tiger States addressed at the level of the Minister of State (Independent Charge) for Environment and Forests on urgent issues, viz. implementation of the tripartite MOU, creation of the Tiger Conservation Foundation, stepping up protection etc.
- Chief Ministers of States having tiger reserves affected by left wing extremism and low population status of tiger and its prey addressed for taking special initiatives.
- Steps taken for modernizing the infrastructure and field protection, besides launching 'M-STRIPES' for effective field patrolling and monitoring.
- Steps taken for involvement of Non-Governmental Experts in the ongoing all India tiger estimation.
- Special independent team sent to Simlipal for assessing the status, besides

constituting State level Coordination Committee for redressing the administrative problems.

- Issue of tiger farming and trafficking of tiger body parts discussed at the level of Minister of State (Independent Charge) for Environment and Forests with the Chinese Authorities.
- Action taken for amending the Wildlife (Protection) Act, 1972 to ensure effective conservation.
- Initiatives taken for improving the field delivery through capacity building of field officials, apart from providing incentives.
- Steps taken for the independent Monitoring and Evaluation of tiger reserves.
- Action initiated for using Information Technology to strengthen surveillance in tiger reserves.
- Providing special assistance for mitigation of human-tiger conflicts in problematic areas.
- As an outcome of the fourth Trans-border Consultative Group Meeting held in New Delhi, a joint resolution has been signed with Nepal for biodiversity / tiger conservation.

Progress / Achievements made during the year

- Funding support provided to 39 tiger reserve in 17 States.
- The 2nd All India tiger estimation based on the refined methodology has been initiated.
- An area of 1093.79 sq. km. has been notified by Uttar Pradesh as the core/critical tiger habitat. With this, 16 Tiger States (out of 17) have notified the core or critical tiger habitat under section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006 (Andhra Pradesh,

Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Orissa, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal), amounting to 31407.11 sq.km. The State of Bihar has taken a decision for notifying the core or critical tiger habitat (840 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).

- In-principle approval has been accorded for creation of five more tiger reserves as follows:-

Sl. No.	Name of Tiger Reserve	State
1.	Ratapani	Madhya Pradesh
2.	Sunabeda	Orissa
3.	Pilibhit	Uttar Pradesh
4.	Biligiri Ranganatha Temple	Karnataka
5.	Mukundara Hills (including Darrah, Jawahar Sagar and Chambal Wildlife Sanctuaries)	Rajasthan

- Further, the following areas have been suggested, by the National Tiger Conservation Authority to States, for creation as tiger reserves.

Sl. No.	Name	State
1.	Satyamangalam	Tamil Nadu
2.	Nagzira-Navegaon	Maharashtra
3.	Bor	Maharashtra
4.	Suhelwa	Uttar Pradesh

- Implementing "e-Eye" – a tool of electronic surveillance at the Corbett Tiger Reserve as a pilot project.
- As a communication strategy, a bimonthly

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Table-11. Budget allocation of NTCA (Amount in ₹)

S.No.	Name of State	Released Amounts
1	Andhra Pradesh	10891500.00
2	Arunachal Pradesh	19302010.00
3	Assam	150947200.00
4	Bihar	15835520.00
5	Chhattisgarh	158955000.00
6	Jharkhand	13061600.00
7	Karnataka	150039500.00
8	Kerala	25732200.00
9	M.P	347289200.00
10	Maharashtra	233564000.00
11	Mizoram	15015200.00
12	Orissa	78186010.00
13	Rajasthan	227586000.00
14	Tamil Nadu	46365360.00
15	U.P	25938500.00
16	Uttaranchal	23785000.00
17	West Bengal	41803333.00
	Total	1584297133.00
	N.E.	185264410.00
	W.N.E	1300032723.00
	Cpital	99000000.00
	Total - I	1584297133.00
	NTCA	143000000.00
	Total - II	1727297133.00
	S.NE.	240000000.00
	B.NE	17735590.00
	G.Total	1985032723.00

outreach journal 'STRIPES' is published by the National Tiger Conservation Authority.

- During the current financial year, an amount of ₹8710.118 lakhs has been provided to Chhattisgarh, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Maharashtra and Tamil Nadu for village relocation from Achanakmar, Nagarahole, Bandhavgarh, Kanha, Similipal, Sariska, Melghat and Mudumalai Tiger Reserves.
- As a part of active management to rebuild

Sariska and Panna Tiger Reserves where tigers have become locally extinct, reintroduction of tigers / tigresses was continued.

- Steps taken for modernizing the infrastructure and field protection, besides launching 'M-STRIPES' – a monitoring system for tigers' intensive protection and ecological status for effective field patrolling and monitoring.
- Joint resolution with Nepal was signed on 29th July, 2010 for transborder biodiversity and tiger conservation.

- Officers participated in the International Tiger Forum (Global Tiger Summit) at St. Petersburg, Russia, where Heads of Government endorsed the Global Tiger Recovery Programme for tiger conservation at global level.

Regulatory Acts/Rules governing the program and promulgation of new Acts, if any, along with the details

The Wildlife (Protection) Act, 1972, is the main regulatory Act governing the program. The said Act has been amended in 2006 to provide a separate Chapter (IVB) for strengthening tiger conservation.

Budget allocation of the scheme during the year and progress of expenditure till date are given in Table-10 & 11.

Implementing organization along with details

The Project is implemented in designated tiger reserves through respective State Governments, as a Centrally Sponsored Scheme.

Project Elephant

Introduction and Objectives

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 support is being provided to major elephant bearing States in the country. The Project is being mainly implemented in 16 States / UTs , viz. Andhra Pradesh , Arunachal Pradesh , Assam , Chhattisgarh , Jharkhand , Karnataka , Kerala

, Maharashtra , Meghalaya , Nagaland , Orissa , Tamil Nadu , Tripura , Utrakhand , Uttar Pradesh and West Bengal.

Outlay for the scheme for 2010-11	₹21.50 crores
Expenditure as on 14 th January, 2011	₹20.57 crores

Important Initiatives taken during the year

- A Task Force on Project Elephant under the Chairmanship of Prof. Mahesh Rangarajan, Professor, Department of History, University of Delhi was constituted in April 2010 to provide detailed recommendations to upgrade the project to bring about more effective conservation and management regime for the species in India.

The Task Force submitted its report in August 2010.

- The implementation of the important recommendations is in progress.
- Pursuant to the Task Force recommendation , Elephant notified as National Heritage Animal .
- Action initiated to constitute statutory “National Elephant Conservation Authority”

Major recommendations of the Task Force on Project Elephant

Ministry of Environment and Forests had constituted a Task Force on Project Elephant on 15th February, 2010 with the mandate to suggest measures for more effective conservation and management of wild and captive elephants in India. The Task Force submitted its report on 31st August, 2010. The major recommendations of the Task Force are as follows:-



Fig-42. Asian Elephants (*Elephas maximus*)

- To form National Elephant Conservation Authority (NECA)

The Task Force is of the view that there is a need to strengthen the organizational framework for the Project Elephant so as to give more teeth and financial strength. With creation of NECA on the line of National Tiger Conservation Authority, Task Force has recommended to increase the financial outlay of the project to ₹600 crore in the 12th Plan against ₹81.99 crore in the 11th Plan.

- To constitute a Consortium of Elephant Research and Estimation (CERE) for designing a robust and scientific elephant monitoring programme

Currently population estimates of elephants are made at interval of five years by State Forest Departments using traditional methods. To bring better reliability and transparency, the Task Force has proposed an improved three tier approach for population monitoring and also landscape assessment. This is to be done by a consortium (CERE) of scientists, statisticians, research institutes, universities and NGO's.

- To declare Elephant as National Heritage Animal

The Task Force is of the view that such declaration will accord elephant its due place of pride. It also recommends a) launching of "Haathi-Mere-Saathi" awareness campaign and b) starting Regional Gajah Centers for education and outreach about elephant behaviour, ecology, etc.

- For Mitigation of Human-Elephant Conflict

Task Force has recommended:

- Constitution of Conflict Management Task Force in identified areas consisting of Elephant Experts, people's representatives and representatives of Revenue, Forest and Civil Departments.
- Enhancement of ex-gratia payment to at least Rs three lakh in case death of human life by elephants against current minimum rate of Rs one lakh.

This is necessary as on an average nearly 400 people are killed annually by elephants and about one million hectares of crop damage takes place affecting 500,000 families.

- On Securing Elephant Landscapes and Corridors

India is home to more than 50% of Asian elephant population. The elephant habitat in India spread over 110,000 km² which the Task force has divided in 10 Elephant Landscapes. It has identified five out of ten landscapes for initiating integrated and comprehensive conservation strategy.

The Task Force has prioritized 88 Elephant



Fig-43. Elephants in Satkoshia wildlife sanctuary, a part of Mahanadi Elephant Reserve

Corridors in High Ecological Priority and Low Ecological Priority and has suggested notification of the corridors by respective State Governments.

It has also recommended consultation with NECA whenever any land is to be diverted in these landscapes and corridors for developmental purposes.

– Welfare of Captive Elephants

India has nearly 3600 captive elephants. The Task Force recognizing the role of captive elephants in our culture and traditions, has suggested following measures :-

- Strict enforcement of the existing legal provisions.
- One time amnesty to all elephant owners to declare the same for grant of ownership certificate to be called guardianship certificate in future.
- Setting up of Captive Elephant Welfare Committees (CEWCs) at state level for regular monitoring of the conditions of captive elephants.

- Training and certification of Mahouts.

- Creation of life time care centers for elephants.

- Creation of wildlife veterinary wing within state Forest departments.

- On Anti Poaching, Trade and Ivory Issues

For enhanced protection of the elephant population, the Task force has suggested:

- Immediate filling of vacancies of the frontline staff with local youths.

- Free ration /food allowance for frontline staff including daily watchers.

- Insurance cover to the front line staff involved in protection duties.

- Setting up of Fast Track special courts to deal with wildlife crime.

– On Global Lead in Elephant Conservation

The Task Force has recommended:

- Hosting of International Elephant Congress by India

- Establishing Asian Elephant Forum on the lines of the Global Tiger Forum for securing trans-boundary elephant landscapes.

Estimation of Wild Elephants

All India estimation of wild elephant population is done every 5 years . The trend of last four estimations clearly indicates increase in population of wild elephants in the country. Next All India Estimation is due in 2012. The result of last four estimations are given in Table-12.

Table-12. Estimated population of wild elephants

REGION	STATE	ELEPHANT POPULATION			
		1993	1997	2002	2007
North-East	Arunachal	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	Nil
	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
	Chattisgarh	-	-	-	122
	Total for East		2314	2444	2649
North	Uttarakhand (*part of earstwhile UP)	828*	1130*	1582	1346
	U.P.	47	70	85	380
	Total for North		875	1200	1667
South	Tamilnadu	2307	2971	3052	3867
	Karnataka	5500	6088	5838	4035
	Kerala	3500	3600	3850	6068
	Andhra Pradesh	46	57	74	28
	Maharashtra	-	-	-	7
	Total for South		11353	12716	12814
Islands	Andaman & Nicobar	35	35	40	NA
Grand Total		25604	25877	26413	27669-27719

Elephant Reserves

With the notification of Uttar Pradesh Elephant reserve in the year 2009, the total number of Elephant Reserves (ERs) in the country has become 27 where as permission for five more Elephant Reserves - Baitarini ER & South Orissa ER in Orissa, Lemru & Badalkhod in Chattisgarh and Khasi ER in Meghalaya has been accorded by the Ministry. The area under these would be extending over about 69582 sq km. The list of ERs with date of Notification and area is given in Table-13

Animal Welfare

The AWBI (Animal Welfare Board of India) Plan Scheme relates to provision of assistance for the following type of activities: Financial assistance to Animal Welfare Organisations for maintaining the stray animals in distress and for their treatment (Financial assistance based on the number of animals kept for their fodder, water, minor treatment etc); Human Education Programmes for the welfare of animals; Capital expenditure at the Board's Headquarters i.e. expenditure on non-recurring items such as purchase of Assets/equipments; Expenditure on a variety of other animal welfare activities such as Rescue of Cattle from illegal smuggling and transportation; rehabilitation of rescued circus animals Lab Animals; Inspections, legal expenses in connection with court cases pertaining to animal welfare; Mobile Clinics.

Scheme for Provision of Shelter Houses for animals

There are a large number of animals in our country without proper shelter especially in Goshalas/Pinjrapoles. A number of them are not cared for and are left in the streets, either wounded or suffering from various diseases. Though there are shelter houses

operating at various places, their number is not adequate and the facilities provided are insufficient. This scheme endeavours to fill this gap and provide requisite services for the care and protection of uncared for animals by making provision for establishment and maintenance of shelter houses to various NGOs, Animal Welfare Organisations (AWOs), Goshalas etc. Under this Scheme, the AWOs are assisted to the extent of 90% of the project cost of the construction of a shelter house with a ceiling of ₹25 lakhs including 10% contribution to be made by the AWOs. The amount is released in two equal installments. ₹4.00 crore was provided under the scheme during 2010-2011 for construction of shelter house.

Scheme for Animal Birth Control (ABC) and Immunization of stray dogs

Keeping in view the overpopulation of stray dogs (extended 20 million) throughout the country and also the increase of human / animal deaths due to Rabies, this scheme is being implemented by the Animal Welfare Board of India to facilitate sterilization and immunization of stray dogs through the NGOs including SPCAs throughout the country. The Local Governments/Municipal bodies are also showing increased keenness to become stakeholders in the programme. Presently several Municipalities (such as Delhi, Greater Hyderabad) has entered MOU with AWBI to tackle the population with the objective to make the country "Rabies free". There is an urgent need to expand this scheme to cover more Metros & rural areas to address the issue effectively. Under the scheme, the norms for financial assistance are at ₹370/- per dog for pre & post operative care including medicines & ARV and ₹75/- per dog for catching and relocation of dog (Total ₹445/- per dog). An assistance of ₹3.60 crore was provided under the scheme.

Table-13. List of Elephant Reserves

Sl.No.	Elephant Range	Elephant Reserve with date of notification	State	Total Area (Sq. Km)
I	Eastern India 1. (South West Bengal-Jharkhand -Orissa)	Mayurbhanj ER (24.10.02)	W. Bengal	414
		2. Singhbhum ER (26.9.01)	Jharkhand	4530
		3. Mayurbhanj ER (29.9.01)	Orissa	3214
		4. Mahanadi ER (20.7.02)	Orissa	1038
		5. Sambalpur ER (27.3.02)	Orissa	427
		6. Baitarni ER#	Orissa	1755
		7. South Orissa ER#	Orissa	4216
		8. Lemru #	Chattisgarh	450
		9. Badalkhol-lamorpingla- #	Chattisgarh	1048.30
II	Total			17092.30
	North Brahmaputra (Arunachal-Assam)			
III	South Brahmaputra (Assam-Arunachal)	10. Kameng ER (19.6.02)	Arunachal	1892
		11. Sonitpur ER (6.3.03)	Assam	1420
		Total		3312
IV	Kaziranga (Assam-Nagaland)	12. Dihing-Patkai ER (17.4.03)	Assam	937
		13. South Arunachal ER(29-2-08)	Arunachal	1957.50
		Total		2894.50
V	Eastern Dooars (Assam-W. Bengal)	14. Kaziranga – Karbi Anglong ER (17.4.03)	Assam	3270
		15. Dhansiri-Lungding ER (19.4.03)	Assam	2740
		16. Intanki ER (28.2.05)	Nagaland	202
VI	E. Himalayas (Meghalaya)	Total		6212
		17. Chirang-Ripu ER (7.3.03)	Assam	2600
		18. Eastern Dooars ER (28.8.02)	W. Bengal	978
VII	Nilgiri –Eastern Ghat (Karnataka-Kerala-Tamilnadu- Andhra Andhra)	19 Garo Hills ER (31.10.01)	Meghalaya	3,500
		20. Khasi Hills ER#	Meghalaya	1331
		Total	4831	
VIII	South Nilgiri (Kerala- Tamilnadu)	21. Mysore ER (25.11.02)	Karnataka,	6724
		22. Wayanad ER (2.4.02)	Kerala	1200
		23. Nilgiri ER (19.9.03)	Tamilnadu	4663
		24. Rayala ER (9.12.03)	Andhra	766
		Total		13353
IX	Western Ghat (Tamilnadu- Kerala)	25. Nilambur ER (2.4.02)	Kerala	1419
		26. Coimbatore ER (19.9.03)	Tamilnadu	566
		Total		1985
X	Periyar (Kerala-Tamilnadu)	27. Anamalai ER (19.9.03)	Tamilnadu	1457
		28. Anamudi ER (2.4.02)	Kerala	3728
		Total		5185
XI	Northern India (Uttaranchal- UP)	29. Periyar (2.4.02)	Kerala	3742
		30. Srivilliputtur ER(19.9.03)	Tamilnadu	1249
		Total		4991
TOTAL		31. Shivalik ER (28.10.02)	Uttaranchal	5405
		32. Uttar Pradesh ER (9.9.09)	U.P.	744
		Total		6149
TOTAL				69582.80

2

Scheme for provision of Ambulance Services to Animals in Distress

Under this Scheme, Ambulance/Rescue Vehicles are provided to AWOs/Gaushalas working in the field of animal welfare. The ambulance services are to be used for the following purposes:

- to ensure that immediate treatment / first aid is given to sick, injured stray / abandoned animals;
- to act as an outreach to help the poor people whose animals are involved in accidents or affected with disease and are immobile;
- to act as mobile clinic to hold camps where animals in a village can be vaccinated and treated;
- to pick up unwanted or hostile animals from human habitations;
- to implement the ABC/AR programme by collecting dogs and then releasing them after sterilization and immunization;

Under this scheme the AWOs/Gaushalas are assisted to the extent of 90% project cost for purchase of a suitable vehicle and equipment, modifications and fittings thereon. The maximum amount of grant-in-aid is limited to ₹3.50 lakhs for purchase of the vehicle and ₹1.00 lakhs for equipment, modification and fittings thereon. ₹ 2.00 crore was provided during 2010-11 for the purpose.

Scheme for Relief to Animals during Natural Calamities and Unforeseen Circumstances

We face natural calamities every year in the form of floods, cyclones, droughts and earthquakes. In such circumstances there is an immediate requirement for the provision of relief to affected animals by providing fodder, adequate shelter, medical attention

otherwise the animals would perish. Apart from this, financial assistance is also provided under the scheme for providing relief to the animals affected during natural calamities and for relief to animals rescued from illegal transportation, slaughter, circuses etc.

Animal Welfare Division also handles following two schemes:

- Committee for Purpose of Control and Supervision of Experiments on Animals (CPCSEA)
- National Institute of Animal Welfare (NIAW)

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

The main objective of the Prevention of Cruelty to Animals Act (PCA), 1960 is to prevent infliction of unnecessary pain or suffering on animals. Accordingly, the Committee for Purpose of Control and Supervision of Experiments on Animals (CPCSEA) has been constituted under provisions of Section 15 of this Act. The Act provides for the duties and powers of the CPCSEA, and also penalties, in event of contravention of orders made, or conditions imposed by the Committee. The mandate of the 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 CPCSEA functions within the ambit of the PCA Act, and Rules framed under it, e.g., Rules for Breeding of and Experiments on Animals (Control and Supervision), 1998 as amended.

CPCSEA has been reconstituted on 11th November, 2010 as a committee of experts from several areas, including medicine, veterinary science, pharmaceuticals, biotechnology, biostatistics, animal behavior

and ethics. Apart from this, representative of NGOs/AWOs are also associated with CPCSEA. A total of 1401 institutions have been registered by CPCSEA and 492 CPCSEA nominees have been appointed to assist the Committee in its functions. During this financial year, 165 project proposals on large animals have been considered and 25 have been approved and 5 large animal house facilities have been approved. Regional National Conference of CPCSEA was conducted at Kolkata in West Bengal in April, 2010 and financial assistance was given to CDRI, Lucknow and NIN, Hyderabad to conduct Conference on Animal Ethics.

National Institute of Animal Welfare (NIAW)

The National Institute of Animal Welfare (NIAW) has been set up as a subordinate office of the Ministry of Environment and Forests. The objective of NIAW is to impart training and education in Animal Welfare on a diversified basis comprising, among other things, animal management, their behavior 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 has been operational since January, 2006.

NIAW is conducting different training courses (In-service/ Internship training/ Capacity building) for the different Stakeholders (Personnel from BSF/ ITBP/CZA, B.VSc. Students; Dog Catchers/Gaushala Personnels/ Hon. Animal Welfare Officers) associated with implementation of various animal welfare schemes/ rules. As per the Guidelines of VCI, the internship training programme for 2010-11 started from November, 2010 to

July, 2011, for different Universities. During this period 700 students, 95 personnel of Paramilitary forces / Zoo personnel and 111 NGOs / AWOs have successfully completed different type(s) of training at NIAW. The other major initiative taken is to impart practical training, capacity building and Clinical skill upgradation of Veterinary Doctors and Para Veterinary staff through Project Vet-train under collaboration with Vet Beyond Borders, Australia. Similarly, students/teachers of Germany under Indian Cultural Exchange programme are also facilitated for their project work under the School training programme of NIAW. NIAW has undertaken Extension programme for villagers in U.P. and Haryana also.

Programme issues and possible options

The thrust areas that require focus are described below:

Rabies is one of the most dreadful infectious diseases affecting both human beings and animals. Rabies is prevalent throughout India except the islands of Lakshadweep and Andaman & Nicobar but has a low public health priority. Considering that Rabies is fully preventable disease and the huge expenditure incurred on post-exposure vaccination both in humans as well as animals, there is an urgent need to control and finally eradicate this dreaded disease from India as has been achieved by several European countries as well as South East Asian countries like Malaysia and Singapore.

The AWBI is currently the only agency which is involved in controlling the population of stray/community dogs through Animal Birth Control (ABC) Programme and administering anti-rabies vaccination (ARV) to them in some metros of the country. At present approximately 1,00,000 dogs per year are sterilized/ immunized which is grossly inadequate, with

2

an estimated population of 20 million street dogs. Under the Animal Birth Control scheme, the norms for financial assistance are at ₹370/- per dog for pre & post operative care including medicines & ARV and ₹75/- per dog for catching and relocation of dog (Total ₹445/- per dog).

WHO has also recommended controlling the population of dogs through ABC/AR programme rather than killing them, which does not go well with our cultural ethos of love and compassion for animals. This policy also supports rules framed under Prevention of Cruelty to Animals Act, 1960. (ABC Dogs Rules-2001).

An ambitious programme (Rabies free India) of this nature will require appropriate support by providing additional allocations for Central Sector Scheme or Animal Birth Control.

Capacity Building – Gaushalas & ABC

The country’s large population of stray/ abandoned cattle is supported by a network of Gaushalas and Pinjrapoles, which are in turn get of supported by AWBI. A number of these Gaushalas have been set up by philanthropist individuals and groups, and do need capacity building and management support, what is provided by AWBI to the extent possible.

CPCSEA

It is proposed to step up the level of activities undertaken by CPCSEA in terms of

- Expansion of the coverage of Institutions, which are registered with CPCSEA;
- Emphasis on inspections of animal house facilities throughout the country;
- Ensure engagement of CPCSEA nominees, on target Institutional Animals Ethics Committees of various institutions;

Table-14. Budget of 2010-11 and proposed BE for 2011-12 for Animal Welfare Programme

	Outlay (In crores)	Quantifiable deliverables	Achievement till 31.12.2010	BE 2011-12 (in crores)	Quantifiable deliverables
AWBI Plan	11.18	800 AWO's assisted	687	10	900
Shelter House	4.00	44 Shelter	17 shelters (34 AWOs)	8	44
ABC Scheme	3.60	84000 ABC's	52214	4.50	110000
Ambulance Scheme	2.00	45 Ambulances	30	3	45
Natural Calamity	0.32	Cannot be fixed in the event of	Fund released Natural Calamity	0.50 fixed	Can not be
Committee for the Purpose of Control and Supervision of Experiments on Animal (CPCSEA)	0.35	Cannot be fixed	67 establishments were registered, 25 proposals approved for experiments, 3 Animal House Facilities approved	0.50	Can not be fixed
Nation Institute of Animal Welfare	2.55	26 Training Courses	17 Courses (Completed)	2.50	26 Training Courses

- Imparting training to these CPCSEA nominees;
- Increasing the focus on public outreach by way of publications, media coverage and seminars, with special emphasis on the scientific community, which relies on use of animals in experimentation.
- Undertaking the information, education and communication activities (Seminar and other awareness programme)

National Institute of Animal Welfare (NIAW)

The Institute need to focus on activities as following:

- Scope and number of trainings.
- Practical training for capacity building and Clinical up gradation of Veterinary Doctors/ Para Veterinary staff

- Introduction of specialized training in a phased manner with induction of faculty installation of equipment, upgradation of facilities (including provision for new hostels) as also functioning of an animal hospital and first-aid service through Mobile clinic.
- Activities to undertake Information, communication and Education to all the stakeholders

The budget of 2010-11 and proposed BE for 2011-12 alongwith physical target is summarized Table - 14.

The enhanced amount asked in BE 2011-12 is due to inflation and extra quantifiable deliverables (Physical Targets) against plan scheme and ABC Schemes.

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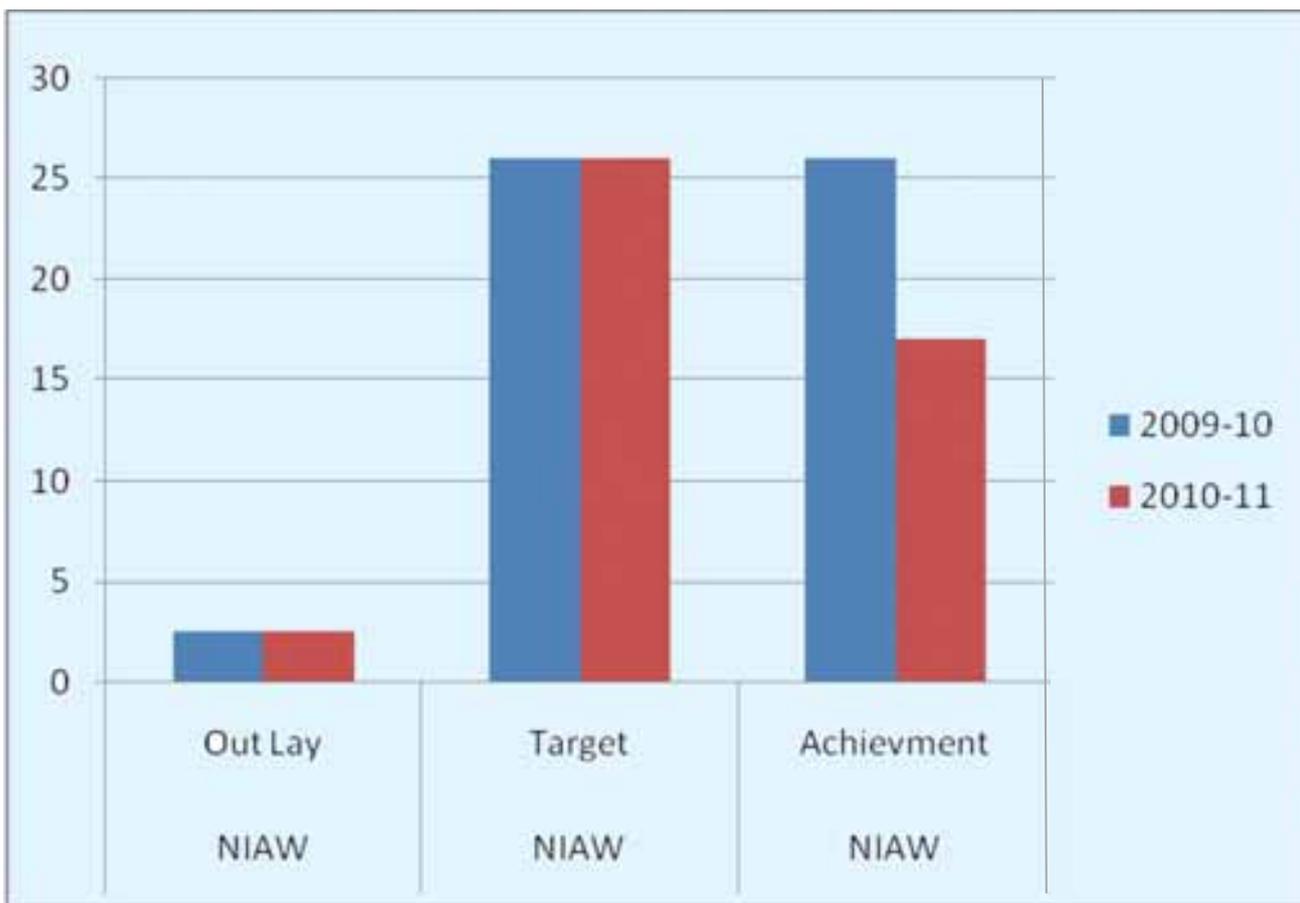


Fig-44. Target/ Achievement for the Year 2009-10 and 2010-11 of National Institute of Animal Welfare (NIAW) (upto 31.12.2010)

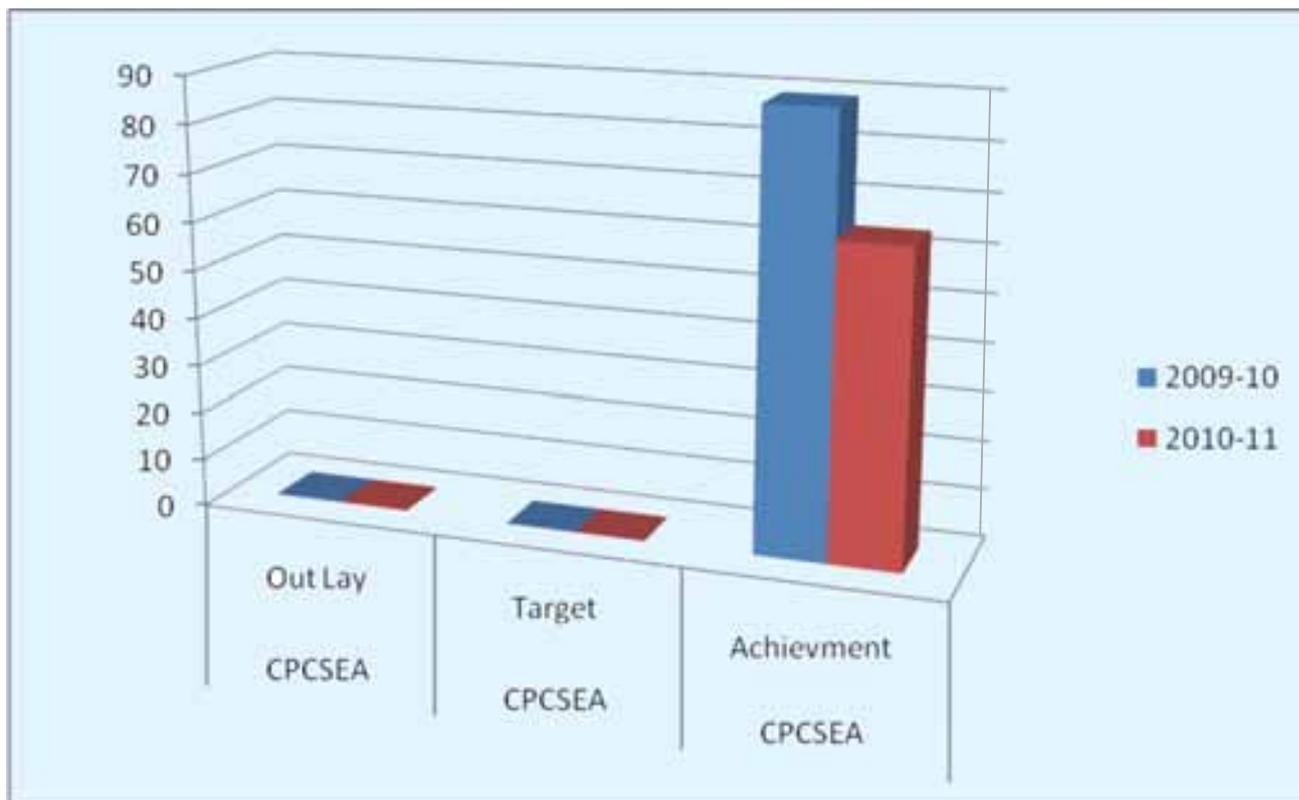
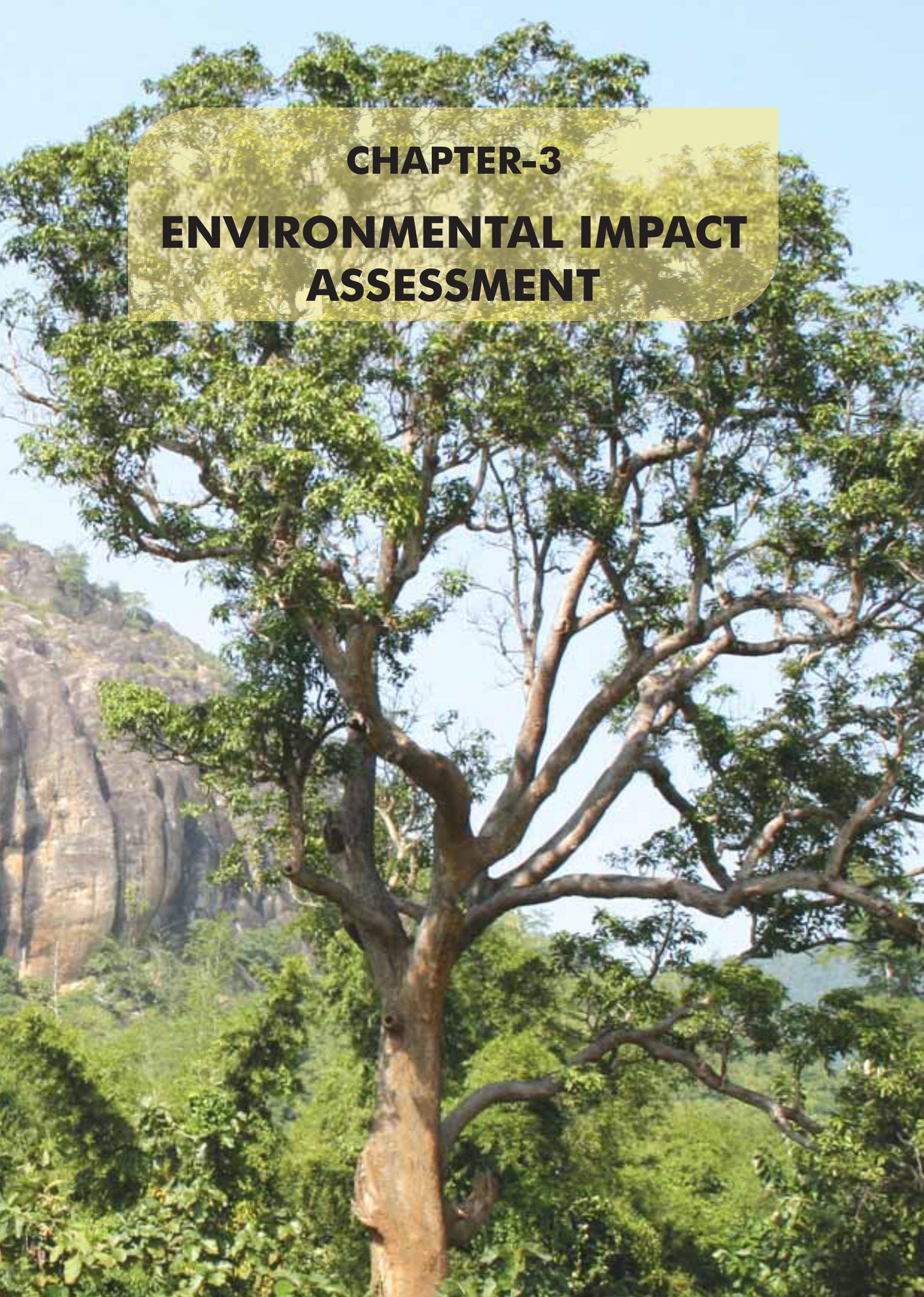


Fig-45. Target/ Achievement for the Year 2009-10 and 2010-11 of CPCSEA (upto 31.12.2010)



CHAPTER-3
ENVIRONMENTAL IMPACT
ASSESSMENT

Environment Impact Assessment (EIA) Environment Impact Assessment Notification 2006

The rapid industrial development in the country has increased manifold, the chances of adversely affecting the environment unless timely, adequate, corrective and protective mitigative measures are taken to minimize or neutralize those adverse impacts on environment. The Ministry of Environment and Forests has used Environment Impact Assessment Notification 2006 as a tool to regulate rapid industrial development of the country for minimizing the adverse impact on environment and reversing the trends which may lead to climate change in long run.

In the re-engineered Environment Impact Assessment (EIA) Notification of September 2006, projects were categorized into category 'A' and category 'B' depending on their threshold capacity and likely pollution potential and were appraised for prior environmental clearance at the Central and the State level respectively. Further the notification provided for screening, scoping, public consultation and appraisal. For appraisal of category 'B' projects and activities, State Level Environment Impact Assessment Authorities [SEACs] have been constituted.

Amended EIA Notification 2009

With a view to further simplify the procedure for obtaining the environmental clearance without compromising or diluting the regulatory framework, the EIA notification has been amended in December, 2009. The amended EIA Notification of December, 2009 provides for exemption of biomass based power plants up to 15 MW, power plants based on non hazardous municipal solid waste and power plants based on waste heat recovery boilers without using auxiliary fuel.

Environmental Clearance to Developmental Projects

As per the provisions of the EIA Notification 2006, several meetings of the Expert Appraisal Committees were convened by the Ministry during the year for appraisal of "A" category projects from sectors of "A" category projects from sectors of industry, thermal power, infrastructure, river valley, mining and "B" category projects from construction sector where State Environment Impact Assessment Authority has not been constituted. As part of appraisal process the Expert Appraisal Committees also visited project sites for obtaining first hand information about the ground level realities and response of people living in the vicinity. Environmental clearance was accorded to four hundred and twelve projects and Term of Reference (TOR) to seven hundred and eighty eight projects (between April to December, 2010). The sector wise list of environmental clearances and TOR issued to the projects by the Ministry is given in Table-15.

Constitution of State Environment Impact Assessment Authorities (SEIAA)

The Ministry has constituted so far twenty five State/UT level Environment Impact Assessment Authorities [SEIAAs] 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 SEIAA for Andhra Pradesh, Karnataka, Uttar Pradesh and West Bengal States have been reconstituted.

Post Project Monitoring of Environment Clearance Conditions

Monitoring of projects with respect to conditions stipulated in the environmental clearance issued under EIA Notification 2006

Table-15. Status of Environment Clearance and TOR issued to Developmental Projects (April 2010- December 2010)

Status of Projects	Industry		Thermal		River Valley		Mining		Infrastructure & Miscellaneous		Total	
	EC	TOR	EC	TOR	EC	TOR	EC	TOR	EC	TOR	EC	TOR
Cleared	173	377	33	105	5	26	97	221	114	59	412	788
Pending	91	119	25	77	12	13	117	150	84	10	329	369
Rejected /Returned	-	7	-	-	-	-	1	6	1	-	2	13

Note: EC – Environment Clearance TOR – Terms of Reference

and Coastal Regulation Zone 1991 is carried out through the six Regional Offices. The Monitoring report is scrutinized in the Ministry and on that basis appropriate action is contemplated under the Environment (Protection) Act, 1986 for violation of environmental clearance conditions. A procedure has been laid down for issuing show cause notice, closure of industry etc. In September 2009 which is placed on the website of the Ministry.

The objectives of the Post Project Clearance Monitoring are (i) to ensure that actions has been taken to incorporate the environmental safeguards during the project cycle in accordance with the conditions stipulated in the Environment Clearance letter; and (ii) to take appropriate corrective measures to adverse impact on environment during operation of the respective projects. The six Regional Offices of MoEF carry out monitoring of the projects. The Category 'B' projects which have been accorded environmental clearance by the SEIAAs/SEACs are also monitored for compliance of their EC conditions. Till November, 2010, six hundred four projects have been monitored by the regional offices of the Ministry. The monitoring cell in the Ministry, besides providing policy guidelines

to these regional offices, also examines the monitoring reports submitted by Regional Offices. In cases of major non compliances further follow up action is taken for effecting compliances including issues of show causes notice followed by Directions on case to case basis.

Recognizing the need to strengthen the monitoring mechanism and to make it more effective, the existing procedure of monitoring is being revised by a committee constituted under the Chairmanship of Additional Secretary. The Committee based on its deliberating have prepared a draft Approach paper which was put on the website of MoEF for inviting Comments from all concerned for finalization of its report.

Accreditation of the EIA consultants with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET)

The Environment Appraisal of Development projects is undertaken as per the provisions of the Environment impact Assessment Notification, 2006 based on the EIA/EMP Reports prepared by the project proponents in assistance with their Consultants. The good quality EIA Reports are pre-requisite

3

for improved decision making. Therefore, all the Consultants/public Sector Undertakings (PSUs) / Universities & Research Institutes working in the area of Environment Impact Assessment are required to get themselves registered under the scheme of Accreditation and Registration of the National Accreditation Board of Education and Training (NABET) and the Quality Council of India (QCI) by 30th June, 2011. No EIA/EMP Reports prepared by such Consultants who are not registered with NABET/QCI shall be considered by the Ministry after 30th June, 2011. After accreditation, the Consultants would need to include a certificate in this regard in EIA/EMP Reports prepared by them and data provided by other Organisations/ Laboratories including their status of approvals etc. The EIA Consultants are advised to see further clarifications on the website of NABET/QCI (www.qcin.org).

Major Policy decisions taken during the year

- Firm coal linkage

A major policy decision regarding requirement of firm coal linkage indicating source of coal and its characteristics was taken on 1st November, 2010. The policy decision taken prescribes that henceforth all project proposals relating to thermal power projects, steel, sponge iron and any other such projects, which are largely dependent on availability of coal as a raw material, shall be considered only after firm coal linkage is available and the status of environment and forestry clearance of the coal block is known. In case of projects which are based on imported coal, a copy of firm MoU signed between the coal supplier and the project proponent shall be required.

It was also decided that all proposal relating to thermal power projects, steel, sponge iron which are pending in the Ministry or with the State Level Environment Impact Assessment Authorities (SEIAAs) / State Expert Appraisal Committees (SEACs) concerned for consideration of environmental clearance shall be deferred and delisted till the status of environment and forestry clearance of the coal supply source for Indian coal or the MoU for imported coal has been established and furnished.

- Consideration of expansion thermal power projects

It has been noticed that a number of expansion projects in thermal power sector are being received in the Ministry seeking terms of reference for undertaking further expansion when either the environmental clearance for the earlier proposal is yet to be granted or has recently been granted.

In view of the above, it has been decided that the proposal for expansion of projects to which environmental clearance has been granted can be considered only once the implementation for the earlier phase has commenced. In case environmental clearance for the earlier proposal is yet to be accorded, the project proponent shall apply fresh and submit a comprehensive proposal for the entire project by clubbing all the phases so that the environmental issues could be addressed holistically.

Coal Mining Sector

The Ministry has been considering coal Mining projects of Jharia Coalfields and Raniganj Coalfields based on cluster approach

which includes existing mines, closed mines, abandoned mines and proposed mines in the two coalfields. An Integrated EIA-EMP is to be prepared for the cluster of mines bringing out the present status of mines in Cluster IX as above- status of environmental quality and the extent of pollution load from each mine and the combined pollution load from the cluster of mines that would be reduced by taking suitable mitigative measures for the individual mines and the expected improvement in the environmental quality of the mines in the cluster and within the coalfield after the implementation of the measures through an Integrated Environmental Plan formulated on the aforesaid basis. The Environmental Management Plan for each cluster would dovetail the plan for addressing subsidence and fire control and resettlement of habitation from unstable sites and fire affected areas in the Jharia Coalfields under the Jharia Action Plan and subsidence and rehabilitation of habitation from unstable areas in the Raniganj Coalfields under the Raniganj Action Plans.

EIA Manuals

The environmental clearances process under implementation prior to 2006, had highlighted the need to introduce specific processes/categories/activities and also the need to introduce new sectors such as construction, coal washery, etc to be brought in the ambit of the EC process based on their extent of impact on environment. The Ministry of Environment & Forests engaged two consultants – for the preparation of thirty seven EIA Sector specific Manuals -Administrative Staff College of India (ASCI), Hyderabad and the IL&FS Ecosmart Ltd., to prepare ten and twenty seven Sector Specific Manuals respectively for the various sectors/activities listed in the EIA Notification 2006.

These Manuals are proposed to serve as Guidance Manuals to various Sector specific Expert Appraisal Committees at the Centre and to State/UT Environmental Impact Assessment Authorities (SEIAAs) and State Level Expert Appraisal Committees (SEACs) in the various States, who have been assigned the task of screening, scoping and appraisal of projects of various sectors for grant of environmental clearance (EC). These Manuals would help in standardisation of the quality of appraisal and in further harmonization in appraisal of projects by EACs/SEACs/SEIAAs in granting ECs for various projects at the Central and State level. The Manuals for each sector is to include Model TORs, technological options, processes for a cleaner production, waste minimisation, monitoring of environmental quality, related regulations, and procedure of obtaining EC if linked to other clearances etc.

The ten sector specific EIA Manuals prepared by ASCI such as Mining, Airports, Ports & Harbours, Nuclear Power etc. are on the MOEF website. Also, the twenty seven Sector specific EIA Manuals prepared by IL&FS such as Thermal Power, Distilleries, Oil & Gas transportation pipeline, Oil Refineries, Petrochemical plants, Ship Breaking Yards etc. are uploaded on the MOEF website. To keep pace with changing technologies and needs of sustainable development, the manuals would require regular updating in the future. The Manuals have been uploaded on the website to not only give wider dissemination to all stakeholders – Governmental and non-governmental, project proponents and consultants involved in the environmental clearance process and experts from academia and concerned sectoral intuitions, industry associations and the local communities where projects are to come up on the EIA Notification

3



Fig-46. Olive Ridley Sea Turtle, need protection from poachers

2006 but also to enhance transparency on the EC process.

Study on carrying capacity based planning for proposed development in Goa and Bellary-Hospet.

Since the notification of EIA, 2006 a large number of environmental clearances have been accorded for industrial, infrastructure and mining projects all over the country. However, the air and water quality data in various regions across the country including Bellary-Hospet region has been showing a declining trend. The need to carry out regional carrying capacity study was therefore felt and it was decided that to begin with we may carry out regional EIA study for Goa and Bellary-Hospet region in Karnataka.

The Indian School of Mines (ISM), Dhanbad shall carry out the study for Goa and the National Environmental Engineering research Institute (NEERI), Nagpur shall carry out for Bellary-Hospet, Karnataka. The proposed study to be carried out by ISM,

Danbad for Goa is have been finalized alongwith an MoU for executing the project for a period of two years. Similarly the proposal from NEERI, Nagpur for Bellary-Hospet is being examined for initiating the study.

Coastal Regulation Zone and Society of Integrated Coastal Management (SICOM)

The Ministry has initiated the World Bank assisted Integrated Coastal Zone Management (ICZM) project with a budget outlay of ₹1155.63crores (US \$ 262 million). To implement the above project, Society of Integrated Coastal Management (SICOM) has been established as a registered body. The SICOM office was inaugurated by Shri Jairam Ramesh, Hon'ble Minister of State (I/C) for Environment and Forests on 15th September, 2010 located at No.9, Institutional Area, Lodhi Road, New Delhi – 110 003. This Society will be implementing the above ICZM projects which has got four major components namely, (i) National Coastal Management Programme, and three ICZM projects in three States namely, Gujarat, Orissa and West Bengal.

Under the National component the demarcation of the hazard line has been assigned to Survey of India for mapping the entire coastline of the mainland coast of the country based on tides, waves, sea level rise and shoreline changes. In order to build a capacity in the country in the area of coastal management a National Centre for Sustainable Coastal Management has been set up within Anna University, Chennai. The

Centre would address the issues relating to research, development and extension in the area of coastal management including addressing issues of coastal communities. Further, two major initiatives have been undertaken by SICOM which includes implementing an Integrated Coastal Zone Management Project at Dandi and surrounding villages and at Vedaranyam keeping in view the historical importance of salt satyagraha undertaken in these two villages by Mahatma Gandhi and Shri Rajaji, respectively.

With regard to the Integrated Coastal Zone Management projects in the State the ICZM project is being implemented at Gulf of Kachchh in Gujarat (₹298 crores), Paradip-Dhamra and Gopalpur-Chilka stretch in Orissa (₹202 crores) and Digha-Shankarpur and Sagar islands in West Bengal (₹300 crores). The State components address the issues relating to coastal management including improving livelihood of the local communities, disaster mitigation and promoting sustainable alternative livelihoods.

The Ministry had issued the draft Island Protection Zone (IPZ) Notification in 25th February, 2010 and the draft Coastal Regulation Zone Notification, 2010 on 15th September, 2010. After a series of discussions with the stakeholders prior to issue of the above draft Notifications and holding consultations with fishermen associations the above two Notifications have been finalized and issued on 6th January, 2011 as Coastal Regulation Zone Notification, 2011 and IPZ Notification, 2011. These two Notifications supercede the CRZ Notification, 1991.

Ecologically Sensitive Areas

Introduction

Environmentally Sensitive Zones may be defined as areas with identified environmental

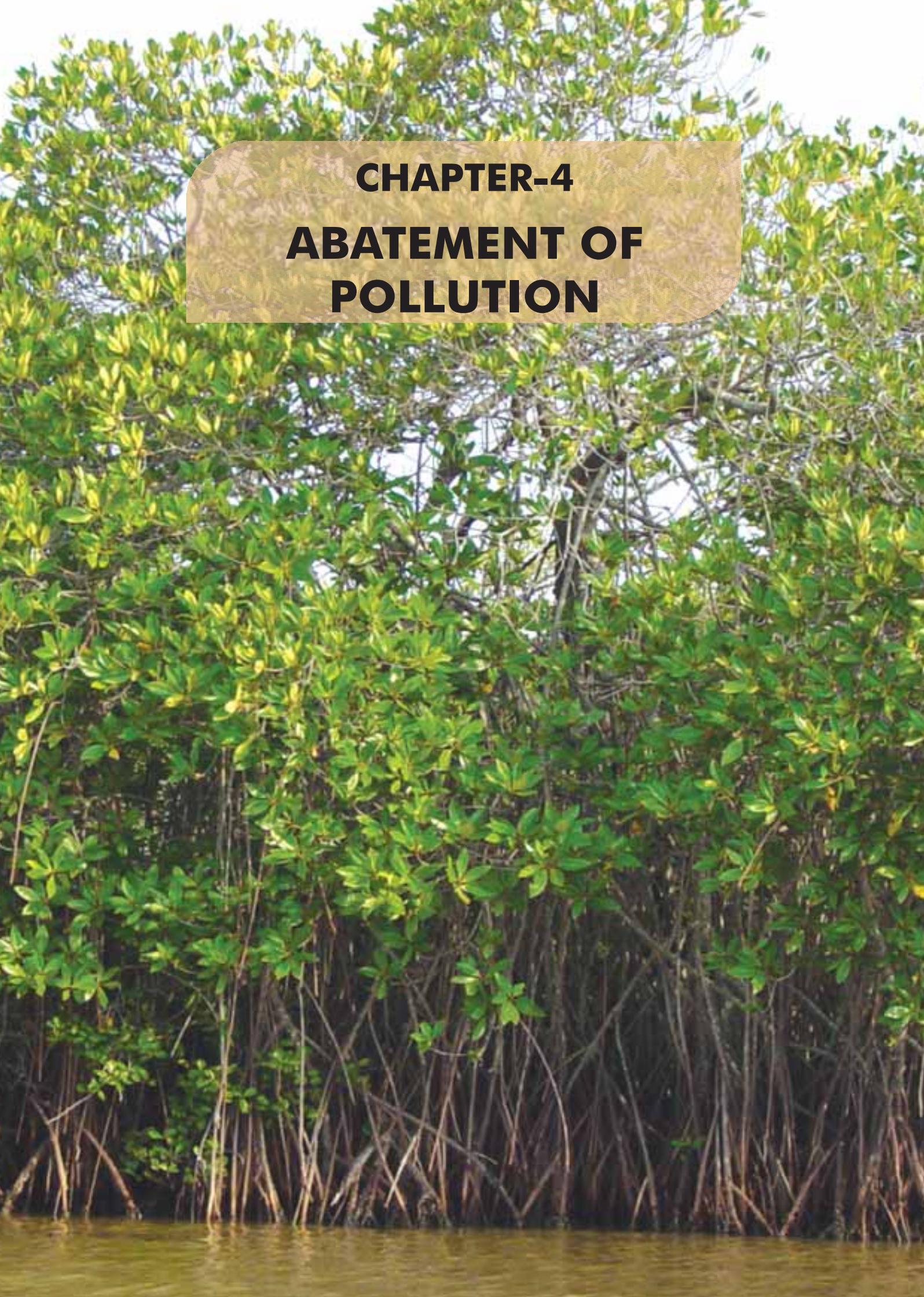
resources having "Incomparable Values" which require special attention for their conservation. The Ministry has already notified Ecologically-sensitive areas in respect of Matheran, Mahabaleshwar-Panchgani, Kaziranga National Park, Murud-Janjira and Dahanu Taluka under the Environment (Protection) Act, 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 notifications involving local communities / experts and shall be approved by the Ministry for regulating development activities and protection and conservation of Entities of 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.

Programmes / achievements made during the year

- Areas around National Parks / Sanctuaries in Haryana are considered for the declaration as Eco-Sensitive Zones and the Draft Notifications in respect of 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 are under consideration.
- Areas around National Parks / Sanctuaries in Assam are considered for the declaration as Eco-Sensitive Zones and the Draft Notifications in respect of Kaziranga National Park, Bordoibam Beelmukh Bird Sanctuary and Panidehing Wildlife Sanctuary are in process.

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- Areas around National Parks / Sanctuaries in Gujarat are considered for the declaration as Eco-Sensitive Zones and the Draft Notifications in respect of Girnar Wildlife Sanctuary, Narayan Sarovar Sanctuary, Purna Wildlife Sanctuary and Balaram-Ambaji Wildlife Sanctuary are in process.
- Areas around National Parks / Sanctuaries in Mizoram are considered for the declaration as Eco-Sensitive Zones and the Draft Notification in respect of Murlen National Park and Pualreng Wildlife Sanctuary of Mizoram are in process.
- Declaration of approx. one hundred thirty five k.m. stretch from Gaumukh to Uttarkashi as Eco-sensitive zone in Uttarakhand is under consideration.
- The draft Notification to declare Dandi as Eco-Sensitive Zone has been published.

A dense mangrove forest with numerous trees and their characteristic prop roots extending into the water. The leaves are green and yellowish, and the water is a murky brown color.

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 rising population 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. Realising this trend of pollution in various environmental media like air, water, soil, etc. The Ministry earlier adopted Policy for Abatement of Pollution in 1992, which provides multi-pronged strategies in the form of regulations, legislation, 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 & periodical revision therein, control of vehicular pollution, control of air & water pollution, abatement and prevention of noise pollution, spatial environmental planning, identification of critically polluted areas and improvement plans therein, etc. The Government also adopted National Conservation Strategy and Policy Statement on Environment and Development, 1992. Afterwards, the Government adopted the National Environment Policy (NEP- 2006) which seeks to extend the coverage, and fill in gaps that still exists, in light of present knowledge and accumulated experience. This policy does not displace, but builds on the earlier policies of the Government. It lays emphasis on many new issues.

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 transportation, i.e. road, rail and airways, industrial 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 revisited and various industry specific emissions standards are evolved afresh or revisited 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, 446 ambient air quality monitoring stations are operational covering 182 cities/towns, industrial areas in 26 States and five Union Territories. Presently, only the criteria pollutants namely; sulphur dioxide (SO₂), nitrogen dioxides (NO₂) and fine particulate matter (PM₁₀) are monitored under National Ambient Air Monitoring Programme (NAMP) by the Pollution Control Boards, Pollution Control Committees, Universities and Research Institutes. Besides, additional parameters for other toxic trace matters and polycyclic aromatic hydrocarbons are also being monitored in selected cities of the country. Installation of automatic air quality monitoring stations is undertaken for twenty nine cities for continuous monitoring. The continuous monitoring has been introduced in twenty seven cities namely; Agra, Ahmedabad, Bangaluru, Chandrapur, Chennai, Cuddalore, Delhi, Durgapur, Faridabad, Ghaziabad, Haldia, Howrah, Hyderabad, Jaipur, Jharia, Jodhpur, Kanpur, Kolkata, Lucknow, Mumbai, Panipat, Patna, Pune, Solapur, Tuticorin, Vadodara and Varanasi. A total of 81 manual monitoring stations have been added in the network under NAMP during 2010-11.

– The Government has published a notification on the Revised National Ambient Air Quality Standards, 2009 (NAAQS-2009) in the official Gazette on 16th November, 2009. These ambient air quality standards/ limits provide a legal

framework for the control of air pollution and the protection of public health.

- In furtherance of these Standards, the CPCB is in the process of creating a road-map for the generation and maintenance of a monitoring of required infrastructure and for the development of protocols.
- The monitored ambient air quality data during the year while comparing with revised (NAAQS-2009) indicates that the annual average levels of Sulphur Dioxide (SO₂) are within the prescribed air quality norms across the country and that of Nitrogen Dioxide (NO₂) are within norms in most of the cities. However, the levels of fine particulate matter (PM₁₀) exceed the prescribed norms in many cities including Delhi. PM₁₀ and NO₂ are the emerging air pollutants.

Assistance for Abatement of Pollution

- Under this scheme, grants are being provided to the State Pollution Control Boards/UT Pollution Control Committees, Environment Department, 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 ₹45.00 crore and the financial allocation for the current financial year is ₹5.00 crore.
- Financial assistance has been extended to fifteen State Pollution Control Boards/UT Pollution Control Committees during the financial year.

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, 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 given in Table-16.

Source Apportionment Studies

- Due to multiplicity and complexity of air polluting sources, apportionment of contribution to ambient air pollution from these 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 undertaken by the Government.
- To evaluate contribution from various sources to air quality, Source Apportionment Study (SAS) has been completed for six cities namely; Delhi, Bangalore, Chennai, Mumbai, Pune and Kanpur involving the institutions like National Environmental Engineering

Table-16. 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) 01.04.2005
Ten major cities, namely, Mumbai, Kolkata, Chennai, Bengaluru, Pune, Hyderabad & Secunderabad, Ahmedabad, Agra, Surat & Kanpur apart from National Capital Region	Bharat Stage II (Euro II equivalent) 01.04.2003 Bharat Stage III (Euro III equivalent) 01.04.2005 (except for vehicles holding Inter-State permits or National Permits or All India Tourist permits)	
Twelve major cities, namely, Mumbai, Kolkata, Chennai, Solapur, Lucknow, Bengaluru, Pune, Hyderabad & Secunderabad, Ahmedabad, Agra, Surat & Kanpur apart from National Capital Region	Bharat Stage IV (Euro IV equivalent) 01.04.2010 (except for vehicles holding Inter-State permits or National Permits or All India Tourist permits)	

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 included 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 used in the study.

- For appraisal and guidance during the survey and study, a National level Steering

Committee under the Chairmanship of Secretary (E&F) was constituted. In order to provide technical assistance and guidance during data collection, use of appropriate model etc. a Technical Committee was also in place under the Chairmanship of Chairman, CPCB and members drawn from various technical institutions and organizations.

- The results of the Study, so obtained have been evaluated by the Technical Committee. International Peer Review of the study has been organized in Spain, Germany (through gtZ) and within the country, since such source apportionment studies have been carried out for the first time in India and the outcome of this Study would form the basis for future policy decisions.

- The outcome of this study would serve as input to Auto Fuel Policy which is under revision. Some of the major accomplishments of the study are as follows:
 - A standard methodology for dealing with air quality management in Indian cities was established.
 - It provided the most needed scientific basis, evidence and insight into urban air quality issues.
 - Useful database on various air quality parameters including some of air toxics has been developed.
 - Technical competence, experience and capacity building in terms of infrastructure as well as trained manpower to conduct comprehensive air quality studies are now available in the country.
 - Refined Emission Factors (EF) for vehicular exhaust emissions, based on mass emission tests of in-use vehicles, was evolved that provide better assessment of vehicular pollution.
 - More reliable emission inventories were built up for the six cities on the basis of primary data.
 - Source emission profiles for vehicular as well as non-vehicular sources were developed. This would provide more reliable inputs to receptor modeling based source appointment studies in future.
- suspension of road dust – can take up studies on silt load measurements in different cities; and prepare guidelines for quality of road, silt content, paving of unpaved roads, concreting of unpaved surface along road side for various traffic volume and road types.
- Group on improvement of fuel quality & vehicle exhaust norms – roadmap beyond 2010 for progressive implementation of BS – IV/V norms.
- Group to deal with old vehicles – retrofitment of pollution control devices, scrap policy, inspection & maintenance issues, etc.
- Group on traffic management – use of IT in traffic management, guidelines for minimizing/synchronization traffic signals, providing adequate parking, parking fee structure, etc.
- Group on construction activities – prepare and supervise implementation of guidelines on cleaner construction practices.
- Group on industrial activities: industrial action plan implementation
- In case of six cities, local Implementation Committee comprising various stakeholders viz. municipal corporation, development authorities, RTO, SPCB, etc. may be set up to oversee implementation of city-specific action plans. Wherever such Committees or Authorities are functional, the study findings could supplement their efforts. The local Committees may also address biomass, garbage/refuse burning and other city-specific sources.
- Molecular markers analysis is a highly skilled task which may be strengthened. The project institutes may focus on developing necessary expertise in such analysis.
- The emission factors for vehicles may be improved upon at regular intervals, as automotive industry in Indian is expanding

Based on the experiences gained and outcomes of the study, following are suggested as future course of action:

- At national level, different working groups may be set up to deal with the sectoral recommendations of the study. These may be housed in the respective thematic Ministries:
- Group for working on road quality improvement and minimizing re-

4

at a very rapid rate and more and more numbers of vehicle models are introduced. More number of tests on in-use vehicles should be carried out in future. Similarly, city-specific driving cycles need to be evolved/updated, as there is continuous change in the road traffic pattern such as synchronization of traffic signals, construction of flyovers, one way traffic, restriction of entries of HCV in city areas and continuous increase in density of vehicles. These steps will lead to more refined EF and subsequently, better estimation of vehicular exhaust. More comprehensive work on non exhaust emission for vehicles may be undertaken.

- Developing source profiles for non-vehicular sources may be extended to cover a few more sources. Similarly, more research, for vehicular and non-vehicular sources, to deal with issues on co-linearity of sources, molecular markers analysis, etc. need to be taken up.
- As and when new studies are commissioned, other emerging parameters like NO_2 , $\text{PM}_{2.5}$ and Benzene may be looked at apart from PM_{10} .
- Public health impact and related issues may also be studied in future. This would help in better understanding of linkages between air quality and exposure assessment and health impacts.
- More scientific studies should be planned to understand formation of secondary particles in Indian condition with presence of high OH radical concentration and moisture. This will require modeling efforts and scientific measurements of SO_2 , NO_x , HNO_3 , SO_4 , NO_3 , NH_3 and NH_4^+ in the atmosphere. This exercise can also look into long range transport of pollutants and formation of haze in winter months.

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 which could be downloaded. During the year, Environmental Standards in respect of following category of industries have been evolved and are being finalized for notification:
 - Effluent Standards for Soda Ash Industry;
 - Effluent Standards for Electroplating Industry;
 - Effluent & Emission Standards for Rubber Product Industry;
 - Effluent & Emission Standards for Pesticide Industry; and
 - Effluent Standards for Copper, Lead and Zinc Smelters.
- The source specific environmental standards have been notified for following industry/process during the year

Effluent & Emission Standards

- Incinerator in Dye and Dye Intermediate Industry (9th June, 2010)
- Incinerator in Organic Chemicals Manufacturing Industry (21st July, 2010)
- Iron Ore Mining and Ore Processing (4th October, 2010)
- Rubber Industry

Effluent Standards

- Revision in Oil and Grease Norms for CETP/General Effluent Standards (9th September, 2010)

Noise Pollution

- Noise levels have been a matter of concern due to various activities, religious functions, festivals, marriages, processions 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 and amended from time to time. The recent amendments to the Noise Rules, 2000 have been published in the official Gazette on 11th January, 2010.

- The CPCB has been advised for revisiting the national ambient noise standards and prepare a blue print to have national ambient noise monitoring network in place. A beginning to monitor ambient noise has been made in accordance with NEP-2006 during the year, starting from seven cities, namely, Delhi, Lucknow, Bengaluru, Kolkata, Hyderabad, Chennai and Mumbai.

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 it is a road map for progressive improvement in environmental management.
- For effective implementation of the Charter, eight taskforces comprising experts and members from institutions and industry associations were constituted. Three of them in respect of Thermal Power, Steel Sector and Petroleum Oil Refinery have been reconstituted in 2009-10. These task forces are meeting regularly to monitor and to provide guidance to the industries for adopting necessary pollution abatement measures.

4

Critically Polluted Industrial Clusters/ Areas

The Ministry has adopted a Comprehensive Environmental Pollution Index (CEPI) system of environmental assessment of the 88 Industrial Clusters, evolved by the Central Pollution Control Board in collaboration with the Indian Institute of Technology (IIT), Delhi. CEPI, a rational number to characterize the environmental quality at a given location following the algorithm of Source, Pathway and Receptor and aggregated CEPI, indicates severe adverse effects on environment and also is an indication of large percentage of population experiencing health hazards. On the CEPI scale, 43 such industrial clusters, having CEPI greater than 70 on a scale of zero to 100, have been identified as critically polluted based on the parameters related to incidence of pollution in water, land, ground water, and air. List of the critically polluted industrial areas/ clusters is given in Table -17.

In view of the high levels of pollution 43 critically polluted areas in the country, the Ministry had imposed a temporary moratorium upto 31st August, 2010 on consideration of developmental projects in these polluted industrial clusters/areas including the projects in pipeline for environmental clearance. The moratorium has been extended upto 31st March, 2011. However, it has been decided to lift the moratorium on consideration of projects for environmental clearance in respect of projects to be located in the five clusters/ areas namely; (i) Tarapur (Maharashtra), (ii) Pattencherru-Bollaram (Andhra Pradesh), (iii) Coimbatore (Tamil Nadu), (iv) Vapi (Gujarat) and (v) Mandi-Govindgarh (Punjab) as the SPCBs and the local stakeholders have initiated some work on the submitted plans in respect of the industrial areas subject to the following conditions:-

- CPCB and the respective SPCBs will immediately put the approved action plans on their respective websites.

- SPCBs will monitor the implementation of the action plans as per their schedule and ensure that there is no slippage either in terms of timeframe or the activities to be completed relating to the action plan. The report will be submitted to CPCB.
- CPCB will also develop a monitoring mechanism and put it in place within 30 days and monitor the implementation of these action plans, area-wise and also carryout random checks on the environmental parameters for their quality.
- The respective SPCBs/UTPCCs will monitor the pollution levels in these areas on regular basis and if at any stage it is observed that the levels are increasing, it will be immediately brought to the notice of CPCB as well as MoEF and in such a situation the moratorium will be re-imposed.
- The EACs/SEACs will take extra precaution during appraisal of projects to be located in these areas and prescribe the requisite stringent safeguard measures, so that the environmental quality is not deteriorated further in these areas.

For restoration of environmental quality in these polluted clusters, State Pollution Control Boards (SPCBs) / Pollution Control Committees (PCCs) were asked to prepare draft Action Plans incorporating establishment of common treatment facilities such as Common Effluent Treatment Plants (CETPs) and Treatment Storage and Disposal Facilities (TSDFs) and expansion of the National Ambient Air and Water Monitoring networks, etc. The SPCBs / PCCs have accordingly submitted the Action Plans for these polluted clusters. The revised Action Plans are being examined by the CPCB to ascertain whether these plans are effectively implementable in the field for improving the environmental quality in these clusters.

Table-17. The CEPI scores for critically polluted industrial areas / clusters

S.No.	Industrial Cluster/Area	Air	Water	Land	CEPI
1.	Ankaleshwar (Gujarat)	72.00	72.75	75.75	88.50
2.	Vapi (Gujarat)	74.00	74.50	72.00	88.09
3.	Ghaziabad (Uttar Pradesh)	68.50	75.25	71.50	87.37
4.	Chandrapur (Maharashtra)	70.75	67.50	66.50	83.88
5.	Korba (Chhattisgarh)	67.00	57.00	72.50	83.00
6.	Bhiwadi (Rajasthan)	71.00	69.00	59.50	82.91
7.	Angul Talcher (Orissa)	64.00	69.00	65.75	82.09
8.	Vellore (North Arcot) (Tamil Nadu)	69.25	65.25	62.50	81.79
9.	Singrauli (Uttar Pradesh)	70.50	64.00	59.50	81.73
10.	Ludhiana (Punjab)	68.00	66.00	64.75	81.66
11.	Nazafgarh drain basin, Delhi	52.13	69.00	65.25	79.54
12.	NOIDA (Uttar Pradesh)	65.75	64.00	60.00	78.90
13.	Dhanbad (Jharkhand)	64.50	59.00	65.50	78.63
14.	Dombivalli (Maharashtra)	66.00	63.50	57.50	78.41
15.	Kanpur (Uttar Pradesh)	66.00	63.50	56.00	78.09
16.	Cuddalore (Tamil Nadu)	54.00	65.25	64.00	77.45
17.	Aurangabad (Maharashtra)	64.75	60.50	59.50	77.44
18.	Faridabad (Haryana)	63.50	59.00	62.75	77.07
19.	Agra (Uttar Pradesh)	59.00	63.75	59.50	76.48
20.	Manali (Tamil Nadu)	64.00	59.00	58.00	76.32
21.	Haldia (West Bengal)	53.75	64.50	57.00	75.43
22.	Ahmedabad (Gujarat)	62.75	58.00	58.00	75.28
23.	Jodhpur (Rajasthan)	71.00	69.00	59.50	82.91
24.	Cochin, Greater (Kerala)	57.00	64.00	54.00	75.08
25.	Mandi Gobindgarh (Punjab)	62.00	55.50	62.00	75.08
26.	Howrah (West Bengal)	57.00	54.50	63.50	74.84
27.	Vatva (Gujarat)	60.00	62.00	56.00	74.77
28.	Ib Valley (Orissa)	61.00	56.50	59.00	74.00
29.	Varanasi-Mirzapur (Uttar Pradesh)	58.00	62.00	53.50	73.79
30.	Navi Mumbai (Maharashtra)	61.00	59.00	55.50	73.77
31.	Pali (Rajasthan)	52.00	64.00	52.00	73.73
32.	Mangalore (Karnataka)	61.75	57.75	54.00	73.68
33.	Jharsuguda (Orissa)	61.00	56.50	56.00	73.34
34.	Coimbatore (Tamil Nadu)	62.25	58.75	45.50	72.38
35.	Bhadravati (Karnataka)	62.75	56.50	45.50	72.33
36.	Tarapur (Maharashtra)	60.75	56.00	51.25	72.01
37.	Panipat (Haryana)	55.75	56.50	59.00	71.91
38.	Indore (Madhya Pradesh)	59.00	57.50	52.00	71.26
39.	Bhavnagar (Gujarat)	54.50	57.50	57.75	70.99
40.	Vishakhapatnam (Andhra Pradesh)	57.00	57.50	55.00	70.82
41.	Junagarh (Gujarat)	53.25	52.50	59.50	70.82
42.	Asansole (West Bengal)	58.38	56.25	50.50	70.20
43.	Patancheru – Bollaram (Andhra Pradesh)	50.00	59.00	54.00	70.07

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

- The successful implementation of environmental protection programmes essentially requires 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.

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 (www.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.

- These revised guidelines, have 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. Under the provisions of Section 12 and 13 of the E(P)A 1986, the private laboratories are considered by the Ministry for recognition.
- The revised guidelines have been operationalised. The Expert Committee on Labs is meeting once in every month to discuss all the cases of Govt. and Private Sector Labs.
- During the year, fourteen private sector Labs were jointly visited for consideration of recognition under E(P)A, 1986.

Common Effluent Treatment Plants (CETPs)

- The concept of the Common Effluent Treatment Plants (CETP) 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 (SSIs) to set up new and upgrade the existing Common Effluent Treatment Plants (CETP) 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 the year, an allocation of ₹5.70 crore was made for providing financial assistance to the on-going CETP projects and for new projects. Financial assistance

was provided for the ongoing CETP projects of Pandesara and Palsana in Gujarat, Waluj and Tarapur in Maharashtra.

– The scheme of CETPs of the Ministry has been revisited in order to make it more attractive and at par with the scheme of other Ministries. The revised CETP guidelines have been submitted to Planning Commission for its concurrence. The salient features of the revised CETP scheme are as follows:

- Central subsidy is proposed to be enhanced.
- All the three levels of treatment, primary, secondary and tertiary are to be covered for assistance. Progressive technologies like Zero Liquid Discharge (ZLD) and Membrane Filtration will also be considered for assistance, subject to a ceiling.
- The management of the CETP is to be entrusted to a Special Purpose Vehicle registered under an appropriate statute.
- Performance Guarantee at full design load is to be ensured upfront.

It is expected that the above changes will give a fillip to the SSIs to set up more CETPs.

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 ₹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



Fig. 47 : Common Effluent Treatment Plant Clarifier at Taloja, Navi Mumbai

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 final report on the "Environmental Post Evaluation of the projects under the Taj Trapezium Zone" submitted by NEERI, Nagpur has been accepted by the Ministry. The present environmental condition vis-à-vis Environmental Management Plan (EMP) for the area as suggested in the report has been found useful for initiation of future activities in TTZ.
- Subsequent to the acceptance by the Ministry of the Post Evaluation Report of the TTZ projects and in order to revive the scheme of TTZ, the U.P. Govt. has been intimated to formulate fresh proposals related to the strengthening of solid waste management, water management, electricity supply and distribution, road connectivity, greening and other activities which have a bearing on the environment in the TTZ area. It has been requested to ensure that the proposals to be submitted by the Govt. of U.P are in line with the EMP as suggested by NEERI, Nagpur in its report.
- On receipt of fresh and consolidated proposals from the U.P. Govt., the matter of revival of the TTZ scheme would be taken up with the Planning Commission.

Environmental Authorities

Environment Pollution (Prevention 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 Lai. The tenure of the EPCA was extended from time to time, and at present extended upto 28th Jan. 2012.

- 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 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 Judgments.
- 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) established under the National Environment Appellate Authority Act, 1997 (22 of 1997) to hear appeals against the grant of environmental clearance under the Environment (Protection) Act, 1986 stands dissolved on establishment of NGT on 18th October, 2010.

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 28th August, 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 30th September, 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 28th February, 2011.

Fly Ash Utilization

Introduction

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 the Ministry 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 1999 resulted in steady increase in the utilization of flyash. However, the utilization has not reached to 100% and certain additional measures are 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

Progress and achievements made during the year

The Fly Ash Utilisation Notification was issued by Ministry in September 1999 to regulate the disposal of fly ash and ensure its proper utilization. Restriction was imposed to the extent that all brick kilns within the radius of fifty kilometers from coal/lignite based thermal power plants should use 25% fly-ash while making the bricks. The same was issued as per the orders of the Hon'ble High Court of Delhi in September, 1999. A second Notification making amendments was issued in August, 2003 increasing the radius from the thermal power plants to 100 kms.

Environmental Health

Introduction

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

It is increasingly evident that poor environmental quality has adversely affected human health. Environmental factors are estimated as being responsible in some cases for nearly 20 percent of the burden of disease in India, and a number of environment-health factors are closely linked with dimensions of poverty (e.g. malnutrition, lack of access to clean energy and water). It has been shown that interventions such as reducing indoor air pollution, protecting sources of safe drinking water, protecting soil from contamination, improved sanitation measures, and better public health governance, offer tremendous opportunities in reducing the incidence of a number of critical health problems.

The National Environment Policy is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (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, efforts may be made to co-relate the manifestations of various diseases with the environmental factors especially respiratory diseases & 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.

The key benefit 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 and injury due to different environmental pollutants.

Development and Promotion of Clean Technology

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 resource 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 & 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, important activities undertaken include;

- Demonstration projects
- Life Cycle Assessment
- Carrying Capacity Studies
- Creation of data base for Clean Technologies
- Training programmes for Adoption of Clean Technologies

Progress made during the year

Demonstration projects

- Projects likely to be completed: Three Demonstration projects mentioned below are at final stage and likely to be completed during the current financial year.
 - Development of Air Pollution Control Package for Small Scale Lime Kilns by NEERI, Nagpur.
 - Implementation of LPS Technology by ABC Papers, Hoshiarpur and PPCB, Punjab.
 - Development & Demonstration of Environmentally sound technology for regeneration/Recovery/Recycling of Paint Sludge by NPC, New Delhi.

- Ongoing Projects: Under the grant-in-aid scheme on Development & Promotion of Clean Technology thirteen projects continued during the period and their progress was monitored through Monitoring Committee, followed by Workshops and Field Visits. These are:
 - Effective removal of arsenic from ground water at 24 – Parganas (N) (II- Phase) by CSMRI, Gujarat.
 - Defluridation of water using natural materials for better drinking water supply in rural regions by JNU, New Delhi.
 - Development of Fly Ash Based Geopolymer Concrete Pre-cast Elements by Annamalai University, Tamil Nadu.
 - Life Cycle Assessment of Wood and Bamboo Composite Products by IPIRTI, Bangalore
 - Capacity Building of Environmental Officers on Cleaner Production/ Technology Integrated Environment Management by FICCI, New Delhi
 - Life Cycle Assessment for construction Industry – concrete (gate-to-grave) by NCCBM, Haryana
 - Environmentally Friendlier Technology in Small Scale Glass Industry Cluster at Firozabad by Winrock International, Gurgaon.
 - Performance Evaluation of Pilot Plant based on Sequencing Batch Reactor for the Biodegradation of Absorbable Organic Halides (AOX) from Pulp and Paper Mills by AMU, Aligarh.
 - Clean Technology for the recovery of Gold, Silver and other allied materials from E-waste and allied sources by Mysore University, Mysore.
 - Pilot demonstration of Clean Technology for landfill gas recovery at Okhla site, Delhi by TERI, New Delhi.
- Creation of Data Base and Evolving a Mechanism for Capacity Building in the financial sector and application of fiscal instrument for clean technology projects, CPCB, Delhi.
- New Projects: Eighth Meeting of the Evaluation and Monitoring Committee was held under the Chairmanship of Prof. L. Kannan in August, 2010. The Committee has recommended seven projects for funding. These are as follows:
 - Demonstration Project of PLASMA Technology for Waste Destruction by JYOTI OM, Gujarat.
 - Demonstration of Nano-sized TiO₂-based Photo catalytic Oxidation Technology for controlling VOCs at Source and in situ Ambient Air by IIT, Kanpur.
 - Proposal on Proving the HCRI Concept in a Flex-Fuel Engine by ARAI, Pune.
 - Cleaner Technology opportunity Assessment in Extractive Industry by NetPEM, Nagpur.
 - Modification & Designing of Fly ash composites in Building Materials for energy Conservation & shielding Application by NPL, New Delhi.
 - Improved Chromium Recovery system Integrated with Water Recovery for Reuse in Tanneries Under Zero Discharge Concept by ILIFO, Chennai.
 - Eco Friendly Road Technology – RBI Grade 81 Natural Soil Stabilizer by M/s Alchemist Touchnology Limited, New Delhi.

Life Cycle Assessment (LCA): A systematic set of procedures for compiling and examining the inputs and outputs of materials and energy and the associated environmental impacts directly attributable to the functioning of a product or service system throughout its life cycle.

Life Cycle Assessment Studies in Thermal Power Plants, Steel, Pulp and Paper and Cement (from cradle to gate) has been completed. Second phase of the project i.e. gate to grave is continuing during the current financial year.

Carrying Capacity Studies: Carrying capacity based development planning is a process to make choices for development based on the premise of the supportive capacity of the region and capacity of the environment to assimilate the pollution from development activities. The planning process targets at equitable distribution of resources and achieve equitable quality of life across the region. Carrying capacity studies of Greater Kochi Region, Doon Valley, Damodar River Basin, Tapi Estuary and National Capital Region (NCR);, Natural Resource Accounting Studies for Upper Yamuna Basin; has been completed.

Creation of data base for Clean Technologies: The Ministry of Environment and Forests has sanctioned a project to Central Pollution Control Board to create a Data Base on the available cleaner technologies in the country as well as in abroad. Evolving a Networking Mechanism of the Research Institutions of the country, Capacity Building in the financial sector and application of fiscal instruments for adoption of clean technologies by the Small Scale Industries are also being worked out.

Major project activities would cover inventorization of indigenous as well as global clean technologies, assessment and evaluation of various technological options for criteria development, networking of R&D initiatives etc. in respect of cleaner technologies in selected 15 industrial sectors.

Training programmes for Adoption of Clean Technologies: Five days structured Training Programmes on Capacity Building of Environmental Managers on Cleaner Production/Technology was organized at New Delhi, Hyderabad, Pune, Goa & Jaipur during

the current financial year. A total of 165 Environmental Managers of different sectors of industries was trained. The Ministry has received information that after getting training, clean technology options has been implemented by the trained Environmental Managers in their industries. This is one of the most successful programme conducted by the Ministry for switchover Clean Technology implementation programme.

Achievements during the year

- Two projects have been completed as given below:
 - Environment Pollution Control in Agro-based Paper Industry by implementation of LPS Technology by ABC Papers, Hoshiarpur and PPCB, Punjab.
 - Development of Air Pollution Control Package for Small Scale Lime Kilns by NEERI, Nagpur
- Capacity Building by CT Training Programmes: Five days structured Training Programmes on Capacity Building of Environmental Managers on Cleaner Production/Technology was organized at New Delhi, Hyderabad, Pune, Goa & Jaipur during the current financial year. A total of 165 Environmental Managers of different sectors of industries was trained. The Ministry has received information that after getting training, clean technology options has been implemented by the trained Environmental Managers in their industries.

Brief summary of completed projects

Environment Pollution Control in Agro-based Paper Industry by implementation of LPS Technology by ABC Papers, Hoshiarpur and PPCB, Punjab

The main objective of this project was to set up a Full Scale LPS Plants, assess the final outcome, analysis of data and develop technical & financial parameters for further designing the plants capacity according to

the size of the agro-based units existing in India.

Lignin is a natural polymer responsible for mechanical properties such as stiffness and rigidity of lignocellulosic materials. In chemical pulping of lignocellulosic materials, lignin gets dissolved during pulping reactions and is released in the form of black liquor. The lignin present in the black liquor contributes towards more than 60% of COD (Chemical Oxygen Demand) with remaining 40% COD resulting from biodegradable components such as sugars, fatty acids etc. the lignin is not biodegradable anaerobically and also limits the anaerobics treatment of black liquor due to its bio-inhibitory nature. Further, only around 10% of the low molecular weight lignin fractions are found to be degradable in subsequent aerobic treatment stages resulting in the release of untreated lignin fractions along with treated effluent from the paper mills without chemical recovery.

The basic principle of the LPS technology is that Lignin is soluble in the alkaline conditions and as soon as the black liquor is acidified by any of the methods such as acid or carbon dioxide under optimized conditions of pH, temperature, pressure retention time etc., the lignin gets precipitated leaving other constituents soluble in the black liquor. The various reaction conditions of Lignin Precipitation Process determine the quality of lignin. The precipitated lignin is filtered through a specially designed proprietary filtration system under specific temperature and pressure followed by washing to obtain lignin in the cake form at around 40% solids. The lignin cake is further dried in the air dryer followed by screening under optimized temperature to obtain fine lignin powder at 95% solids. The lignin thus obtained has purity of above 95% thus making it

suitable for various applications ranging from feed to resin manufacturing. The Granit's LPS Technology removes 95% of the lignin present and remaining 5% of the lignin being low molecular mass fraction is easily degradable in the biological treatment stages. The LPS Technology reduces the COD load of the black liquor by 60% thus removing the bio-inhibitory fraction of the black liquor making it highly treatable. The treated effluent after secondary clarification is expected to have COD conc. of less than 350 ppm and BOD conc. of less than 30 ppm.

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

The objectives of the study included Designing air pollution mitigation measures for lime Kilns and Development of an appropriate air pollution control package for lime kilns. The key emission from a lime kiln are dust, tarry matter, sulphur dioxide, Carbon monoxide and Carbon Dioxide emissions depend on the sulphur content of the fuel. Sulphur Dioxide (SO_2) emissions are self controlled in the lime making process. Abatement of particulate emissions in the form of tar/smoke/dust is a major concern for the



Fig-48. Lignin Precipitation System (LPS) Plant Heat Exchanger and Reactors

lime kilns. To meet the objectives, NEERI carried out the studies at Wani, Maharashtra. The kiln was identified in consultation with MPCB, Amravati. In Wani area there are a total of 40-50 lime kilns spread over an area of about two sq. km. The capacity of the lime kilns is between 10 and 50 TPC. These kilns are of primitive type vertical kiln with natural draft. Their combustion efficiency is low and hence a lot of volatile/tarry matter in the form of smoke is evolved during the lime making process. There was a need to design a pollution abatement system for the above lime kilns. The available techniques for reducing dust emissions are fabric filters, electrostatic precipitators and/or wet scrubbers. Wet scrubber is a choice to abate lime kiln emissions due to presence of tarry/ particulate matter. The air pollution control system designed and successfully tested for a 10-TDP lime kiln in the area consists of a venture scrubber followed by a packed bed wet scrubber and demister. The tarry matter/dust removal efficiency of the system was observed as 8-85%. The scrubbed tarry matter after drying can be used as fuel supplement.

Industrial Pollution Abatement through Preventive Strategies (Waste Minimisation for Small & Medium 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 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 objective of the scheme is 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 exclude procurement of equipment and hardware.
- Establishing and running Waste Minimization Circles (WMCs) in clusters of Small and 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 programs and preparation of compendium of success stories on cleaner production/waste minimization

Activities undertaken and completed

- Demonstration projects.
- Establishment of Waste Minimisation Circles
- Training programmes.
- Organisation of workshops/seminars
- Publications of News letters, Posters etc.
- Developing Awareness Material on Waste Minimization

Progress made during the year

- **Demonstration projects**
 - Projects likely to be completed: Under the grant-in-aid scheme on "Abatement of Pollution through Preventive Strategies (Waste Minimisation)" four projects are likely to be completed. These are:
 - Waste Minimization Studies in Small Scale Industries in Balanagar

Industrial Area, Hyderabad.

- Waste Minimization Studies in Small Scale Industries – Textile Sector in Nandigaon Village Kothur Mahboobnagar Distt., (A.P).
- Enhancing the Environmental Performance and Competitiveness of Vegetable Oil Industry in Andhra Pradesh
- Waste Minimisation (WM) Assessment, Demonstration of WM Measures, and Training.
- Clean Technology for Waste Minimization from Nutraceutical Industry.



Fig-49. Waste plastic derived oil plant, Annamalai University, Tamil Nadu

- Ongoing Projects: Under the grant-in-aid scheme on “Abatement of Pollution through Preventive Strategies (Waste Minimisation)” 12 projects continued during the period and their progress was monitored through Monitoring Committee. These projects are as under:

- Waste Minimisation studies in Electroplating Industries in Balanagar Industrial area, Hyderabad by EPTRI, Hyderabad
- Waste Minimisation studies in Textile sector in Nandigaon village Kothur Mahboobnagar district, Andhra Pradesh by EPTRI, Hyderabad.
- Waste Minimization in small scale Industries – WMC Extension –Phase-III proposed by NPC, New Delhi
- Clean Technology for waste Minimization from Nutraceutical Industry, Yenepoya University, Mangalore,
- Minimization of Environmental Impacts of Slaughter House Wastes

by Value Addition as Pet Foods by AMU, Aligarh.

- Biological Liquefaction of Waste Fleshing and Treatment with Tannery Effluent for Biogas Generation in Single Reactor by CLRI, Chennai.
- Enhancing the Environmental Performance and Competitiveness of Vegetable Oil Industry in Andhra Pradesh Winrock International India, Gurgaon, Haryana.
- Waste Minimisation Studies in Electroplating Operation in Imitation Jewellery Units at Machilipatnam, Krishna Distt. Andhra Pradesh by M/s APITCO, Hyderabad
- Evaluation of Refuse Derived Fuel from Waste Plastics as Engine Fuel Substitute by Annamalai University.
- Production of bioelectricity from sludge and domestic wastewater using microbial fuel cell University of Calcutta, Kolkata

- Waste Minimisation through co-composting of on and off-farm wastes for sustainable crop productivity and soil health by Annamalai University.
- Waste Minimisation in Moradabad Brassware Cluster by the Energy Resource Institute, New Delhi
- New Projects: Eighth Meeting of the Evaluation and Monitoring Committee has recommended seven new projects to be carried out for the financial year 2010-11 onwards. These are:
 - Organizing Training Programs on Waste Minimisation (WM) & Cleaner Production (CP) for Critically Polluted Industrial Clusters by M/s Ramky Enviro Engineer Limited, Dwarka, New Delhi.
 - Synthesis of Polymer Hydro gel and Development of Hybrid Waste Water Treatment System Using Cavitations Technique and Hydro gel by Department of Chemical Engineering, Vishwakarma Institute of Technology (VIT), Pune.
 - Development of Reactive Thermal Plasma Reactor to Synthesis SiALON and Silicon Nitride Based Ceramics from Fly Ash by Department of Manufacturing Engineering, Annamalai University, Tamil Nadu.
 - Design of Air Pollution Control System for Induction Furnace by Department of Metrological and Materials Engineering, IIT, Roorkee.
- **Establishment of Waste Minimisation Circles:** The National Productivity Council (NPC), New Delhi coordinates the activities pertaining to Waste Minimisation Circles (WMCs) through facilitators designated by it, training and awareness activities by NPC itself as well as through Development Commissioner, Small Scale Industries (DC, SSI). NPC has trained 168 participants in 162 organizations through WMC facilitator training programs,

prepared compendium of success stories in this area for mass awareness both at Centre and State levels.

A WMC is defined as 'A small group of entrepreneurs in the small scale sector who manufacture similar products and employ the same processes meeting periodically and regularly, to analyse the operation of their unit, to identify sources of waste generation and implement Waste Minimisation Options leading to an increase in individual profitability and reduction in pollution load from the units'. Waste Minimisation circles established till date in 41 sectors are as follows:

Phase/year wise		No. of WMCs
1 st phase	(1995-96)	15
2 nd phase	(1997-2006)	118
3 rd phase	(2007-2010)	24
Total till date		157

- **Training programmes:** The National Productivity Council imparts trainings to the Small Scale Industries through WMC facilitators at all the established circles. Besides this, the Evaluation and Monitoring Committee has recommended a project to M/s Ramky Enviro Engineers, New Delhi for organizing 20 training programmes in the critically polluted areas during two years tenure.

The main objective of the program is to organize a series of training programs, in various critically polluting industrial clusters to develop the capacity in the field of Waste Minimization and Clean Technology amongst various stakeholders, with a view to achieve the millennium goal of sustainable development. The subsequent objectives are:

- To strengthen the institutional capacities and the human resources in the environmental sector, in particular waste minimization & clean technologies,

- To build awareness through orientation and motivation among different stakeholders including regulators, entrepreneurs, Consultants, etc.
- Skill development, transfer of knowledge, coaching of key persons and trainers through hands on experience
- Networking between training providers and prime institutions for consultation and implementation.
- **Organisation of workshops/seminars:** The National Productivity Council has organized four regional workshops at Chennai, Ahmadabad, Hyderabad, Kolkata and Bangalore during the current financial year. Besides this four local level workshops has been organized at Indore, Devaas, Nagpur and Khurja during the current financial year. A National level workshop is likely to be organized at the earliest.
- **Publications of News letters:** National Productivity Council (NPC) publishes quarterly News letters covering different sectors. More than two dozen News Letters has already been published. These news letters are sent to the stakeholders, WMCs, State Boards and Policy makers through out the country.
- **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 MoEF 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 programs.
 - "Training of the Trainer" programs on Waste Minimization
 - National and Regional Waste minimization Awareness Workshops

Achievements made during the year

Under the grant-in-aid scheme two projects has been completed on "Abatement of Pollution through Preventive Strategies (Waste Minimisation)".

- Waste Minimization in Basic Chrome Manufacturing Unit by M/S Ramky Enviro Engineers Ltd., New Delhi.
- Enhancing the Environmental Performance and Competitiveness of Vegetable Oil Industry in Andhra Pradesh Winrock International India, Gurgaon, Haryana.

Brief summary of the completed projects

Waste Minimization in Basic Chrome Manufacturing Unit by M/S Ramky Enviro Engineers Ltd., New Delhi

The Basic Chrome Sulphate (BCS) is being used as a major chemical in the Tanning process in the leather industries. Near the vicinity of the Tannery industries, lots of BCS units have come up. The major BCS manufacturing units are located in the areas of Kanpur in (U.P), West Bengal, Orissa, Tamil

Nadu etc. the raw material used for the production of BCS is Chromite ore. The Chromite ore contains heavy metal like chromium and lead. During the manufacturing process, lots of hazardous wastes are generated.

There are about 17 Small/Medium Industries/manufacturing units producing about 1000 to 1300 TPM BCS. In addition, about one ton of sodium sulphate is also produced as a by product which is contaminated with hexavalent chromium. A good quantity of toxic & hazardous waste is generated during the process. Presently, most of the units at Kanpur are being closed due to environmental pollution. The industries lack in the technical capabilities to improve upon their existing production process to minimize not only the waste generation but also to improve the shop floor environment to the productivity and comply with the ever stringent environmental regulations.

The main objective of the project is to demonstrate the resource conservation & waste minimization in Basic Chrome Sulphate (BCS) manufacturing industries. Subsequent objectives are resource recovery, recycle & reuse; improve upon the shop floor environment; and enhancement of productivity.

Enhancing the Environmental Performance and Competitiveness of Vegetable Oil Industry in Andhra Pradesh Winrock International India, Gurgaon, Haryana.

Environmental degradation by the edible oil sector is a matter of serious concern as it generates large quantities of wastewater. On an average, for every ton of oil produced, the discharge of wastewater is about 30 M³. Process wastewater contributes to most of the pollution load in the effluent being drained by the industry; while non- process waste water constitutes the major portion of total waste water quantity. The process is high in BOD,COD,TSS, oil phosphate, sulfate and chloride. These pollutants need to be removed

from the effluent to prevent the damage being done to the environment. Apart from the liquid waste, solid waste and air emissions are also generated. The sustainability of the industry is at stake due to the above problems and constant pressure from regulators to combat pollution. India is the 3rd largest producer of edible oil in the world. Andhra Pradesh has about 55 oil manufacturing units concentrated in pockets as clusters but spread across the state. The specific objectives of the proposed project are to promote the adoption of WM measures to tackle environmental pollution in edible oil units and promote more resource efficient processes and operations in the fields of water pollution and solid wastes, thereby positively influencing the local and global climate change, to enhance the performance and competitiveness of small and medium scale edible oil units in Adoni by raising environmental awareness, to build the capacity of the targeted beneficiary units by training to adopt WM approach on a sustainable basis to reap benefits, to develop and promote environmental actions those are instrumental in alleviating poverty, improving health and safety conditions.

Methodology adopted in the study for waste minimisation in the vegetable sector include the formation of study team, preparation of material and energy balance, collection of data on operating processes, house keeping, shop floor practices, wastage of raw material, utilities and energy, critical analysis of data, cost benefit analysis and recommendation of the suitable measures.

New Waste Minimisation Circles Developed: During the IIIrd phase of the project 24 New Waste Minimisation Circles has been developed in the cities like: Nuzwid, Pithampur, Indore, Dewas, Dhule, Jamnagar, Nagpur Trichur, Hyderabad, Ujjain and Mumbai. These WMCs has covered the sectors like Earthen Tile, Foundry, Steel Rolling, Electroplating, Engineering, Cotton Seed Oil, Brass Foundry, Ceramic Tiles, Sponge Iron,

Textile Processing, Paints, Resins, Pharmaceuticals, Hotel Chemicals, Ceramic Pottery and Ceramic Insulators.

Project and Awareness materials developed

- Training Package
- WMC News letter : Published 27 Issues,
- WMC Website (www.wmc.nic.in) launched
- WM – EC Manual prepared
- Five Posters developed
- Project Audio-Visual CD prepared
- Technical Brochure on Sanganer Textiles prepared etc.

Central Pollution Control Board

Introduction and objectives

The Central Pollution Control Board (CPCB) performs functions as laid down under the Water (Prevention & Control of Pollution) Act, 1974, and The Air (Prevention and Control of Pollution) Act, 1981. It is responsible for planning and executing comprehensive nationwide programmes 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 / Pollution Control Committees besides providing technical assistance & guidance to them.

The Central Pollution Control Board has been playing a vital role in abatement and control of pollution in the country by generating environmental quality data, providing scientific information, rendering technical inputs for formulating 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 also co-ordinates enforcement and implementation of Rules framed under the Environmental (Protection) Act, 1986 with State Pollution Control Boards / Pollution Control Committees. It also 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, Pollution Control Committees 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 seventeen major polluting industrial sectors and monitoring its implementation through eight task forces and steering committees;
- Action plans for improvement of environment in eighty eight critically polluted areas/clusters and monitoring their implementation;
- Action plans for improvement air quality in sixteen 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 made during the year

Development of Environmental Laboratories

Adoption of Revised Guidelines for Recognition of Environmental Laboratories under the Environment (Protection) Act, 1986:

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Ministry of Environment and Forest has constituted an Expert Committee at CPCB vide letter no. Q-15018/8/2006-CPW dated 28th January, 2009 for operationalization / adoption of revised Guidelines for recognition of Environment laboratories under the Environment (Protection) Act, 1986. The Expert Committee held eleven meetings. New/renewal cases of recognition of Government Environmental Laboratories were considered, their inspection reports examined and evaluated by the Expert members.

Environmental Laboratories Approved for Recognition by Central Pollution Control Board under the Environment (Protection) Act, 1986: In exercise of power conferred on Central Pollution Control Board, Delhi vide Gazette Notification No. S.O.145(E) dated 21st February, 1991 for recognition of environmental laboratories of Government / semi-Government organization, Public Sector Undertaking and Educational Institution to carry out the functions entrusted to the Environmental Laboratories under section 12(1)(b) & 13 of the Environment (Protection) Act, 1986, CPCB has approved four laboratories (new/renewal) on recommendation from the Expert Committee.

Strengthening of SPCBs Laboratories : Proposals from the following State Pollution Control Boards for financial assistance for strengthening of laboratories were received:

- Madhya Pradesh State Pollution Control Board, Bhopal
- Orissa Pollution Control Board, Bhubaneshwar
- Bihar State Pollution Control Board, Patna
- Maharashtra State Pollution Control Board, Mumbai
- Meghalaya State Pollution Control Board, Shillong
- Himachal Pradesh State Pollution Control Board, New Shimla
- Tripura State Pollution Control Board, Tripura

Participation of CPCB Laboratories in International Proficiency Testing (PT) Programme Conducted by New York State Department of Health, USA : To ensure analytical quality, the CPCB laboratories at Delhi and its Zonal Offices located at Kolkata and Lucknow participated in Proficiency Testing Programmes organized by New York State Department of Health, Wadsworth Centre, Environmental Laboratory Approval Programme (ELAP), Albany New York.

Participation in NABL Proficiency Testing (PT) Programme conducted by National Physical Laboratory, New Delhi : CPCB's Instrumentation Laboratory participated in the NABL Proficiency Testing Programme for testing of metals in water (TC-44 Part-II) during June, 2009. conducted by National Physical Laboratory, Council of Scientific & Industrial Research (CSIR), New Delhi. The PT samples comprising various trace metals such as As, Cu, Fe, Zn, Pb, Cd, Ni were received by Central Pollution Control Board Laboratory and analyzed using Atomic Absorption Spectrophotometer / Inductively Coupled Plasma and results reported to National Physical Laboratory (NPL) New Delhi.

Analytical Quality Control (AQC/Water) for CPCB, SPCBs, PCCs for Laboratories recognized under Environment (Protection) Act, 1986 : CPCB maintains a large water quality network covering lakes, wells, and ground water stations spread over 27 States and six Union Territories operated through various State Pollution Control Boards (SPCBs). Comparability of data within the collaborative programme becomes the key challenge to the water testing laboratories. To ensure the reliability of the data, a programme called "Analytical Quality Control (AQC)" was initiated with 20 laboratories in 1991. In 2009, number of laboratories participating in this exercise have increased to 194 laboratories of SPCB / PCC, Environment (Protection) Act recognized laboratories.

Inter-Laboratory QA/QC Study on Persistent Organic Pollutants (POPs) in Asia

Region : National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi was registered as POPs laboratory representing the country having analytical facilities for POPs in India with UNEP Chemicals during January/February, 2009.

Environmental Research Activities

Participation of CPCB Laboratories in International Proficiency Testing (PT) Programme Conducted by New York State Department of Health, USA : To ensure analytical quality, the CPCB laboratories at Delhi and its Zonal Offices located at Kolkata and Lucknow participated in Proficiency Testing Programmes organized by New York State Department of Health, Wadsworth Centre, Environmental Laboratory Approval Programme (ELAP), Albany New York.

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countries (Asia & OECD Countries) including National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi participated.

Ministry of Environment and Forests (MoEF), Government of India entrusted CPCB to undertake the inventory of POPs being released from sources in Northern and Eastern regions of the country as part of Development of National Implementation Plan (NIP) under Stockholm convention, a UNDP Sponsored project.

Testing and Validation of BOD Biosensor Based on Microbial Mixed Culture for Rapid BOD Determination in Wastewater

Biochemical Oxygen Demand (BOD) is an important parameter in water quality monitoring and in designing effluent treatment plants. The test takes considerable time say three days at 27°C or five days at 20°C and consumes energy too. To overcome these constraints, attempts were made to carry out the test in short time by using BIO-SENSOR probes. This technique involves selection of suitable microbial composition to degrade a wide range of wastes. In this endeavor, CPCB conducted a study in collaboration with Institute of Genomics & Integrative Biology (IGIB), CSIR, Delhi to develop BIO-SENSOR an instrument for rapid BOD test. The BIO-SENSOR membrane has been developed and analysis was carried out using GGA (Glucose Glutamic Acid) standard and different effluent samples. The analytical results exhibited close agreement between conventional method and bio-sensor method. A standard calibration graph showing linear relationship is produced below

Studies on Correlation between TOC, BOD and COD in Complex Environmental Matrices

Studies on correlation between total organic carbon (TOC), biochemical oxygen demand (BOD) and chemical oxygen demand (COD) in complex environmental matrices were done as determination of total organic carbon (TOC) is considered more rational for

4

measurement of organic contamination in the environmental samples and being considered as a potential replacement of time consuming BOD and COD analysis. During the first phase of study, environmental samples were collected from various stages of waste water treatment plants from pharmaceutical industries at Ankleshwar, Gujarat. The preliminary analytical results indicated that the correlation between COD and DOC (Dissolved Organic Carbon) or BOD (Bio-chemical Oxygen Demand) and DOC was influenced by several factors.

Pilot Plant Study Using Sludge-Reagent-Product (SRP) Technology

An innovative technology called “Sludge-Reagent-Product (SRP) Technology” has been developed by CPCB to recover alum in the sludge used in water treatment. This technology showed 80 to 90% recovery of chemical coagulant (alum) from discarded alum-treated-sludge which can be recycled for reuse. Thus reducing the need for use of fresh alum besides being both economically and environmentally viable options in water treatment processes. A bench scale working Model Plant (based on SRP Technology) has been initiated. Construction work for 0.5 MLD pilot water treatment plant, based on SRP technology at Bhagirathi Water Works (Delhi Jal Board), Yamuna Vihar, Delhi is under progress.

Source Apportionment of Ambient Air Particulates through Non-Destructive Analytical Technique Using Energy Dispersive X-Ray Fluorescence (ED-XRF) Spectrometer

To control heavy metal pollution and limit its harmful impact, stringent regulations are being implemented by government and regulatory bodies worldwide. Meeting these regulations requires appropriate and accurate assessment of metallic species through reliable monitoring techniques. Energy Dispersive X-ray Fluorescence (EDXRF) spectrometry is a non-destructive analytical technique having wide application in measurement of heavy

metals on particulate air filters using US Environmental Protection Agency (EPA) methods. CPCB used “Panalytical” Energy Dispersive X-ray Fluorescence (EDXRF) Spectrometer, a highly sophisticated instrument for Source Apportionment studies of ambient air particulates in various cities through ED-XRF. This instrument is first of its kind in the country for analysis of suspended particulate matter (SPM) fractions of 10 and 2.5 microns sizes in ambient air for different metallic elements. During 2009 several ambient air particulate samples on air filters under the Project “Source Apportionment studies of ambient air particulate from various cities” were analyzed for 44 trace elements using ED-XRF.

The Source Apportionment Studies taken up for the first time in six cities viz. Bangalore, Chennai, Delhi, Kanpur, Mumbai and Pune, have been completed. The report comprises Air Quality Monitoring results for three seasons, Chemical Speciation of PM₁₀ & PM_{2.5}, Source Apportionment through Factor analysis & CMB 8, Emission Inventory with future projections, Analysis of various control scenarios using dispersion modeling; and preparation of action plans. On MoEF's advise the report was peer reviewed by international experts.

Trace Metal Characterization in Solid Waste through ED-XRF

Energy Dispersive X-ray Fluorescence (EDXRF) is a non destructive analytical technique, wherein digestion of the solid sample is not required. The ED-XRF analysis of solid waste samples is very fast, accurate and because of the non-destructive nature of analysis, very small sample quantity is required for analysis of large number of trace metals. Samples were analysed using the above instrument.

Trace Metal Characterization in Solid and Hazardous Waste Using Inductively Coupled Plasma – Optical Emission Spectrometer (ICP-OES)

The detection of trace metals in environmental samples could be accomplished

by various methods such as colorimetric, polarographic, atomic absorption spectrophotometer, ICP technique, but trace metal analysis using ICP-OES is relatively simple, accurate versatile and free from interferences and several trace metals can be analyzed simultaneously in a sample. In order to assess the hazardous nature of municipal and industrial solid wastes and the environmental impact caused by dumping of such waste trace metals were detected by ICP-OES. In municipal solid waste and industrial solid waste which are reported to contain various toxic and hazardous metals such as Arsenic, Cadmium, Chromium, copper, iron, manganese, nickel, lead, selenium, antimony, cobalt, vanadium and zinc etc. The samples of solid waste / hazardous wastes were analyzed for various trace metals analysis.

Bio-Remediation of Contaminated Site In Ranipet Area, Tamil Nadu

More than two lakh tonnes hazardous waste (HW) generated over a period of 20 years was dumped by M/s. Tamil Nadu Chromates and Chemicals Limited (TCCL) on an unsecured land area of 3.5 hectares within its premises located at Ranipet industrial area, Tamil Nadu. The leachate from the dump having Cr (VI) has contaminated the surrounding soil and water environment, with ground water samples showing Cr (VI) concentration in the range of 50 to 200 mg/l. CPCB has sponsored a demo-project the IIT Madras for field level bio-remediation of Cr (VI) contaminated soil and aquifer in Ranipet area. The concentration of Cr (VI) has been observed to reduce from 2500 mg/kg to less than 200 mg/kg within 41 days. The results indicated that Cr (VI) reduction occurred in most of the wells surrounding the injection wells.

Project "Monitoring of Pesticide Residues" at National Level

Department of Agriculture and Cooperation (DAC), Ministry of

Agriculture, New Delhi and Project Directorate, All India Network Project (AINP) on Pesticide Residues, Indian Agricultural Research Institute New Delhi sponsored the above project to Central Pollution Control Board. It is inter-ministerial project scheme involving Ministry of Agriculture, Ministry of Health, Ministry of Chemicals and Fertilizers, Ministry of Commerce, Ministry of Environment and Forest and Agricultural Universities. During the project study samples were for analysis of four groups of pesticides viz. Organo-chlorines, Organophosphates, Synthetic Pyrethroids and Herbicides (total 32 individual pesticides) were analyzed.

Between April, 2009 to December, 2009, a total of 559 surface water samples and 41 soil samples were collected and analyzed for pesticides residues, the data reports were forwarded to Project Coordination Cell of the Indian Agricultural Research Institute, Pusa, New Delhi.

National Implementation Plan (NIP) Under Stockholm Convention Harmonization of Monitoring Protocols for Dioxin - Furan in Environmental Matrices

National Reference Trace Organic Laboratory was assigned to collate and compile the monitoring and analysis protocols after consensus with the participating organizations.



Fig-50. 'Perkin Elmer' Inductively Coupled Plasma – Optical Emission Spectrometer

Three harmonized protocols were collated and compiled for monitoring of Dioxin Furan congeners in stationary source emissions, ambient air and solid waste. The draft protocols were circulated to various participating laboratories. The comments received have been incorporated and following protocols finalized. The finalized protocols were circulated to UNDP, MoEF and other participating laboratories such as NEERI, Nagpur; NIIST, Thiruvananthapuram and released.

Sampling of Dioxin-Furan from particulate and Vapour Phase of ambient air at Delhi for phase distribution assessment study

Dioxin - Furan congeners have the tendency to be distributed between particulate and vapour phase of ambient air and stationary source emissions. Central Pollution Control Board initiated a study of phase distribution of dioxin-furan in particulate phase and vapour phase of ambient air. Particulate phase and vapour phase samples were collected at ITO traffic inter-section and Residential area of East Arjun Nagar during December 2008, May 2009, August 2009 and December 2009, with PUF samplers, which have inbuilt provision to collect separate particulate phase and vapour phase PCDDs / PCDFs and analyzed for 17 congeners for reporting status of phase distribution.

Disposal of Plastics waste through Plasma Pyrolysis Technology (PPT)

Disposal of thin plastic bags, metalized plastics such as gutka pouches, wafer packing etc., multi-layer plastics such as packaging materials, PVC materials i.e. PVC tiles, pipes etc. is a serious environmental concern all over the world. Incineration is commonly used technology at present for the disposal of plastic and other organic waste material in developed countries. However, Plasma Pyrolysis is State-of-the-Art technology for the disposal of plastics and hazardous waste. CPCB associated itself with FCIPT, Institute for Plasma Research

wherein an initiative to develop Plasma Pyrolysis technology (PPT) with financial support from Department of Science and Technology (DST), New Delhi has been done.

Standardization of Methodology for Assessment of Volatile Organic Compounds (VOCS)

Volatile Organic Compounds (VOCs) are the group of organic compounds that readily evaporate at normal air temperature. Fuel oils, gasoline, industrial solvents, paints, and dyes are the major sources of VOCs in environmental matrices, ambient air, soil, sediments, surface water, ground water. Eighty four individual VOCs are listed in USEPA analytical method, of these the chlorinated VOCs are associated with commercial and industrial use and include dozens of chemicals that are typically very mobile, persistent, and toxic in the environment. Non-chlorinated VOCs are associated with gasoline, fuel oils, and industrial solvents. These chemicals are also mobile, but are generally less toxic and persistent than the chlorinated solvents. CPCB initiated the project for standardization of methodology for assessment of VOCs in surface water, drinking water and groundwater by purge & trap sample pre-concentration followed by GC-MS analysis, the study is in progress.

Standardization of Methodology for Determination of Polycyclic Aromatic Hydrocarbon (PAHs)

Polycyclic Aromatic Hydrocarbons (PAHs) are organic compounds induced into the environment mainly during the combustion processes, such as burning of fossil fuels.. Many of these compounds are carcinogenic and are often found in water, air (e.g. PAHs absorbed on airborne particulates) and other environmental locations. Thus monitoring of PAHs is very crucial from environment at consideration. The United States Environment Protection Agency has designated sixteen PAHs - Naphthalene, Acenaphthylene, Fluorene, Phenanthrene, Anthracene, Fluoranthene,

Pyrene, Benzo(a)anthracene, Chrycene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Benzo(gh)perylene and Indeno(1,2,3,cd)pyrene as priority pollutants. The common analytical method for PAHs employs HPLC with UV detection at 254 nm wavelength another analytical option is fluorescence detection for PAHs as these compounds have high natural fluorescence. With above in view, CPCB initiated a project on standardization of methodology for determination of PAHs by reversed-phase HPLC. The methodology for standardization is in progress adopting HPLC with UV and Fluorescence detector with following programming option:

Project "Assessment of Persistent Organic Pollutant (Pops) Residues in Human Population of Delhi with Reference to Adverse Health Effects"

The POPs persist in the environment at very low levels and are linked to many health and environmental effects. The organo-chlorine pesticides are highly hazardous chemicals and their widespread use makes them available in food chain and is absorbed in human body through skin, inhalation, oral and placental routes. The above study was a collaborative project with University College of Medical Sciences (UCMS) Delhi to generate epidemiological data and establishment of relative risk / relationship between the incidence of adverse health outcomes including cancer due to exposure to pesticides with special reference to organo-chlorine Persistent Organic Pollutants residues and Polychlorinated Biphenyls (PCBs).

National Water Quality Monitoring

National Water Quality Monitoring Programme (NWRM)

Salient features of NWQM network are given below:

- i. There are 1700 stations spread over 27 States and six Union Territories.
- ii. The monitoring network covers 353 Rivers,

107 Lakes, nine Tanks, 44 Ponds, 15 Creeks/Seawater, 14 Canals, 18 Drains and 490 Wells.

- iii. Out of 1700 stations, 980 are on rivers, 117 on lakes, 18 on drains, 27 on canals, nine on tank, 15 on creeks/seawater, 44 on pond and 490 are groundwater stations

Bio-monitoring is also carried out on specific locations. In view of manpower and resource constraints organic pollution related parameters are chosen for frequent monitoring i.e. monthly or quarterly while major cations, anions, other inorganic ions and micro pollutants (toxic metals & POP's) are analyzed once in a year to keep a track of water quality over large period of time. The water quality data are brought out as 'Water Quality Status Year Book'.

Water Quality Trend

The water quality monitoring data collected between 1995 to 2009 (Fig 51-53) indicated organic and bacterial contamination continued to be critical, primarily due to increasing discharge of untreated sewage generated from urban centers which the municipal bodies are unable to handle. Besides, the receiving water bodies have inadequate water for dilution.

Water Quality of Rivers – Bhagirathi, Alaknanda and Ganga

The river Bhagirathi from its source, flows about 200 km before meeting river Alaknanda at Devprayag at an elevation of 475 m (1,558 ft). Downstream of this confluence the river is known as the Ganga. The stretch of river Alakananda from Joshimath to Devprayag and river Ganga from Devprayag to Haridwar was surveyed to assess the impact of untreated sewage on the river quality. The water quality of river Ganga is regularly monitored at

- D/s Missarpur, Haridwar;
- U/s Laxmanjhula, Rishikesh;
- River Alaknanda at Devprayag b/c Bhagirathi;

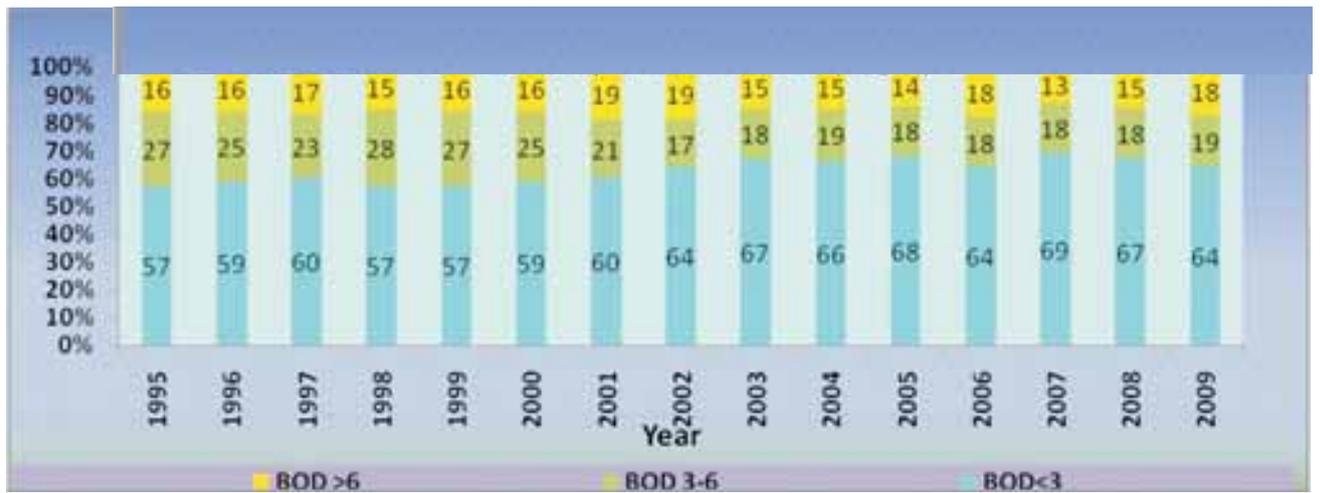


Fig-51. Water Quality Trend (BOD, mg/l)

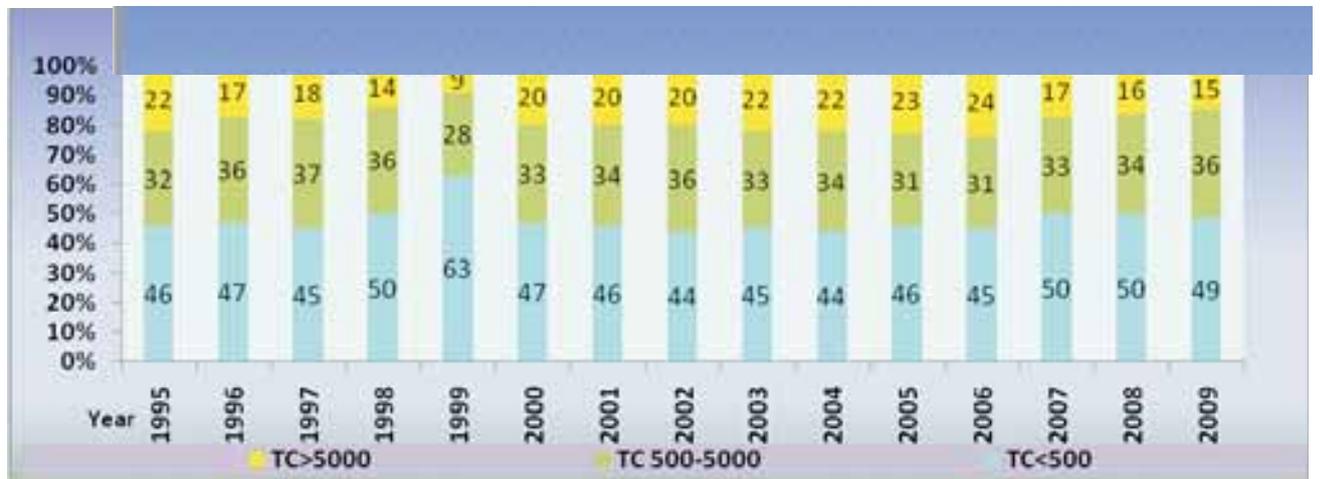


Fig-52. Water Quality Trend (Total Coliform (TC), MPN/100 ml)

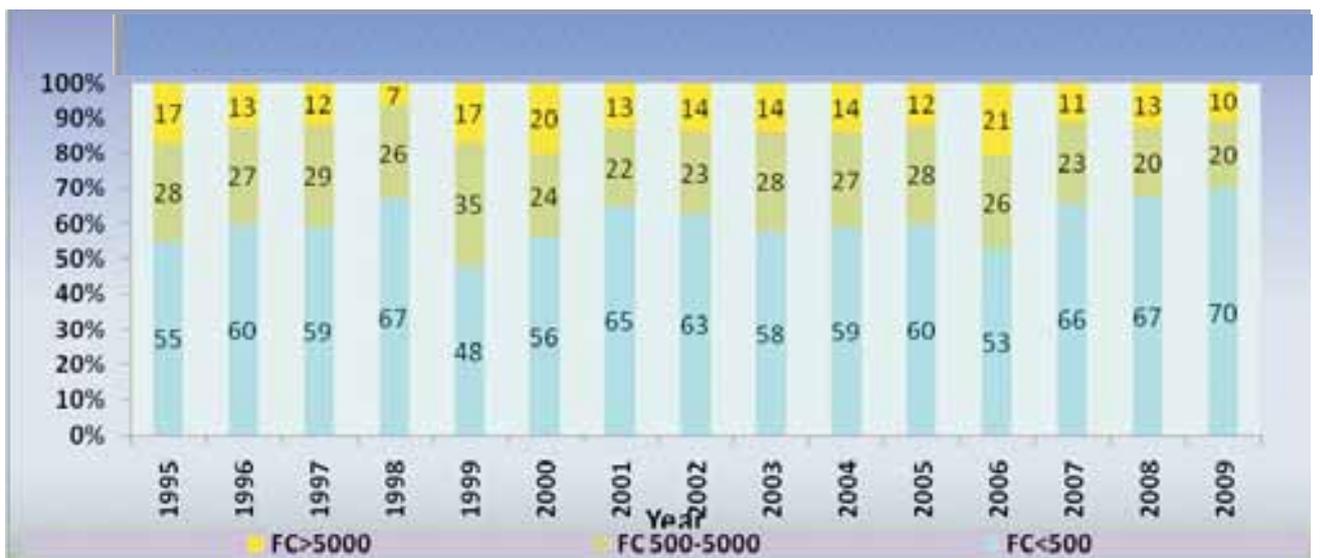


Fig-53. Water Quality Trend (Faecal Coliform (FC), MPN/100 ml)

- River Alaknanda at Deoprayag a/c Bhagirathi;
- River Bhagirathi at Deoprayag b/c Alaknanda;
- River Alaknanda at Rudraprayag a/c Mandakini;
- River Alaknanda at Rudraprayag b/c Mandakini and
- River Mandakini at Rudraprayag b/c Alaknanda in the stretch under reference by CPCB.

The monitoring data collected indicated that the water quality was meeting desired criteria w.r.t. pH, dissolved oxygen (DO) and BOD; however for faecal coliform the criteria limits for bathing waters were exceeded.

Water Quality Status of River Yamuna

The river Yamuna (entire 1376 Km. stretch) is regularly monitored by CPCB at 21 locations, the monitoring frequency is once a year at two uppermost locations, quarterly at three locations and monthly at remaining locations. The deterioration in the water quality of river Yamuna is caused by indiscriminate wastewater discharges from various sources. The condition aggravated further due to inadequate water to enhance self purification capacity of the river. There was barely any flow in river Yamuna River during the period April to September 2009 except at few locations in a stretch of about 210 km between Hathnikund barrage upto Palla.

Identification of Polluted River Stretches

The uses of rivers for various purposes require specific physio-chemical and bacteriological characteristics. The river stretches not meeting the water quality criteria and having BOD > 3 mg/l are identified as polluted stretches. These polluted stretches are further classified under different priority levels on the basis of extent of pollution. The water quality data for the years 2002-2008 was analyzed and the monitoring locations exceeding the water quality criteria identified

as polluted locations with respect to risk. Priority levels of polluted stretch are based on the risk defined as;

Risk = Frequency of Violation of Criteria X Consequence (Magnitude)

The criteria formulated for identification of polluted river stretches for priority one to five based on BOD was found to be applicable for 150 stretches listed as 'Priority polluted river stretches' as follows :

- Priority 1 (BOD > 30mg/l and BOD exceeding 6mg/l on all occasions)
- Priority 2 (BOD between 20 & 30 mg/l)
- Priority 3 (BOD between 10 & 20 mg/l)
- Priority 4 (BOD Between 6-10 mg/l)
- Priority 5 (BOD between 3 & 6 mg/l)

National Air Quality Monitoring

National Ambient Air Quality Standards (NAAQS)

The ambient air quality objectives/ standards are pre-requisite for developing programme for effective management of ambient air quality and to reduce the damaging effects of air pollution. The previous National Ambient Air Quality Standards (NAAQS) notified in year 1994 addressed six pollutants (SO₂, NO₂, RSPM /PM₁₀, SPM, CO and lead). The pollutant Ammonia was added in 1996. The revised National Ambient Air Quality Standards notified in November 2009 addresses the pollutants namely: (SO₂, NO₂, PM₁₀, SPM, CO, NH₃, Benzo(a)pyrene B(a)P, O₃, Lead, Nickel and Arsenic) .

National Ambient Air Quality Monitoring Programme

Central Pollution Control Board is executing a nation-wide National Air Quality Monitoring Programme (NAMP). The monitoring under the NAMP is being carried out with the help of Central Pollution Control Board; Zonal Offices; State Pollution Control Boards; Pollution Control Committees and National Environmental Engineering Research

Institute (NEERI), Nagpur. The growth of operating Air Quality Monitoring Stations in the country is given in Fig-54. The air quality network has 411 operating stations covering 167 cities/towns in 26 States and five Union Territories. Trend in annual average concentration in SO₂ levels in various cities is depicted below showed a decreasing trend in Delhi, Kolkata, Mumbai, Chennai etc., during last five years. The decreasing trend in sulphur dioxide levels may be due to various measures taken such as reduction of sulphur in diesel, use of LPG instead of coal as domestic fuel conversion of diesel vehicles to CNG etc. Regarding trend in annual average concentration in NO₂ levels in various Metropolitan cities depicted below NO₂ levels were within the national standards. Various measures such as implementation of Bharat Stage-III norms have been taken to mitigate ambient NO₂ build up .

Ambient Air Quality for criteria pollutants - Agra

CPCB's Agra Project Office is monitoring ambient air quality since year 2001 at four locations basis. The data collected is compiled for the following locations in the Taj Trapezium:

- Tajmahal,
- Etmad-ud-daulah,
- Rambagh (all above three are protected monuments) and
- Nunhai (industrial Area)

Observations were compared as per the revised national ambient air quality standards (NAAQS) indicated that the annual general trends of the four criteria pollutants at the four stations from year 2002 to 2009 showed that SPM concentration was lower than that in year 2002, the RSPM values in general were higher w.r.t. year 2002, where no major changes were observed for SO₂ & NO₂ between years 2002 to 2009.

Air Quality Management during Commonwealth Games-2010

The Ministry of Environment & Forests and

Central Pollution Control Board have initiated establishment of a Lidar based air quality forecasting system, during Common wealth Games – 2010 with technical assistance from Government of France. In this regard, Memorandum of Understanding (MoU) between CPCB and French companies was signed. Work on the study has been initiated

Continuous Ambient Air Quality Monitoring (CAAQM)

Central Pollution Control Board (CPCB) has started National Air Quality Monitoring Programme (NAMP) in 1984 to assess air quality & the effectiveness of pollution control programmes and air quality trends. The present Indian (National) Air quality Monitoring Network is limited in its scope of application and hence, there is need to modernize the existing system to International standard. Internationally use of continuous Automatic Ambient Air Quality Monitoring is widely accepted. In most of the countries it is the requirement to do air quality monitoring using automatic analyzers and the manual monitoring is done as a complement to online measurements. CPCB has initiated a project "Private Participation in the Management of Continuous Ambient Air Quality Monitoring Station / Network under the proposed option of Operation Contract". The project is being executed as Pilot Project in four cities namely Delhi, Lucknow, Bangalore and Chennai under Operational Contract. Each identified city will be having a Pilot Network of three CAAQM Stations (One in residential area, one in industrial area and one in traffic hotspot area).

Continuous air quality monitoring (CAAQM) using online monitoring instruments in Delhi is conducted at three fixed locations and using mobile van at one location :

- Delhi College of Engineering (DCE),
- Bahadur Shah Zafar Marg (ITO)
- Siri Fort

Besides ONE mobile van stationed at CPCB Parivesh Bhavan, East Arjun Nagar. On

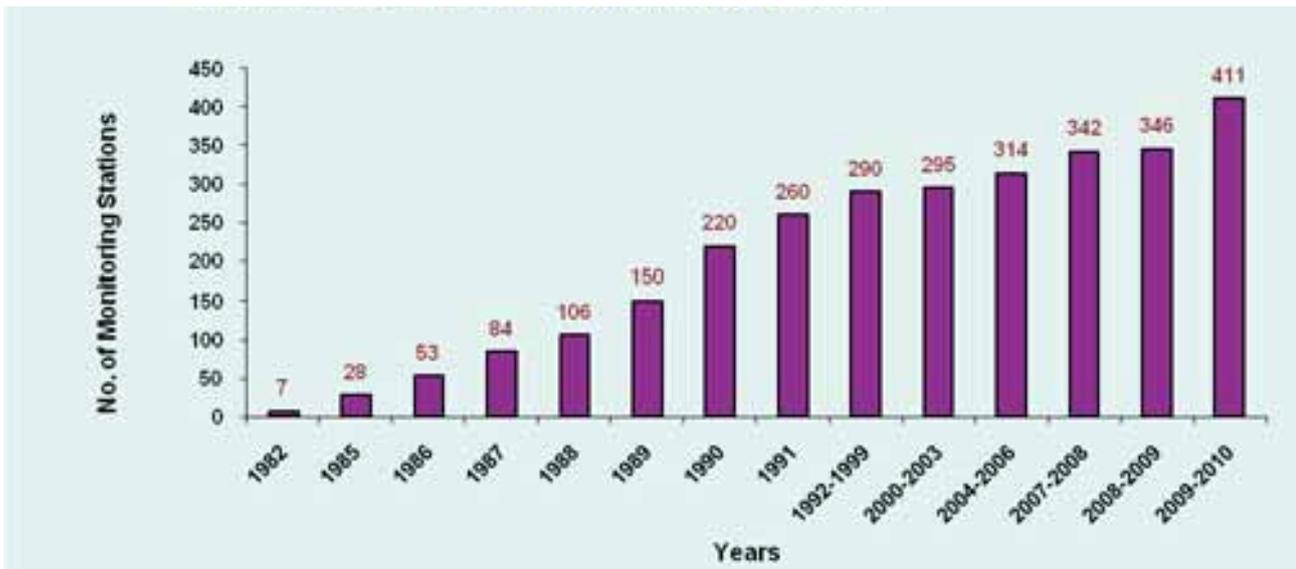


Fig-54. Growth of Operating Ambient Air Quality Monitoring Network

line air quality data (updated every 15min) of these four stations are displayed on CPCB's website (www.cpcb.nic.in).

Emission Inventory and Source Apportionment Studies for Indian Cities

Under the project 'Air Quality Assessment, Emission Inventory And Source Apportionment Studies For Indian Cities' studies on development of emission factors for vehicles, and source emission profiles for vehicular as well as non-vehicular sources have been concluded. Source apportionment studies have been carried out at six major cities viz. Delhi (NEERI), Mumbai (NEERI), Chennai (IITM), Bangalore (TERI), Pune (ARAI) and Kanpur (IITK) for assessing contribution of different source categories in the ambient air quality and subsequent preparation of Air Quality Management Plan. The report is under s comprise air quality monitoring results for three seasons.

Air Quality Monitoring Under Male Declaration

Ambient Air Quality Monitoring under Male Declaration at international boundary with Bangladesh is being done at Port Canning, West Bengal under the program

"Male Declaration for the study of trans-boundary movement of pollutants". The site is located about 70 km. east of Kolkata bordering Bangladesh. Twenty four hour ambient air quality monitoring is conducted for at least ten days in a month, for parameters RSPM (Fig-56), NO₂, SO₂ and meteorological data.

Noise Pollution Control

Ambient Noise Monitoring Network Programme In India

As per section 5.2.8 (IV) of National Environmental Policy (NEP)-2006, CPCB is in the process of developing Noise Monitoring Network in India. It has been decided to include ambient noise as a regular parameter for monitoring in specified urban areas to begin with 26 cities have been selected. Monitoring stations shall be located in silence / residential / commercial / industrial areas depending upon the major noise sources. The data will provide necessary information for decision makers, develop protocols for ambient noise monitoring network.

Sewage Treatment

Status of Water Supply, Wastewater Generation and Treatment in Class-I Cities and Class-II Towns.



Fig-55. : Lidar based air quality forecasting system

The status of water supply and sanitation indicates the environmental quality in terms of aquatic pollution load. The Central Pollution Control Board (CPCB) published three reports in the last three decades on the status of water supply and waste water generation, collection, treatment and disposal in Class-I cities and Class-II towns (1978-79, 1989-90 and 2000). The present study is the fourth in the series which provides the status of water supply, sewage generation and treatment of 498 Class-I cities and 410 Class-II towns along with the information on 53 coastal class-I cities and 35 coastal class-II towns.

Monitoring of Major Wastewater Drains / Outfalls in NCT Delhi

Twenty five major wastewater drains joining River Yamuna / Canals from National Capital Territory (NCT) - Delhi are being

monitored regularly by CPCB on monthly basis. Out of the twenty five drains, seventeen drains discharge into river Yamuna (Fig-57.), six into Agra canal and remaining two drains into Gurgaon canal.

Performance of Sewage Treatment Plants (STPs) in U.P., Haryana and Delhi under Yamuna Action Plan

CPCB regularly monitors four sewage treatment plants constructed under Yamuna Action Plan (three STPs in Haryana State & one STP in Delhi) for their performance evaluation under National River Conservation Directorate project.

COASTAL ISSUES : Status of water supply, wastewater generation, treatment in Class-I cities & Class-II towns in coastal areas

The Central Pollution Control Board (CPCB) published three reports in the last three decades on the status of water supply and waste water generation, collection, treatment and disposal in Class-I cities and Class-II towns (1978-79, 1989-90 and 2000). The fourth study which was conducted in 2008 includes information on 53 coastal class-I cities and 35 coastal class-II towns also. The coastal states covered were Andhra Pradesh, Gujarat, Maharashtra, Tamilnadu, West Bengal and Kerala. The per capita water supply was higher in West Bengal, Kerala, Maharashtra and Orissa. Maximum wastewater generation was in the coastal towns in Kerala and West Bengal. The two mega cities

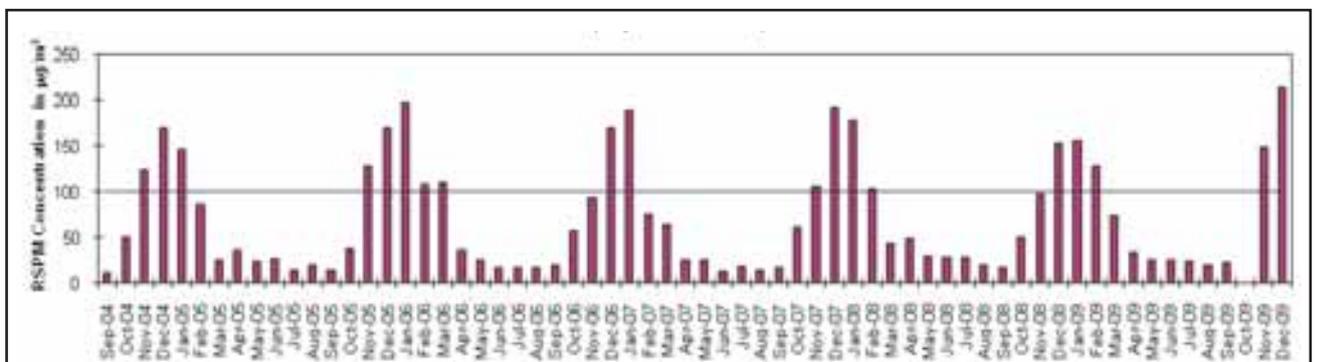


Fig-56. Trends of Average RSPM Concentration at Port Canning (Near to Bangladesh Border) (Sept. 04 to Dec 09)

Mumbai and Kolkata are major contributor to wastewater generation.

Wastes Management

Road Map for Management of Hazardous Waste

A draft road map for hazardous waste management has been developed by Central Pollution Control Board and the same has been forwarded to MoEF for consideration and publication. The road map emphasizes the 3 R's principle i.e. reduce, reuse and recycling and suggests various actions such as creation of waste exchange bank, proposal for incentives to re-processors with state-of-the-art facilities to meet CPCB guidelines & beyond, performance evaluation of TSDFs, on-line tracking system for movement of hazardous waste etc.

Plastic Waste Management

CPCB released the findings of reports on - Assessment of Plastic Waste and its Management in Railways & Airports . The highlights are briefed below :

a) Railways : Delhi has three major railway stations (H.Nizamuddin, Old Delhi and New Delhi Railway Stations), which cater maximum commuters of National capital. There are 460 dustbins to store the waste at

stations. The various segments of study covered were Platform Vendors, Offices at station, Pantry cars, Waiting / Retiring Rooms, Dustbins, Rag Pickers, and Kabadis . There are about 235 to 260 rag pickers actively involved in the collection of value added plastic products. The solid waste generation at Hazarat Nizamuddin station was about four tonns, at old Delhi Station about eight tonns and at New Delh Station it was about 11.25 tonns respectively. The quantity of plastic waste generation at Hazarat Nizamuddin station was 972 kg, at Old Delhi station it was 1428 kg and at New Delhi station was 4,358 kg.

b) Airports : The domestic airport at New Delhi has three terminals, i.e. Terminal 1A and Terminal 1B and Domestic arrival terminal 1C. Terminal 1A caters to domestic flights of the Indian Airlines and its subsidiary Airlines while terminal IB and IC caters to other airlines. The International Terminal or Terminal II of Indira Gandhi International Airport (IGIA) New Delhi, from where 35 international airlines fly at regular intervals to the major cities across the world. The study area includes, Terminal Vendors, Restaurants, Dustbins, Air Caterers and Waste collectors. The maximum quantity of plastic waste is being generated by air caterers as compared to other sources. The quantity of solid waste

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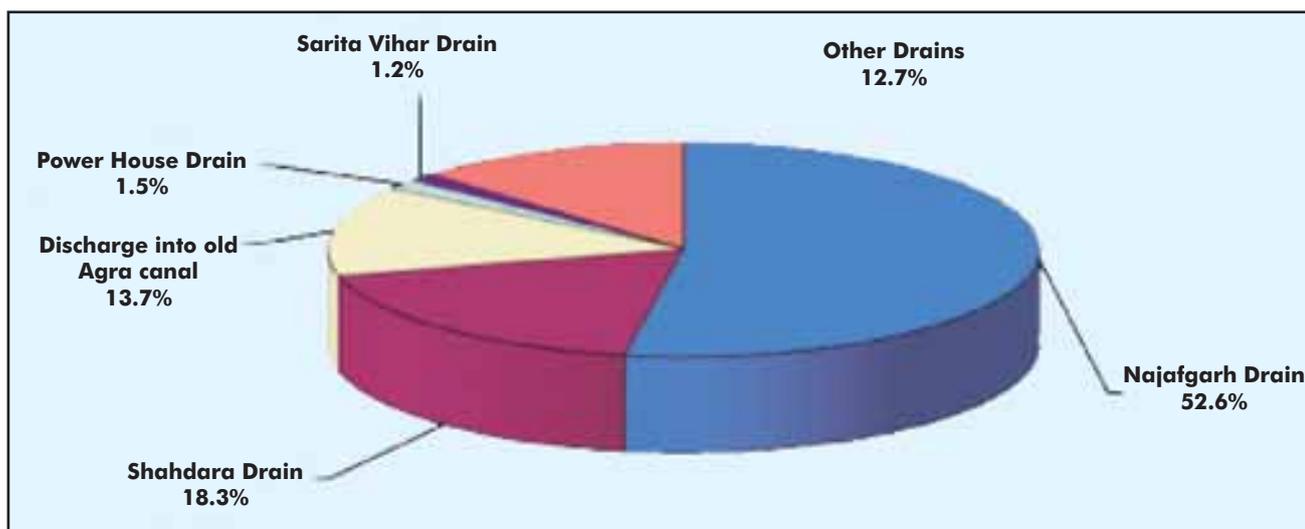


Fig-57. Percentage Discharge to river Yamuna from is Delhi in year 2009

generated per day is about 14 tonnes. The total quantity of plastic waste generated at airport (domestic and International) reported was 4,130 kg per day. Out of which, 2,666 kg/day was generated at domestic airport and 1,523 kg/day at International airport.

Bio-Medical Waste Management

For effective management of bio-medical waste generated from Health Care Facilities (HCFs), Government of India promulgated Bio-medical Waste (Management & Handling) Rules in July 1998 (hereafter referred as BMW Rules) under the Environment (Protection) Act, 1986. There has been increase in number of CBWTFs over the years presently there are 177 CBWTFs to facilitate proper treatment and disposal of bio-medical waste in the country. Based on the annual report information received from the SPCBs and PCCs (except Lakshadweep Pollution Control Committee as on 31 March 2009), salient features are given below:

i.	No. of healthcare facilities	:	95,273
ii.	No. of beds	:	1418984
iii.	No. of Common Bio-medical Waste Treatment Facilities (CBWTF)	:	177
iv.	No. of healthcare facilities (HCFs) using CBWTFs	:	63434
v.	Quantity of bio-medical waste generated in Tons/day	:	409.10*
vi.	Quantity of bio-medical waste treated in Tons /day	:	295.30

Note: * Above details excludes the bio-medical waste generated from Lakshadweep UT as well as Bio-medical wastes generated (about 4.2 Tons per day) from Armed Forces Health Care Establishments

Central Board constituted an expert committee for evaluation of the new state of the treatment technologies for disposed of Bio Medical Waste of Occupational Environment & Health, Maulana Azad Medical College, New Delhi.

Battery Management Rules

It was observed that the compliance of the Battery Management & Handling Rules - 2001 rules at the level of almost all the stake holders was unsatisfactory. Majority of SPCBs are not filing the annual compliance status reports to CPCB. The re-call of used lead acid batteries by the unorganized sectors and its recycling in an unscientific manner is still taking place, thereby causing environmental concern.

In order to formulate the 'Code of practice for Environmentally Sound Management of Used Lead Acid Batteries', a committee comprising of the Experts from CII, ILZDA and CPCB has been constituted. NPC has been engaged by CPCB to prepare the comprehensive industry document (COIND) on 'Secondary Lead and Zinc Smelting Units'.

Regarding Amendment in the Battery Rules a mass awareness programmes were organized at Mumbai, Jaipur and Bangalore during 2008-09 and at Kolkata and Jalandhar in 2009-10 by CPCB jointly with SPCBs. The major suggestions emerging from the workshops are summarized below:

- The need to enhance the frequency of mass awareness programmes and organize the same at district levels;
- Re - conditioners are mostly found in roadside shops hence unorganized sector. A need to be explored whether they can be covered under the municipal laws (through issue of trade license) with technical support from SPCB.
- Establishment of 'Authorized Collection Centers' by Battery Manufacturers needs to be publicized and made more visible & accessible to the public.

- Unauthorized & illegal Recyclers (smelters) are still operating in the country almost everywhere and responsible for violating the provisions of the rule to a great extent. To have proper control on these illegal smelters, there is a need to prevent the supply of raw materials to them.
- The re-collection of the used batteries by the importers is very poor and no responsibility is fixed.
- The exact definition of 'Bulk Consumer' in the said rules is not available. This must be elaborated with particular regard to capacity and numbers of the lead acid batteries being used.
- Development of mechanism for Collection of Waste Electrical, Electronics Equipments (WEEE)
- Preventing Dumping of used/old equipment.
- Study of International Practices for Management of E-Waste
- Sharing of Information/Technology
- Reduction of Hazardous Substances in EEE

Development of Environmental Standards

Bulk Drug Industry

The Central Pollution Control Board took up the task to collect & collate information related to design and operation of incinerators installed in Bulk Drug industries, and conducted performance study in order to evolve emission standards for three incinerators. The Environmental Standards for incinerator for pharmaceutical industry was notified. Effluent Standards of Pharmaceutical Industry - The Central Pollution Control Board developed standards both for formulation as well as bulk drug industry under Schedule- I of the Environment (Protection) Act, 1986 Effluent Standards (at serial numbers 39 and 73 were reviewed) and a common standard notified in the Gazette on July 9, 2009.

Dye & Dye Intermediate Industry

Dye & dye Intermediates manufacturing processes use several raw materials and generate considerable pollution (solid wastes, effluents and air emissions). In general, the wastes and emissions generated depend on the raw material and equipment used, as well as the manufacturing processes employed. The environmental standard was finalized in the Expert Committee meeting held on January 28, 2010 at MoEF.

Basic Organic Chemical Industry

Organic Chemicals manufacturing processes use various raw materials and generate solid wastes, effluent and emissions.

Management of E-Waste

Based on the recommendations of the 'Principal Director of Audit, Scientific Department, New Delhi' on the Performance Audit Report on 'Management of Waste in India', Ministry of Environment & Forests (MoEF), constituted a committee to evolve 'Road Map' for Management of Wastes including E-waste Management in the Country. Accordingly a draft road map on e-waste management has been prepared, some of the issues covered were :

- Strengthening of Legislative Frame Work - a draft rule on the management of e-waste is under preparation at MoEF in which CPCB has contributed significantly.
- Developing mechanism to check Illegal import of the e-waste
- Making Legal Provisions for Extended Producer Responsibility (EPR)
- Phasing Out hazardous substance in Electrical Electronic Equipments (EEE) to the extent possible
- Re-visiting import provisions in SEZ Regulation
- Banning Import of CRT
- Regulating Import based on longer usable life time

4

The manufacture of basic organic chemicals is mostly accomplished in multi – steps, with each steps (generally batch process) generating waste that includes raw materials that remain un-reacted. Some of the wastes have high calorific value were developed by CPCB and the Environmental Standard for sector specific incinerator for organic chemical industry finalised in the Expert committee meeting held on January 28, 2010 at MoEF.

Implementation of New Environmental Standards for Petroleum Oil Refineries and Mass Based Standards for Oil Refineries

In 2008, revised effluent and emission standards for oil refineries were notified under the Environment (Protection) Act, 1986. During the year 2009 – 2010, load based standards for Sulphur Recovery Units (SRU) in oil refineries was also notified. All refineries and State Pollution Control Boards have been directed to implement the revised standards.

Revision of Ambient Air Quality Criteria/ Standards

After an interval of 15 years, National Ambient Air Quality Standards (NAAQS) were revised by CPCB and notified under the Environment (Protection) Act, 1986 on November 16, 2009 vide notification no. G.S.R. 826(E); and the Air (Prevention and Control of Pollution) Act, 1981 vide notification no. B-29016/20/90/PCI-I on November 18, 2009.

Amendment of noise pollution (Regulation & Control) rules. 2000

Ministry of Environment & Forests constituted a committee headed by the Chairman CPCB to examine the Noise Pollution (Regulation and Control) Rules, 2000 in the context of various court orders and complaints received from the public as well. The committee, after reviewing the noise pollution rules, 2000, recommended few amendments to make the said rules more

conductive to human health. Accordingly, Noise Pollution (Regulation and Control) Rules 2000 has been amended vide SO 50 (E) dated 11.01.2010 with the title 'The Noise Pollution (Regulation and Control) (Amendment) Rules, 2010'.

Review of effluent standards & development of emission standards for dyes and dye intermediate industry

Central Pollution Control Board (CPCB) evolved standards for discharge of effluent from dyes and dye intermediate industries, which were notified in 1987 under the Environment (Protection) Act, 1986. These standards are under review, besides, standards for emissions are also being developed. National Chemical Laboratory has been engaged for the work. The basic studies have been completed and draft report is under preparation.

COINDS of Large and Small scale Pulp & Paper Industries

The existing notified effluent and emission standards listed in the (Environment) Protection Act wer reviewed and uniform standards for both Large (wood based) and Small (Agro based) Pulp & Paper industries irrespective of their production capacity, size and raw material proposed by CPCB. The proposed standards for waste paper based industries are under consideration of the Peer & Core Committee.

Performance Evaluation of Air Pollution Control Systems in Pulp & Paper Industry

CPCB has identified ten units to carryout in-depth study w.r.t. the above project of the five plants surveyed it was observed that most mills had Fluidized Bed Combustion (FBC) boiler (either atmospheric FBC or circulatory FBC). The boilers use fuels like coal, wood dust, effluent sludge, bagasse pith, coconut shell, paddy husk, coir pith, etc. Large and small paper mills have installed ESPs for control of particulate emissions which in waste paper based mills or small agro based mills

multi cyclone was the air pollution control device.

Development of COINDS for cement plants

A study on "Development of COINDS on cement plants" was undertaken in association with National Council for Cement and Building Materials, Ballabgarh. Based on the study, revision of particulate matter standards can be considered. Development of emission standards for SO₂ & NO_x and load based emission standards for particulate matter from cement plant is under assessment.

Revision of emission limits for new genset engines

Revision of emission limits for new Genset engines (upto 800 KW) run on diesel has been proposed in the 11th meeting of the Standing Committee held on November 10, 2009. Draft proposal has been sent to all certification agencies and Indian Diesel Engine Manufacturers' Association (IDEMA) for circulation among stake holders for their views/comments.

Development of COINDS for Bee-Hive Coke Oven Plants

Coke is a hard gray, porous solid residue left after bituminous coal is heated to high temperature under anaerobic conditions wherein volatile organics are driven out, the residue is mainly carbon. Coke is an ideal fuel in several industries mainly Steel plants in blast furnaces, metallurgical processes (ferrous & non – ferrous) in foundries and in some lime kilns. CPCB has initiated a study that includes compliance of standards and clean technologies to be adopted.

Comprehensive Environmental Pollution Index (CEPI)

The Ministry of Environment & Forests (MoEF) has adopted a Comprehensive Environmental Pollution Index (CEPI) system of environmental assessment of the Industrial Clusters, evolved by the Central Pollution Control Board in collaboration with IIT, Delhi.

For the first time, Comprehensive environmental assessment has been done by CPCB & MoEF for the 88 prominent Industrial clusters of the country on the basis of Comprehensive Environmental Pollution Index (CEPI) number. The present CEPI system is intended to be used as an early warning tool for categorizing industrial clusters/areas in terms of the severity of the overall pollution levels. The features of CEPI are summed below:

- CEPI may be used as a tool in synthesizing the available information on environmental status of areas by using quantitative criteria and its ability to reduce complex information into smaller and more easily retained information.
- CEPI could help in determining the effectiveness and comparing alternate plans and policies and assist decision-makers in initiating appropriate measures in grading polluted / polluting industrial clusters.

The Hon'ble Minister released two reports pertaining to CEPI) for 88 Industrial Clusters.

Mass Awareness

CPCB launched 'Paryavaran Darshan' on June 5th 2010. The program is a weekly TV program with Doordarshan as a mass media effort through DD National & 18 Regional Channels.

Hazardous Substances Management (HSM)

Introduction and Objectives

Planning and overseeing the implementation of policies and programs on management of hazardous substance and chemical emergencies is the task assigned to the Hazardous Substance Management Division (HSMD). The mandate is to promote safe handling, management and use of hazardous substances which includes hazardous chemicals, hazardous and other wastes. The objectives of the scheme are:

4

- Proper handling and disposal of wastes.
- Environmentally sound recycling of wastes.
- Effective management of chemical accidents.
- Creation of management structure for hazardous wastes.

The following four International Conventions are also handled in HSMD:

- The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for certain Hazardous Chemicals & Pesticides in International Trade.
- The Stockholm Convention on Persistent Organic Pollutants (POPs)
- The Basel Convention on Control of Transboundary Movement of Hazardous Wastes.
- Strategic Approach to International Chemical Management (SAICM)

Hazardous Waste Management

- To regulate management of hazardous waste generated within the country as well as export/import of such wastes, the Hazardous Waste (Management and Handling) Rules, 1989 were notified under the Environment (Protection) Act, 1986. New rules titled Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 have been notified superseding the earlier regulation.
- A national on hazardous wastes is being prepared to facilitate implementation of an action plan for management of hazardous waste and to fulfill obligations under the Basel Convention on transboundary movement of hazardous waste including their minimization, environmentally sound management and active promotion of cleaner technology.
- The Ministry has sponsored a project on a web based National Hazardous Waste

Information System for tracking the waste from its generation to its disposal point. An inter-ministerial coordination committee has also been constituted to co-ordinate at the field level for effective implementation of the Hazardous Waste (HW) Rules.

National Inventory of Hazardous Wastes

- As per information of Central Pollution Control Board (CPCB), there are 36,165 industries in the country generating about 6.2 million Metric Ton (MT) of hazardous waste every year, of which Landfillable waste is 2.7 million MT (49.55%), incinerable 0.41 million MT (6.67%) and Recyclable Hazardous Waste 3.08 million MT (43.78%).

Treatment, Storage and Disposal Facilities (TSDFs)

- Common Treatment, Storage and Disposal Facilities (TSDFs) have been developed for the disposal of land disposable Hazardous Waste (HW) at twenty seven different places in fourteen States namely, Gujarat (Eight Nos.), Maharashtra (four Nos.), Uttar Pradesh (three Nos.), Punjab (One Nos.), Himachal Pradesh (One Nos.), Madhya Pradesh (one no.), Punjab(one no.), Rajasthan (one no.), Tamil Nadu (one no.) and West Bengal (one no.). Total waste handling capacities (disposal capacity) of these facilities, is 15,00,568 MTA which is much less than the present generation of 27, 28,326 MTA of land-disposable Hazardous Wastes.
- There are 14 common incinerators in seven states of the country having a capacity of 25.00 MT per hour.
- During the year, financial assistance of ₹2.20 crores has been provided to the states of Madhya Pradesh, Kerala and West Bengal.

Co-incineration of High Calorific Value Hazardous Wastes

- The problems of limited capacity of incinerators, secure land-fills, high disposal cost can be effectively addressed by co-processing of these wastes in cement kiln, iron & steel plants and power plants and power plants. When compared to conventional incineration, there is a triple benefit in co-processing in terms of energy recovery, saving of fuel and resource conservation. The high temperature alkaline media in Cement Kiln can effectively absorb variety of chemicals/elements released from waste without affecting the quality of cement. Also it gives better destruction efficiency than incinerator due to higher temperature and more retention time.
- CPCB has conducted 11 trial runs in years 2009-2010. The Ministry has approved the project on 'Trial runs for Co-processing of Hazardous Wastes and other wastes in Cement Plants, Power Plants, Iron and Steel industries' for a total cost of ₹5.04 crores. The first installment of ₹2.00 crores has been released for carrying out trial runs for eight category of hazardous waste in four plants each of cement, thermal power plants, iron and steel industries during the year 2010-11. About eighty eight trial runs would be conducted during the period.

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. There are one thousand eight hundred ninety four MAH units in the country, located in 303 districts.

- A sub-scheme entitled "Industrial Pocket-wise Hazard Analysis" has been in operation since the Eighth Five Year Plan. Out of 303 districts having Maximum Accident Hazard Units, the Off-site Emergency Plans are available for 180 districts. During 2009-10, the Ministry has initiated preparation of Hazardous Analysis and Off-site Emergency Plans for 16 districts. During 2010-11, Ministry has initiated preparation of Off-site Emergency Plans for 41 districts.
- Financial assistance for conducting training programmes on Emergency Preparedness, Accident Prevention has been provided to National Safety Councils, Kerala State Productivity Council and other state run institutions. The main objective of the programme is to effectively prepare, prevent and mitigate emergencies arising due to chemicals and to impress upon the people concerned the necessity of emergency preparedness and response.
- The Ministry continues to take follow-up steps for improving implementation of the Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
- A "GIS based Emergency Planning the Response System" for chemical accidents in Major Accident Hazard (MAH) units has been developed in selected six districts each for Gujarat and Maharashtra.
- Accident Information and Reporting System (CAIRS) has been developed.
- The Ministry has initiated the process for development of National Implementation Plan (NIP) under the Stockholm Convention. The activities relating to development of NIP have been assigned to premier scientific and research

institutions. The draft NIP would be available by May, 2011.

Management of Plastic Waste

- The Ministry of Environment and Forests (MoEF) notified the draft “Plastics (Manufacture, Usage and Waste Management) Rules, 2009” to replace the Recycled Plastics Manufacture and Usage Rules, 1999 (amended in 2003) to regulate the manufacture and usage of plastic carry bags. The draft rules were widely published for public comments. An expert committee was constituted by the (MoEF) to examine these comments and to suggest economic instruments. These Rules were finalized as Plastic Waste (Management and Handling) Rules 2011 and notified on 04.02.2011. The full text of the notification may be accessed at <http://www.moef.nic.in/downloads/public-information/DOC070211-005.pdf>.
- Financial assistance has been provided to various State Pollution Control Boards for organizing training workshops and public awareness on management of Plastic Waste.

Management of Municipal Solid Waste

- MoEF has reviewed the prescribed limits for non-paper recyclable material in waste paper consignments being imported from other countries. The revised guidelines and specifications for non-recyclable material in waste paper consignment have been notified.
- A Committee was constituted to evolve Road Map on Management of wastes in India. The report of the Committee can be accessed at <http://moef.nic.in/>

[downloads/public-information/Roadmap-Mgmt-Waste.pdf](http://www.moef.nic.in/downloads/public-information/Roadmap-Mgmt-Waste.pdf).

- Financial assistance has been provided to various State Pollution Control Boards for organizing training workshops and public awareness on management of municipal solid waste.

Mercury

- UNEP has initiated Intergovernmental Negotiating Committee (INC) Meetings with the mandate to prepare a mercury instrument. The INC has commenced its work in 2010 and would conclude in 2013 over five Intergovernmental Negotiating Committee meetings. First session of the Intergovernmental Negotiating Committee Meeting (INC-1) on mercury held on June 7-11, in Stockholm, Sweden and the second session of the Intergovernmental Negotiating Committee Meeting (INC-2) on mercury held on January 24-28, 2011 in Chiba, Japan. India participated in these meetings.
- A Master Plan Study on Mercury relating to Environmentally Sound Management of Mercury in Fluorescent Lamps has been initiated.
- A project proposal on “Inventory of mercury in Indian coals and estimation of mercury emission from coal based thermal power plants” is being initiated.

Management of Chemicals

- A draft Hazardous Substances (Classification, Packaging and Labelling) Rules is being finalized.
- The project on “Inventorization of Lead, Cadmium, Mercury and Arsenic in Paints, Distempers and Pigments” is being initiated.

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

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 38 rivers have been covered under the programme. (Table-18)

The pollution abatement works taken up so far under the NRCP include:

- Interception and diversion works to capture the raw sewage flowing into the river through open drains and divert them 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.

Recent Initiatives in river Conservation Mission

National Ganga River Basin Authority

National Ganga River Basin Authority (NGRBA) was constituted on 20th February, 2009, under the chairmanship of the Prime Minister as an empowered planning, financing, monitoring and coordinating authority for the Ganga River, in exercise of the powers conferred under the Environment (Protection) Act, 1986.

Table-18. Rivers covered under NRCP

S. River	S. River	S. River	S. River
1 Adyar	11 Ganga	21 Musi	31 Tapi
2 Betwa	12 Godavari	22 Narmada	32 Tunga
3 Beehar	13 Gomati	23 Pennar	33 Tungabadra
4 Bhadra	14 Khan	24 Pamba	34 Tamrabarani
5. Brahmani	15 Krishna	25 Panchganga	35 Vaigai
6 Cauvery	16 Kshipra	26 Rani Chu	36 Vennar
7 Cooum	17 Mahanadi	27 Sabarmati	37 Wainganga
8 Chambal	18 Mandovi	28 Satluj	38 Yamuna
9 Damodar	19 Mandakini	29 Subarnarekha	
10 Dhipu & Dhansiri	20 Mahananda	30 Tapti	

In its first meeting on 5th October, 2009, the Authority decided that under Mission Clean Ganga it will be ensured that by 2020 no untreated municipal sewage and industrial effluents flow into Ganga and the investments required to create the necessary treatment and sewerage infrastructure will be shared suitably between the Centre and the State Governments.

An Action Plan was approved by the NGRBA in its first meeting, to achieve the aforesaid Mission objective. Implementation of this Action Plan was reviewed in the 2nd Meeting of the NGRBA on 1st November, 2010.

The following steps have been taken by the Ministry of Environment & Forests to implement the Action Plan:

- **Preparation of Basin Management Plan:** A comprehensive River Basin Management Plan for Ganga is being prepared. This work has been entrusted to a consortium of seven Indian Institutes of Technology (IITs) (Kanpur, Delhi, Madras, Bombay, Kharagpur, Guwahati and Roorkee). In this regard, a Memorandum of Agreement (MoA) has been signed on 6th July, 2010 by the MoEF & the IITs.

The Plan is being prepared with the objective of taking comprehensive measures for restoration of the wholesomeness of the Ganga system and improvement of its ecological health. The Plan will be the basis for specific projects to be undertaken, policy interventions required and non-project investments



Fig-58. River Ganga at Badrinath

under NGRBA. A number of intermediate reports will be prepared containing actionable projects and concrete proposals. Preparation of this Plan will take a period of 18 months.

- **Revision of Guidelines for preparation of DPRs:** The guidelines prepared in the year 2002 for DPR preparation have been revised with the help of IIT Roorkee. As per the new guidelines, whole river basin will be considered for river conservation schemes. Preparation of City Sanitation Plan is required and on that basis schemes will be selected for abatement of pollution. Prefeasibility report will also be prepared before preparing DPR. Operation and Maintenance (O&M) plan for first five years will be inbuilt in the Detailed Project Report (DPR) whereas for next ten years O&M plan based on recovery will be included. Stake holder consultation at project formulation stage, provision of integrated sewer network up to the house property line to ensure 100% sewage collection, signing of tripartite Memorandum of Agreement (MoA)

among Government of India, SG and ULB for improved implementation of projects, appraisal of projects proposals by independent institutions/experts to enhance quality of DPR and cost optimization.

- **Initial portfolio of projects:** In order to bridge the critical deficit in sewage infrastructure and treatment capacity, and other related activities for river conservation in towns along the river Ganga the first phase of projects worth ₹1450 crores has been approved for development of sewer networks, sewage treatment plants and sewage pumping stations, electric crematoria, community toilets, development of river fronts, etc. These projects are currently under implementation by the states.
- **Funding of NGRBA projects:** The existing NRCP funding pattern i.e. 70:30 between the Centre and States is being followed for NGRBA projects. Planning Commission has been requested to agree to the proposal that the O&M costs of the assets created under NGRBA will be shared by the Central and State Governments on 70:30 basis for five years, with a review at the end of two years. During this time, the States are expected to build the technical and financial capacity of ULBs to ensure O&M on a sustained basis.
- **Measures for improving implementation:** The following are among the measures taken to improve implementation of projects under NGRBA;
- **Standing Committee and Empowered Steering Committee:** A Standing Committee of NGRBA has been constituted with Union Finance Minister as chairman to function on behalf of the Authority, take necessary decisions and periodically review and assess implementation of Authority's work programme and prescribe measures to achieve its objectives. An Empowered Steering Committee (ESC) has been constituted for appraisal and sanction of project proposals on a Fast Track Mode.
- **State River Conservation Authorities:** To facilitate coordination and implementation of the conservation activities at the State level, Empowered State River Conservation Authorities (SRCAs) have been notified under Environment (Protection) Act, 1986 for all the five Ganga States.
- **Dedicated implementation institutions in States:** States have been requested to set up dedicated entities for timely implementation and proper O&M of NGRBA projects.
- **Memorandum of Agreements (MoA) :** Tripartite MoAs are being signed with the State Governments/Urban Local Bodies in respect of sanctioned projects. The MoAs provide for commitments by the Centre and States for funding of the projects, regular monitoring and review of implementation, coordination by the State Governments with the ULBs and other agencies to ensure synergy with programs like JNNURM/UIDSSMT etc. 29 MoAs have been signed so far.
- **Independent appraisal of Detailed Project Reports:** Reputed professional institutions have been appointed for appraisal of DPRs for works to be taken up for sanction under NGRBA.
- **Third Party Inspection:** Third Party Inspection (TPI) for projects has been introduced, covering all four stages in the life cycle of a project, namely Pre-construction, Construction, Commissioning & trial run and, Post-construction. The inputs of third party

inspection will be taken into consideration before release of funds.

- **Industrial Pollution:** In order to effectively tackle the problem of industrial pollution, a dedicated cell is being set up in Central Pollution Control Board (CPCB) for inspection and monitoring of industrial units discharging effluents into the river Ganga. In the first instance, the cell will focus its efforts on the critical stretch of about 500 kms from Kannauj to Varanasi.

National River Conservation Plan (NRCP) – (Other Schemes)

At present, the National River Conservation Plan (NRCP) includes works in 178 towns along polluted stretches of 39 rivers spread over 20 states on 70:30 funding pattern between Centre and States. This includes works undertaken under GAP-II. The total cost of the sanctioned projects is about ₹6311 crores. The main rivers under this Plan are Ganga, Yamuna, Gomti and Damodar, Mahananda, Godavari, Musi, Sabarmati, Tungabhadra, Krishna, Satluj, Cauvery Ranichu, Veehar, Narmada etc. Out of an sanctioned cost of ₹6311 crores for NRCP, an amount of ₹3419.31 crores has been released by the Government of India so far. 860 schemes have been completed as against 1124 number sanctioned of schemes. 4537.80 mld has been sanctioned so far on the basis of sanctioned DPRs within the approved cost of the respective projects and a capacity to treat 3195 mld of sewage has been created till the end of September, 2010 in addition to 869 mld already created under the completed project of Ganga Action Plan Phase-I

National River Conservation Plan (Externally Aided Projects)

Yamuna Action Plan (YAP) – (Phase-I)

Yamuna Action Plan (YAP) Phase I was launched by the Ministry to take up the pollution abatement works in Yamuna river in the States Uttar Pradesh, Delhi & Haryana in April 1993 as a component of Ganga Action Plan Phase-II with a loan assistance from Japan Bank for International Cooperation (JBIC). This project has been completed at a total cost of ₹ 682 crores and 269 out of the total 269 schemes have been completed in February 2003. Under this plan, a sewage treatment capacity of 753.25 mld out of the envisaged capacity of 753.25 has been created, with the state-wise break up of 322 mld (in Haryana), 401.25 mld (for Uttar Pradesh) and 30 mld. (in Delhi).

Yamuna Action Plan (Phase-II)

Government of India, Ministry of Environment & Forests have received financial assistance of Yen 13.33 billion from the Japan International Cooperation Agency for



Fig-59. A view of river Yamuna at Tajewala, Haryana

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 31st March 2003. The project has been approved by CCEA at an estimated cost of ₹624 crores for abatement of pollution of river Yamuna in Delhi, UP (eight towns) and Haryana (six towns) under YAP-II. The cost of works under YAP-II is to be shared between Government of India and State Governments in the ratio of 85:15 i.e. ₹530 crores Central share and ₹94 crores States' share. Pollution abatement schemes for creation of 189 mld sewage treatment capacity have been sanctioned so far under the Plan at a cost of ₹647.86 crores, out of which an amount of ₹358 crores has been released towards Central share. The works under YAP-II are likely to be completed by 30th September, 2011.

YAP-II project also includes preparation of DPRs for projects in the three States which are proposed to be undertaken under YAP III with JICA assistance.

The cost of works to be executed in the three States under YAP-II comprises of:

Delhi	₹387.17 crores
UP	₹124.13 crores
Haryana	₹62.50 crores
Miscellaneous	₹50.20 crores

(WQM, Capacity building, Consultancy etc.)

National Ganga River Basin Authority (NGRBA)

JICA assisted Ganga Action Plan (GAP) Project at Varanasi

Based on the project proposal/feasibility study prepared under the JICA assisted

development study, the GAP project at Varanasi has been approved for funding by JBIC for 11.184 billion Yen.

The project consists of the following components:

- Sewerage component (comprising of trunk sewers, pumping stations and related rising mains, rehabilitation of old trunk sewers and five ghats pumping stations, renovation of existing STPs, construction of 140 mld new STP at Sathwa and land acquisition)
- Non-sewerage component (comprising of community toilet complexes in slum areas, construction of dhobi ghats and improvement of bathing ghats)
- Public awareness and participation programme
- Institutional Development programme for the local body (Varanasi Nagar Nigam and Varanasi Jal Sansthan) to enable proper O&M of the assets created.

Uttar Pradesh Jal Nigam is the project implementing agency (PIA) for the sewerage component while the non-sewerage component would be implemented by Varanasi Nagar Nigam.

Pollution abatement schemes for creation of 140 mld sewage treatment capacity have been sanctioned so far under the Plan at a cost of ₹496.90 crores.

World Bank Assistance: Discussions have been initiated with the World Bank for long term support of Authority's work programme. Financial assistance of the order of US\$ one billion has been indicated in the first phase. A Project Preparation Facility (PPF) of US\$ 2.96 million has been sanctioned. A list of projects to be taken up under the programme has been drawn up in consultation with the States. A framework is being prepared jointly

by the Ministry and the Bank, which will provide the eligibility criteria for project selection and prioritising of investments.

States have also been requested to set up dedicated Project Management Group (PMG) under the State nodal Departments for planning, coordination, monitoring implementation and reporting of the projects taken up under the Programme. The Project is likely to be approved by the World Bank Board by June, 2011.

Other initiatives: North East

Identification of polluted stretches of rivers and polluting towns in rest of the North-Eastern states are being carried out by the state governments. On the basis of survey, investigation and DPRs, rivers from NE states would be considered for inclusion under NRCP. During the current financial year 2009-10 the cost sharing ratio between the Centre and States of the projects under NRCP and NLCP in the NE states has been changed to 90:10. The State Governments have been requested

to prioritise the works for the polluted stretches identified by the CPCB and to send proposals for pollution abatement works.

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.

Details of Projects Approved/Completed

Details of projects completed between 1st April, 2010 to 31st October, 2010 are given in Annexure-IV. The list of projects sanctioned between 1st April, 2010 to 31st October, 2010 are given in Annexure-III. It was targeted to create 350.00 mld capacity through commissioning of Sewage Treatment Plants (STP) during the year 2010-11 and 80% works have been completed.

Water Quality Management Plan for River Ganga

The water quality of river Ganga is being monitored since 1986 from Rishikesh in Uttaranchal 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.



Fig-60. River front development at Kolkata

Water quality monitoring carried out by reputed institutions such as, IIT, Kanpur, Bharat Heavy Electricals Limited (BHEL), Patna University, etc. indicates that, water quality of the river Ganga conforms to the prescribed standards in terms of key indicators, namely, Biochemical Oxygen Demand (BOD) and Dissolved Oxygen (DO) at most of the locations, except in the stretch between Kannauj and Varanasi in Uttar Pradesh.



Fig-61. Sewage treatment plant at Saharanpur, Uttar Pradesh

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-19.

A very significant factor is increasing demand due to large scale water extraction for various purposes including irrigation, drinking water supply, and power projects. Besides this, inadequate operation and maintenance (O&M) by the States, under-utilisation of the STPs in some instances, delay

Table-19. Summer Average Values (March-June) for Water Quality on River Ganga under Ganga Action Plan

S.No	Station/Location	Distance(KM)	1986		2010	
			DO (mg/l)	BOD (mg/l)	DO (mg/l)	BOD (mg/l)
1	Rishikesh	0	8.1	1.7	7.48	1.48
2.	Hardwar D/s	30	8.1	1.8	7.38	1.90
3.	Garhmukteshwar	175	7.8	2.2	7.43	2.18
4.	Kannauj U/S	430	7.2	5.5	7.32	4.18
5.	Kannauj D/S	433	NA	NA	7.03	4.58
6.	Kanpur U/S	530	7.2	7.2	6.35	3.34
7.	Kanpur D/S	548	6.7	8.6	6.18	4.16
8.	Allahabad U/S	733	6.4	11.4	7.67	5.51
9.	Allahabad D/S	743	6.6	15.5	7.98	4.41
10.	Varanasi U/S	908	5.6	10.1	8.46	2.26
11.	Varanasi D/S	916	5.9	10.6	7.85	3.78
12.	Patna U/S	1188	8.4	2.0	6.13	1.79
13.	Patna D/S	1198	8.1	2.2	6.10	2.20
14.	Rajmahal	1508	7.8	1.8	6.35	1.63
15.	Palta	2050	N/A	N/A	7.61	2.53
16.	Uleberia	2500	N/A	N/A	6.51	2.69

Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD)

Bathing Water Quality Criteria : DO equal to or more than 5.0 mg/l
BOD equal to or less than 3.0 mg/l

in acquisition of land, contractual issues, court cases, erratic power supply and inadequate capacities of local bodies/agencies and lack of involvement of civil society were some of the constraints faced in the implementation of the Ganga Action Plan.

The water quality monitoring has also been undertaken for other rivers namely, Yamuna, Western Yamuna Canal, Gomti, Hindon, Satluj (Punjab), Cauvery (Tamil Nadu), Tunga, Bhadra, Tungbhadra in Karnataka and Waterways of Chennai. The number of monitoring stations presently are 158 in 10 rivers which include 27 stations set up in the upper reaches of Ganga and 32 stations of Chennai Waterways.

National Lake Conservation Plan (NLCP)

Objectives

The objective 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 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.



Fig-62. A view of Dal Lake, Jammu and Kashmir

- Public awareness and public participation
- Other activities depending upon location specific conditions including public interface.

Projects approved under NLCP

The Ministry is implementing the scheme of National Lake Conservation Plan (NLCP) since June, 2001 for conservation and management of polluted and degraded lakes in urban and semi-urban areas of the country where degradation is primarily on account of discharge of waste water into the lake, through an integrated ecosystem approach. The mandate of the NLCP Scheme is pollution prevention and conservation of perennial lakes.

So far under NLCP, a total of 41 projects for conservation of 61 lakes have been sanctioned in 14 States at a sanctioned cost of ₹1028.19 crores. Conservation works for 18 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 between the Central and the State Government.

NLCP Guidelines

With the 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.



Fig-63. Tsomgo Lake in Sikkim

Budget Allocation

Budget Allocation for 2010-11 under National River Conservation Plan and National Lake Conservation Plan is given in Table-20.

The names and addresses of State Implementing Agencies under NRCP is given at Annexure-V.

National Wetland Conservation Programme (NWCP)

Introduction and Objectives

According to most widespread definition, Wetlands are defined as: "lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water".

Unsustainable use of wetlands without reckoning of their assimilative capacity

Table-20. Budget allocation under NRCP and NLCP during 2010-11

(₹ in crores)

Sl.No	Name of the Plan	Budget Estimate	Revised Estimate (Proposed)	Expenditure (December 2010)
1	National River Conservation Directorate(NRCD)	6.71	6.71	5.02
2	National River Conservation Plan (NRCP)	195.00	199.07	162.31
3	National Ganga River Basin Authority (NGRBA)	500.00	500.00	199.75
4	National Lake Conservation Plan (NLCP)	50.00	50.00	47.52
	Total	751.71	755.78	414.60

constitutes major threats to the conservation and management of these vital biodiversity rich areas.

In view of the above, Government of India operationalized National Wetland Conservation Programme (NWCP) in closed collaboration with concerned State Governments during the year 1987.

The scheme was initiated with the following objectives:-

- to lay down policy guidelines for implementing programme of conservation and management of wetlands in the country;
- to provide financial assistance for undertaking intensive conservation measures in priority wetlands;
- to monitor implementation of the Programme;
- to prepare an inventory of Indian wetland.

Activities undertaken so far

National Wetland Conservation Programme (NWCP)

- Wetlands (Conservation and Management) Rules, 2010 were notified under Environment (Protection) Act, 1986.
- Management Action Plan of thirty six wetlands were approved and financial assistance released to the concerned State Governments. So far an amount of ₹11.77 crores has been released against the total allocation of ₹11.90 crores during 2010-11.
- Seven new research projects were sanctioned.
- Two meetings of Expert Group on Wetlands (EGoW) were held on 9th September, 2010 and 24th September, 2010 in which five more wetlands were recommended for assistance.
- One regional workshop at Manali, Himachal Pradesh, was organized during the year for providing training to wetland managers for efficient execution of Management Action Plan (MAPs) of wetlands in the States.

- Ramsar Convention on Wetland and other international efforts

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 sixty contracting Parties to the Convention, with 1912 wetlands sites, totaling 187 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. 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 our obligation under the Convention, till date 25 sites have been designated a Ramsar sites in India (Annexure-VI A) and six more wetlands are under process of being designated as Ramsar sites.

India was re-nominated as member of Supervisory Council for another term (2008-2011) on the basis of its contribution towards conservation of wetlands in the country.

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.

Progress/Achievements made during the year

- Wetlands (Conservation and Management) Rules, 2010 were notified under Environment (Protection) Act, 1986.
- MAPs of 36 wetlands were approved and financial assistance released to the concerned State Governments.
- Seven new research projects were sanctioned.
- Against the total allocation of ₹11.90 crores an amount of ₹11.77 crores has been released.
- The meetings of EGoW was successfully held in New Delhi. Major outcome of these meetings are recommendation for identification of five new wetlands under NWCP.

Comparison of progress vis-à-vis that achieved in the previous years supported by time series data, drafts and charts etc.

- Wetland (Conservation and Management) Rules, 2010 were notified under Environment (Protection) Act, 1986.
- Total number of wetlands identified under NWCP has increased from 103 in 2007-08 to 115 in 2010-11 covering 24 states and two UTs. Five more wetlands have been recommended for inclusion in the list by the Expert Group on Wetlands.
- In comparison to three workshops/training programmes during the year 2009-10, one workshop was organized during 2010-11.
- Sanctioned seven research projects during the year 2010-11 in comparison to two during the year 2009-10.

State wise status

- One hundred and fifteen wetlands covering 24 states and two UTs have been identified under the NWCP. The State-wise list of identified wetlands is given in Annexure-VIB.

Regulatory Acts/Rules governing the programme and promulgation of new acts

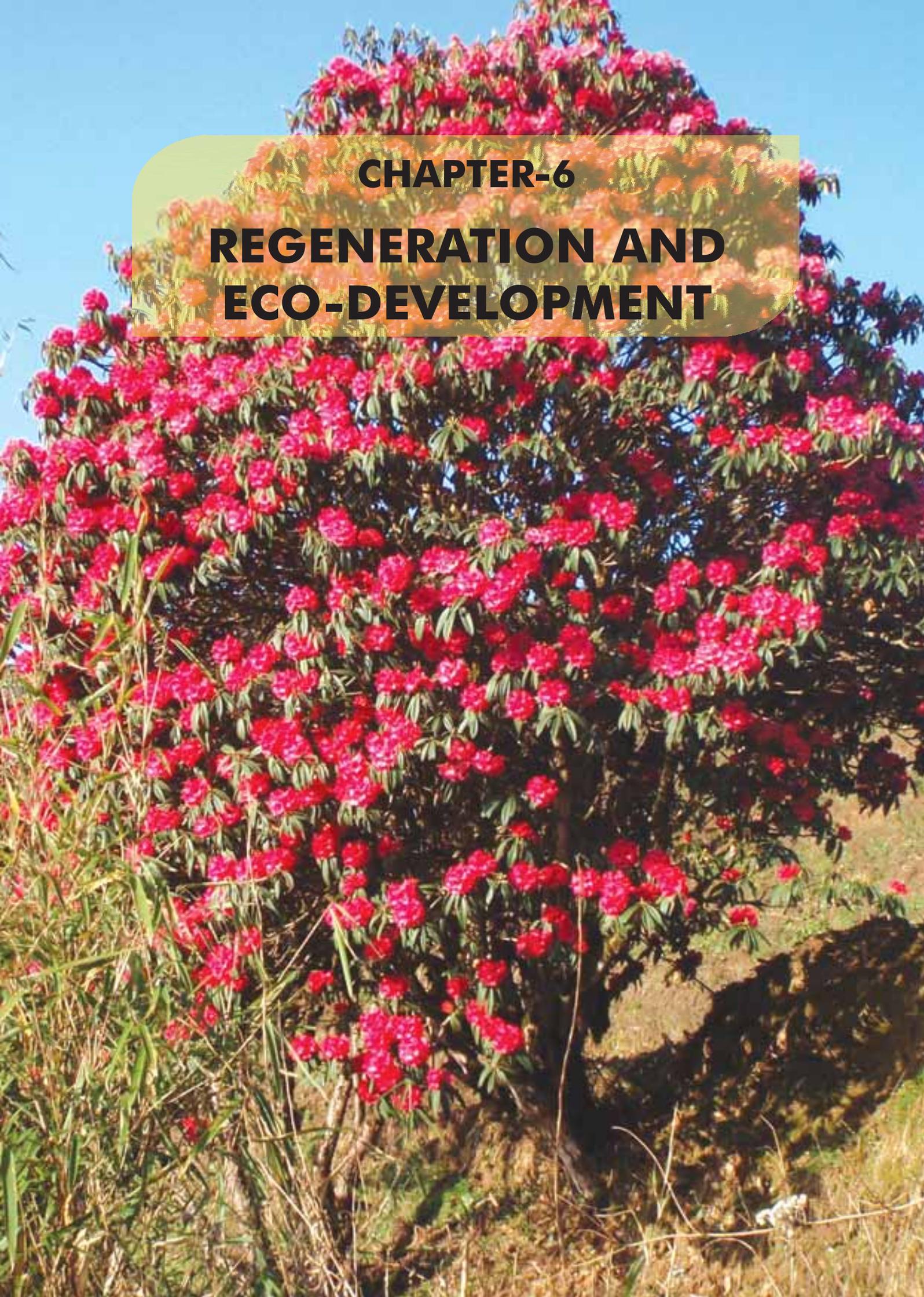
- Ministry has notified Wetland (Conservation & Management) Rules, 2010 under part-II, Section 3- Sub section (i) of Environment (Protection) Act, 1986, vide notification No.657 dated 4th December, 2010.
- These Rules, which for the first time lay down legally enforceable provisions for the conservation and management of Wetlands, have been drafted to ensure better conservation and management and to prevent further degradation of existing wetlands in India.
- Under the Rules, wetlands have been classified for better management and easier identification. Central Wetland Regulatory Authority has been set up to ensure proper implementation of the Rules and perform all functions for management of wetlands in India. Apart from necessary government representatives, the Authority shall have a number of expert members to ensure that wetland conservation is carried out in the best possible manner. The Rules specify activities which are harmful to wetlands such as industrialization, construction, dumping of untreated waste, reclamation etc. and prohibit these activities in the wetlands. Other activities such as harvesting, dredging etc may be carried out in the wetlands but only with prior permission from the concerned authorities.

Budget allocation

An allocation of ₹11.90 crore has been made during the year 2010-11 for conservation and management of wetlands and an expenditure of ₹11.77 crore has been incurred till 10th February, 2011.

Implementation organization

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;
- Augment availability of 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-Governmental 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.

Name of the Schemes

National Afforestation and Eco-Development Board (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) Scheme

(a) 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 organs 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. From the year 2010-11, State Forest

Development Agency (SFDA) has been constituted at the State level to smoothen the fund flow to the FDAs. This decentralized three-tier institutional structure (SFDA, 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 three-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 enhancement for improving employability of the rural people.

Progress and Achievements during the year

- Eight hundred (800) FDA projects have

been operationalised so far, since the launch of the FDA mechanism in 2000-01, at a cost of ₹ 3512.95 crores to treat a total area of 17.40 lakh ha. (as on 31.12.2010). Rehabilitation of shifting cultivation lands have been given specific focus under the programme, and so far, thirty five jhum projects have been sanctioned in North-Eastern States and in Orissa.

- As on 31.12.2010, ₹ 182.53 crores was released to State Forest Development Agencies (SFDA) during the year 2010-11 for implementation of National Afforestation Programme (NAP).

Implementing organization

The NAP Scheme is being implemented through three-tier decentralized mechanism of State Forest Development Agency (SFDA) at State level, Forest Development Agency at Forest Division Level and Joint Forest Management Committees (JFMCs) at the village level.

Comparison of progress as compared to previous years

Year-wise and State-wise progress of National Afforestation Programme in the Tenth Five Year Plan and during the current year is given in Table-21 and Table-22 respectively.

A number of initiatives have been taken by the Ministry to expedite the implementation of the scheme as well to improve the qualitative aspects of implementation. These include:

- 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.

Table-21. Year-wise progress of National Afforestation Programme (as on 31st December, 2010)

Year	No. of New FDA projects approved	No. of New JFMCs involved	Project Area approved (ha.)*	Release** (₹ in 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	13	6598	173435	345.62
2009-10	5	7756	103556	318.17
2010-11 (as on 31.12.2010)	23 SFDA Projects	—	50100	182.53

* Area approved for advance soil work/preparatory plantations during the year for all ongoing FDA projects.

** Total (financial assistance provided during the year for planting, advance soil work, maintenance etc.) for all ongoing FDA projects.

New initiatives under the Scheme

- Organising district -level interdepartmental linkage workshops for promoting linkage of NAP with other developmental programmes for enhancing the sustainability of JFM
- Initiating pilot projects for establishing forest-based microenterprises 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 has been made 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, women empowerment, capacity building in

particular of frontline staff of Forest Department and JFMC members especially with regard to local management and administrative responsibilities.

(b) NAEB Scheme

This scheme includes Salary & auxiliary expenditure of the Board employees, Grants in Aid for Greening India, Monitoring & Evaluation, Communication Strategy, and support to Regional Centres. Important Components are described below:

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 1988, is essential for economic and ecological security of the country. Achieving the target of one- third of FTC, however, requires substantial increase in the current annual tree planting rate in the country, and

Table-22. State-wise status of SFDA projects (till 31.12.2010)

S.No.	State FDA	Total Approved Amount (₹ in lakh)	Total Release Amount (₹ in lakh)	Approved Area (in hectares)
1	2	3	4	5
1	Andhra Pradesh	1573.58	1049	2341
2	Arunachal Pradesh	701.31	312	3125
3	Bihar	620.67	277	0
4	Chhattisgarh	3347.67	1545	0
5	Gujarat	3026.13	1341	0
6	Haryana	2231.67	1115	0
7	Himachal Pradesh	648.25	195	1646
8	Jharkhand	1981.96	873	0
9	Karnataka	1580.99	406	0
10	Kerala	1128.49	377	666
11	Madhya Pradesh	4022.29	1526.3	13000
12	Maharashtra	3819.47	1617	0
13	Manipur	1037.9	708.05	3599
14	Meghalaya	954.06	440	4800
15	Mizoram	1222.8	611	2370
16	Nagaland	1010.61	1010.61	2000
17	Orissa	1737.14	666.63	0
18	Rajasthan	839.84	247	400
19	Sikkim	1252.88	600	1900
20	Tamil Nadu	721.17	361	0
21	Tripura	1175.78	920	6271
22	Uttar Pradesh	2363.77	1850	5167
23	West Bengal	472.61	206	2815
	Total :	37471.04	18253.59	50100

that too, mostly on lands outside recorded forest area (RFA) wherein non-forest organizations and the custodian institutions can play a significant role. The Scheme 'Grants-in-Aid Scheme providing assistance to Voluntary Agencies for tree planting' was started for encouraging participation of the interested Non-Governmental Organisations as well as Government Institutions. It has been observed that for raising tree plantations on

lands outside RFA, economic return is the major driving force. These could be encouraged if returns to the growers were made attractive. The wanting economic returns are largely attributed to the low volume and poor quality yield of tree products. The main reason for this is that the tree growers do not have easy access to quality planting material (QPM) due to both paucity of QPM

production, facilities in the rural areas and low awareness about gains of using QPM. Recognizing these constraints, the then Grants-in-Aid Scheme was restructured by incorporating additional components of QPM production facilities and creation of mass awareness about QPM. This was renamed as "Grants in aid for Greening India" Scheme and three aspects expressly stated:-

- a) Raising mass awareness about QPM and tree planting
- b) Enhancing the capacity for QPM production
- c) Tree planting with people's participation

"Grants in Aid for Greening India" Scheme have been discontinued w.e.f. 2008-09. The ongoing projects, however, will continue to be supported till completion.

Budget Allocation of the Scheme and Progress of Expenditure

The Budget Estimate for ongoing projects under the Scheme for 2010-11 is ₹1.00 crore, out of which ₹0.36 crore has been released to six agencies upto 31.12.2010.

Table-23 reflects the 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 2010-11.

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.

Regional Centres of NAEB

The Board has seven Regional Centres located in various universities/ national level institutions (Annexure-II B) Dr. Y.S.Parmar University of Agriculture, Solan, Himachal Pradesh, University of Agricultural Science, Bangalore, Indian Institute of Forest Management, Bhopal, Jadavpur University, Calcutta, Agricultural Finance Corporation, Mumbai, Agricultural Finance Corporation, Delhi, North Eastern Hill University (NEHU) Shillong. 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 the Board.

(c) Eco-Development Forces (EDF) Scheme

Introduction and objective

Eco-Development Forces Scheme was established in 1980s as a scheme being implemented through Ministry of Defence 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 Forces 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,

Table-23. Progress under the previous 'Grants-in-Aid to Voluntary Agencies' and present Grants-in-Aid for Greening India' Scheme

Year	No. of tree planting projects supported *	Expenditure (₹ 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	5.86
2007-08	129	8.48
2008-09 ***	85	3.95
2009-10***	29	1.05
2010-11***	6	0.36

* Includes ongoing projects, sanctioned in previous years also.

** Includes grants given for Awareness Generation, High-Tech Nursery and Tree Planting components of the Grants in Aid for Greening India Scheme.

*** Includes only on-going projects as no new project was sanctioned.

etc. and also the professional and managerial guidance is provided by the State Forest Departments. In ETF battalions, the Ministry of Defence 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 made during the year

The progress of ETF Battalions during the year 2010-11 is given in (Table-24)

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 and also other soil and moisture conservation works. Besides, the battalions also take up maintenance of old plantations.

Closer monitoring of physical progress and coordination between the Ministry, Territorial Army and State Governments has witnessed timely availability of land and other resources for planting, redeployment/disembodying 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

Revised Budget Estimate for the scheme during 2010-11 is ₹32.00 crores out of which ₹31.88 crores has been reimbursed to Ministry of Defence till 31.12.2010.

Implementing Organizations along with details

Directorate General of Territorial Army, Ministry of Defence, New Delhi.

Table-24. The progress of ETF Battalions during the year 2010-11 (as on 31st December, 2010).

Battalion	Location	New Plantation during the year (As on 31.12.2010)		Maintenance of old Plantation (As on 31.12.2010)	
		No. of Plants	Area in ha.	No. of Plants	Area in haa
127 Inf Bn (TA) Eco	Uttarakhand	4.69 lakh	400	5.00 lakh	800
128 Inf Bn (TA) Eco	Rajasthan	4.80 lakh	600	2.86 lakh	570
129 Inf Bn (TA) Eco	Jammu & Kashmir	0.92 lakh	120	2.09 lakh	188
130 Inf Bn (TA) Eco	Uttarakhand	5.00 lakh	500	10.01 lakh	1,000
134 Inf Bn (TA) Eco	Assam	6.84 lakh	671	7.25 lakh	822
135 Inf Bn (TA) Eco	Assam	7.85 lakh	980	5.08 lakh	500
	TOTAL	30.10 lakh	3,271	32.29 lakh	3,880

CHAPTER-7

RESEARCH



Environmental Research

Introduction

Ministry of Environment & Forests has been funding research in multi-disciplinary aspects of 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 and Scope

The objective of the scheme is 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 Grants 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. 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 financial year (up to

12th January, 2011) five meetings of the Thematic Group were held to consider the new/revised/comments received proposals and review/monitor the ongoing/completed projects. Total 118 proposals were considered by the Expert Group of which eleven were recommended. Progress of 51 ongoing projects was reviewed and monitored, 29 comments received proposals were considered during the year. Twenty seven new projects have been initiated during the period (Annexure-III). The Expert Group also reviewed the Final Technical Report (FTR) of nine completed projects during the period (Annexure-IV).

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. The programme 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. Ecosystem studies become even 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 12 new projects were initiated (Annexure-III), eight were completed (Annexure-IV) and 25 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 Eastern and Western Ghats Research Programme one new project was initiated (Annexure-III), 14 studies were completed (Annexure-IV) and 21 projects were reviewed and monitored for their progress.

Thematic Group on 'Economic & Social Issues'

The Thematic Group- 'Economic & Social Issues' would consider all proposals related to cost benefit analysis, socio-economic, policy related issues and other miscellaneous issues.

During the year one meeting of the Thematic Group was held to consider the new / revised proposals & review / monitor the ongoing / completed projects. The Expert Group considered four new and three comments received projects. Progress of one ongoing project was reviewed and monitored during the year. The Expert Group also reviewed the three FTR of completed project during the period.

In addition to the ongoing programmes, the following three new initiatives have been taken up during the year 2010-11.

7

Institution of MoEF – National Environment Fellows Programmes

During the year 2009-10 the Ministry has launched to institute the National Environmental Sciences Fellows Programme aims to be a flagship programme for young scientists who are desirous of working in the forefront of environmental sciences research. It is envisaged that ten National Environmental Sciences Fellows would be selected at a given point of time. Under the proposed programme each awardee will receive a total annual grant of '30 lakhs comprising of (a) emoluments of '10 lakhs (b) contingency of '5 lakhs and (c) research grant of '15 lakhs. This grant will be released to the selected Host Institutions for being granted to the awardee.

The Management Committee of the Programme has finalized the advertisement along with a matrix of thrust areas for the Programme under which the Fellowships would be awarded. The advertisement was published in National English Newspapers and Current Science. The Ministry has received applications from research scientists in India and abroad in response to the advertisement for the Fellowship programme. These applications are under advanced stage of scrutiny by the Management Committee of the programme, which is chaired by Dr. K. Kasturirangan, Member (Science), Planning Commission.

Institution of Mahatma Gandhi Chair for Ecology and Environment

The Ministry had started a new chair for institution of Mahatma Gandhi Chair for Ecology and Environment during the year 2009-10. The selected Fellow for the Chair will work on one of the thrust areas of research identified by the Ministry. The Fellow could be from any discipline of science, engineering, social work, art and humanities. There is no upper age limit. The candidate must be at the level of a University Professor or equivalent grade Scientist an Institution either serving or

superannuated. A total annual grant of '13 lakhs per Chair comprising of (i) emoluments equivalent to that of a Professor or equivalent Scientist grade which presently stands at '9,60,000/- (ii) Data Entry Operator '72,000/- (iii) JRF '1,68,000/- and travel grant of '1 lakh. The Chair is an integrated part of the ongoing R&D Scheme of the Ministry which stands approved during the 11th Five Year Plan.

The Ministry has instituted a Mahatma Gandhi Chair in Ecology and Environment at the Centre for Biodiversity Studies, Baba Ghulam Shah Badshah University, Rajouri, Jammu and Kashmir.

New Institutions - National Environment Protection Training & Research Institute (NEPTRI)

The proposal for conservation of existing Environmental Protection Training and Research Institute (EPTRI), Hyderabad into a National level institute to be named as National Environment Protection Training and Research Institute (NEPTRI) as a Joint venture between Government of India and Government of Andhra Pradesh is under active consideration. The in-principle approval of Planning Commission subject to certain conditions for this purpose has been obtained. A Detailed Project Report is under finalization in consultation with the Government of Andhra Pradesh.

Identification of New Thrust / Priority Areas and New Initiatives under R&D Scheme

- During the year, an All India Coordinated Research Project on reproductive biology of rare endangered and threatened species has been evolved and sanctioned to ten scientists working at different universities / institutions. The Principal Investigator's will work on reproductive biology of RET Tree species of Central and Western Himalaya, Rajasthan,

Uttarakhand, Jammu province of J&K, Andhra Pradesh, Arunachal Pradesh and Meghalaya, Nagaland and Manipur, Kashmir Himalaya and Western Ghats.

- The Ministry has also started deliberations on a new proposed All India Coordinated Programme on Biodiversity. One of the aims of the programme would be to have seamless integration with the All India Coordinated Programme on Capacity Building in Taxonomy. The important thrust areas of the programme include setting up of Long Term Ecological Monitoring sites in the different ecogeographical zones of the country. Biodiversity would be one of the key variables, which would be monitored on a long-term basis in these sites.
- The Ministry has taken up revision of the Research Guidelines for funding research programmes in environment. The need for revision has been felt keeping in view, the renewed scientific impetus of the Ministry, new and emerging environmental challenges, to broaden the participation of the stakeholders, introduce the concept of cost-sharing and to make the research in environment more productive by emphasizing on outputs.

State of the Art Report on Bioremediation of Contaminated sites in India

The Ministry had commissioned a State of the Art Report on Bioremediation of Contaminated sites in India, prepared by Professor M.N.V. Prasad, Department of Plant Science, University of Hyderabad. The report after extensive peer-review has been finalized and is under publication.

Advisory Committee for Research Programme on Bioremediation of Contaminated Sites & Reclamation of Degraded Areas

The 5th meeting of Advisory Committee

for Research Programme on Bioremediation of Contaminated Sites & Reclamation of Degraded Areas was held at NEERI Nagpur during the year. The Committee reviewed the progress of on-going Research Programme on “Bioremediation of Copper Tailings” at Malajkhand in collaboration with Hindustan Copper Limited.

Western Ghats Ecology Expert Panel (WGEEP)

The Western Ghats Ecology Expert panel (WGEEP) under the Chairmanship of Prof Madhav Gadgil has been constituted by the Ministry with the main objectives of identification and management of ecologically sensitive areas in the Western Ghats and to recommend measures for conservation, protection and rejuvenation of the Western Ghats region following a comprehensive consultation process with the people and the government. The Panel will also recommend the modalities for the establishment of Western Ghats Ecology Authority under Environment (Protection) Act, 1986.

The Panel has had nine meetings so far at different places spread across the Western Ghats region. The members of the Panel have also undertaken site visits and public consultations to various places including Gundia Hydroelectric Power Project site in Karnataka, iron ore mines in Goa and Ratnagiri and Sindhudurg region of Western Ghats in Maharashtra. As a part of the interaction with the stakeholders the Panel along with the Hon'ble Minister of State (I/C) of Environment & Forests, had an interactive meeting with the Members of Parliament (MPs) from the Western Ghats region in Parliament House Annexe. The members of the Panel have also interacted with the state government officials of Kerala, Karnataka, Goa and Maharashtra and sought their concerned views/suggestions on the issue of ecologically sensitive areas in Western Ghats region. The Panel has also interacted with a vast cross-section of

7

society through brainstorming sessions, public consultations and round table discussions.

A web site www.westernghatsindia.org has been developed by the Panel, which serves as a medium of exchange and repository of information on ecology of Western Ghats region. The Panel has selected 80 different authors to write commissioned papers on selected thematic areas in respect of their field of expertise in the context of the mandate of the Panel. The Centre for Ecological Sciences, Indian Institute of Science, Bangalore is coordinating these Commissioned Papers with the requisite financial support from the Ministry.

The Panel has finalized a project on assessing the levels of eco-sensitivity along the Western Ghats. Salim Ali Centre for Ornithology and Natural History is coordinating this Project with the financial support of the Ministry. Under this project the Panel intends to compile all available information in the form spatial database on Western Ghats ecology and prepare maps of levels of ecological sensitivity in Western Ghats region.

Professor Madhav Gadgil, Chairman of the Panel had discussions with the Chairmen of Dhanu Taluka Protection Authority, Dhanu, Loss of Ecology Authority, Chennai and Bhure Lal Authority, Delhi on the nature, constitution, powers and functions of the proposed Western Ghats Ecology Authority.

Summaries / Research findings of some of the Projects completed during the year 2010-11.

Distribution, abundance and conservation status of the Slender Loris in the Eastern and Western Ghats, India

Ecology, habitat parameters, poaching pressure and diversity of Slender loris, a near threatened species, have been investigated in Eastern and Western Ghats. Results reveal that similar pattern affects distribution of the

species in Kerala, Tamil Nadu, Goa and Maharashtra. Mysore Slender loris is more flexible than Malabar Slender lorries, but the former is more unreliable to unstable environment and human pressures. The study would help in developing a common strategy for conservation of Slender Loris. Education of local people would be important part of this strategy. Hunting/ poaching is the main threat. Specific steps for conservation in different areas are recommended.

Investigations on the fungi and insects associated with fruits and seeds of selected endemic trees of Western Ghats

A rich diversity of fungi and insects which affect the fruits and seeds of some endemic trees of Western Ghats has been documented. As many as 222 fungal isolates of 85 species were associated. A total of 22 species of insects were found. Life cycle of several infecting insects and fungi has been investigated. The damage caused by the pathogens and pests was assessed and control measures have been recommended. Two new species of fungi and two new species of insects have been recorded.

National Natural Resources Management System (NNRMS)

The Scheme of National Natural Resources 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 Secretary (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 programme from the technical and financial angle. The NNRMS SC-B for final consideration and funding takes up only those proposals recommended by the Technical and Financial Sub-Committee.

Achievements during the year

Two Meetings of Technical and Financial Sub – Committee of National Natural Resources Management System on Bio-resources and Environment (NNRMS SC-B) and one meeting of the Standing Committee of NNRMS SC-B were organized during the year 2010-11. Eight new projects have been initiated/sanctioned during the period. The Standing Committee of NNRMS SC-B recommended four new projects for funding in its meeting held on 20th October, 2010. The Standing Committee also reviewed the Final Technical Report (FTR) of three mega projects completed recently.

Based on the results obtained and experience gained during the implementation of the project on “Monitoring of Snow and Glaciers in Himalayas” the Ministry has agreed to continue

the work on snow and glacier monitoring in the Indian Himalayan region and suggested that Space Applications Centre (SAC), ISRO, Ahmedabad to take up this work in collaboration with all the organizations of the country working in this field. Accordingly, Phase-II of the project has been initiated by the Ministry in collaboration with SAC, Ahmedabad. Under this project the Monitoring of seasonal snow cover of the entire Indian Himalayan region and Monitoring the retreat/advance of the glaciers in the representative basins will be studied.

A research project on ‘Coastal Zone Studies’ by Space Application Centre, Ahmedabad -380 015

A research project on ‘Coastal Zone Studies’ has been completed by Space

7



Fig-64. Satellite imagery showing ecologically sensitive areas around Kalubhar island, Gulf of Kachchh

Applications Centre (ISRO), Ahmedabad using the data of the state-of-art Indian satellites at the behest of Ministry of Environment and Forests, (MoEF), Government of India to study the coastal zones of the country vis-à-vis various issues pertaining to the coast. The project has five major components, viz., Inventory and Monitoring the Coastal Zone, Coastal Ecosystems (Vital/Critical Habitats), Coastal Zone Information System, Coastal Zone Management, and impact of sea level rise on the coastal environment. The project has been executed along with 22 organizations comprising of State Government, Central Government and Academic Institutes.

Following information for Indian coast has been generated under this project:

- Coastal landuse maps showing Ecologically Sensitive Areas (ESAs) and high tide and low tide lines on 1:25, 000 scale – Around 1000 maps have been prepared using LISS-IV data and are put in a digital data base in Geographical Information System (GIS).
- Mangrove maps at dominant community level – Around 450 maps at 1:25, 000 scale were prepared for mangrove community zonation using hybrid techniques of digital and visual interpretation of Resourcesat LISS-III data for the period 2004-07.
- Coral reef maps at eco-geomorphological level – Around 178 maps at 1:25, 000 scale covering all the coral reefs along the Indian coast have been mapped using Resourcesat LISS-IV and LISS III data.
- Health models for both the ecosystems – Models for assessing health of mangroves as well coral reefs have been developed and demonstrated for selected areas along the Indian coast.
- Models for Coastal Zone

Management and plantation of mangroves – Conceptual models have been developed for preparing integrated coastal zone management plans and identifying suitable sites for mangrove plantation.

- Coastal Zone Information System - Query Shells around Coastal Zone Information System are developed for all the Maritime States and Union Territories of India. Database has been prepared using various coastal thematic maps prepared using satellite data for 1989-91 period and 2004-2006 period. The shells are developed for retrieval of thematic information and automatic map generation.
- Models to study the impact of Sea Level Rise on coastal environment – Approach has been developed to assess coastal vulnerability due to sea level rise for Andhra Pradesh, Tamil Nadu and Gujarat coasts. Regional response zonation of the coast has been carried out.

The information generated under this project could be utilized for: -

- Zoning the coast on CRZ or CMZ particularly the ecologically sensitive areas
- Monitoring implementation of CRZ
- Site selection of mangroves and shelter belts
- Conservation of the coral reefs and mangroves
- Site selection of any developmental activities
- Understanding the role of keystone coastal ecosystems in global climate change
- Identifying vulnerable zones to predict sea level rise.

A research project on 'Snow and Glacier Studies' by Space Application Centre (SAC), Ahmedabad-380015

A research project on 'Snow and Glacier Studies' has been completed by Space Applications Centre (SAC), ISRO, Ahmedabad. The project was jointly funded by Ministry of Environment and Forests and Department of Space, Govt. of India. The objectives of the project were:- i) Inventory of all Himalayan glaciers on 1,50,000 scale, ii) monitoring of seasonal snow cover (every 5 days) in winter months of hydrological year 2004-2005, 2005-2006, 2007-2008 to 2008 for entire Indian Himalayan region, iii) monitoring of retreat/advance of the glaciers in fourteen glaciated basins representing different climatic zones of Indian Himalayas and iv) estimation of mass balance of glaciers based on monitoring of snow line on glaciers at the end of ablation period in ten glaciated basins of Himalaya. The project has been executed by Space Applications Centre (SAC), ISRO, Ahmedabad in collaboration with other fourteen organisations.

Glaciers inventory was carried out in the Indus, Ganga and Brahmaputra river basins on 1: 50,000 scale using recent images of Indian Remote Sensing Satellite for the first time in the country in a GIS environment. The GIS database contains 37 parameters as per the UNESCO/TTS format and 11 additional parameters. The study has shown that there are 32540 glaciers covering 77310.18 sq km.

An algorithm based on Normalized Difference Snow Index was developed at Space Applications Centre using visible and short wave infrared data of AWiFS sensor of Resourcesat satellite for snow cover mapping. Snow cover was monitored for 33 sub-basins distributed in different climatic zones of Himalaya for four consecutive years starting from 2004. The results of snow cover

monitoring show variations in patterns of snow accumulation and ablation for basins falling in different climatic zones.

Monitoring of retreat/advance of glaciers for identified fourteen basins was carried out. The basins are distributed in different climatic zones of the Himalaya. The glaciers were monitored for two time periods as: i) long term changes by using SOI topographical maps and satellite data; ii) Short term changes by using multi-temporal satellite images. The study has shown 7 to 30 % loss in glaciated area based on SOI maps of 1962-69 and recent satellite data. Monitoring using multi-temporal satellite images has also shown retreat of large number of glaciers. Glacier mass balance studies indicate upward movement of snowline at the end of ablation season.

This project has generated large amount of digital database in GIS environment of glacier inventory, snow cover mapping, monitoring advance/retreat and mass balance.

The information generated under this project has potential applications in climate change research; snow and glacier melt runoff modeling, hydropower potential estimation and disaster monitoring. Based on the results obtained and experience gained from this project, MoEF and DOS have approved phase II of this project.

A research project on 'Techniques of Survey and Planning for Conservation and Sustainable Use of Biodiversity in Mizoram, North Eastern Region' by Dr. K.D. Singh, Ashoka Trust for Research in Ecology and Environment (ATREE), 1, K Block Commercial Complex, 2nd Floor, Birbal road, Jangapura Extension, New Delhi-110014

A research project on 'Techniques of Survey and Planning for Conservation and Sustainable Use of Biodiversity in Mizoram, North Eastern Region' has been completed by

7

Ashoka Trust for Research in Ecology and Environment (ATREE). The project's overall objectives were to promote conservation and sustainable use of biological diversity in Mizoram and to develop the following:

- A cost-effective methodology for forest sector strategic planning at the district level; and
- Techniques of micro-planning at the village level.

A Stratified Random Sampling was conducted in the Kolasib district as an example using Census 2001 Village Directory as the basis. 40 villages of the district were stratified into three accessibility classes taking into account distance of a village from the nearest town and frequency of bus transport. Studies on the natural resources and the livelihood pattern at the household level for current year as well as 10 years back were undertaken in 12 randomly selected villages, four in each stratum. The sample survey analysis has brought to light many interesting on-going developments and trends, which are as under:

- Shifting agriculture has significantly decreased both in stratum 1 and 2 (viz. very accessible and medium accessible villages). However, it has increased in inaccessible villages. A reason could be the lack of development in inaccessible villages.
- Plantations of commercial species have significantly increased across strata. Arecanut, having locally available market, is a common choice; whereas, red palm oil and other horticultural species like oranges and pine apple are more pronounced in accessible villages. This could be attributed to joint venture schemes promoted by the Horticultural Dept in partnership with the private companies.
- Teak and bamboo plantations (the latter

is localized) have significantly increased in the last 10 years in accessible area. There are many other species introduced, though in small areal extent. One obvious conclusion is the need for extension services to community in the choice of plantation crops, keeping in view species suitability and marketing prospects.

- The forest cover has increased slightly in accessible villages, but declined significantly in inaccessible villages. Forests seem to be under pressure, both from population increase as well as rising aspirations for economic development. Dense forests and traditionally managed safety/supply reserves have both decreased in all strata in a significant manner with maximum change in inaccessible villages. The overall increase of forests in accessible and moderately accessible villages is perhaps, an indication that economic development might slow down deforestation.
- The change in livelihood pattern in various strata during the last decade is perhaps the most important indicator of development. In accessible villages, significant part of population has moved away from shifting agriculture to permanent agriculture. In moderately accessible villages, people have moved from shifting agriculture to forest products as well as permanent agriculture. However, in inaccessible villages, more people seem to be involved in shifting agriculture. One fact is also obvious that overall (un-stratified) figures at a district level hide fine movements. Therefore, there is need for problem oriented survey design and analysis.

Research on Wetlands

- Under National Wetland Conservation

Programme during the year, seven new projects were sanctioned. (Annexure-III)

- Management Action Plan of thirty six wetlands have been approved.
- Two meeting of Expert Groups on Wetlands (EGoW) were held in which five more wetlands were recommended for assistance. Details about wetlands are given in Chapter-5.

Research on Mangroves and Coral Reefs

- The National Committee of Mangroves and Coral Reefs monitors the implementation of the approved Management Action Plan for the Coastal States and UTs. To supplement baseline information on priority area 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 and Coral Reefs' was held on 29th-30th March, 2010. The Group considered 28 projects and recommended four research projects in the area of mangroves and coral reefs and are being sanctioned by the Ministry.

Research on Biosphere Reserves

- During the year, nine projects were completed (Annexure-IV) and the ongoing projects were reviewed.

G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora

Introduction

G.B. Pant Institute of Himalayan Environment and Development (GBPIHED) was established in August 1988 by the Ministry of Environment and Forests, Government of India, as an autonomous Institute, with a mandate of achieving sustainable development and environmental conservation in the Indian Himalayan Region (IHR). The Institute executes

its mandate through the Headquarters located at Kosi-Katarmal, Almora (Uttarakhand), and four regional Units located at Kullu (Himachal Pradesh), Srinagar-Garhwal (Uttarakhand), Pangthang (Sikkim) and Itanagar (Arunachal Pradesh). The Institute designs and implements R&D activities on priority environmental problems; develops and demonstrates best practices and delivers technology packages for improved livelihood options for the people of IHR. The identified thematic categories for Institute R&D activities include: (1) Watershed Processes and Management (WPM), (2) Biodiversity Conservation and Management (BCM), (3) Environmental Assessment and Management (EAM), (4) Socio-economic Development (SED), (5) Biotechnological Applications (BTA), and (6) Knowledge Products and Capacity Building (KCB). The projects sites, spread over different parts of IHR, have been selected carefully keeping in view the biophysical heterogeneity and location-specific needs of the inhabitants. All activities are need-based, target-oriented and time-bound. Research, demonstration and dissemination are underlying elements of all project activities geared towards development of environment-friendly technology packages.

Objectives

The Institute has three broad objectives:

- 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 made during the year

The achievements with wide range implications include the following:

7

- Towards celebrating the International Year of Biodiversity, the Institute has organized one National Conference on "Orchids: Systematic and Diversity Analysis for Conservation and Sustainable Utilization" (March 19-21, 2010) and a International Workshop on "Mountain Biodiversity and Impacts of Climate Change with special reference to Himalayan Biodiversity Hotspot" (December 6-8, 2010)
- Institute has been entrusted with the responsibility of acting as a Nodal Institute for the Transboundary Cooperation project entitled "Kailash Sacred Landscape Conservation Initiative, ICIMOD Nepal.
- Under the agis Indian Network for Climate Change Assessment Network (INCCA) the Institute contributed to the Climate Change and India: A 4x4 Assessment published jointly with MoEF and released by Hon'ble Minister of State (I/C), MoEF on 15th November, 2010.
- Institute developed a document for the Task Force of Planning Commission of India on critical issues related to hill states and hill areas jointly with Planning Commission, Govt. Of India, and released by Deputy Chairman, Planning Commission on 19th August, 2010.
- Institute developed a database of Indian Himalayan state for planning and research. This publication was released by Dr. Andreas Schild, Director General, ICIMOD, Kathmandu on 10th September, 2010.

Research and Development Achievements

Group 2: Watershed Processes and Management (WPM) & Knowledge Products and Capacity Building (KCB)

Watershed Process and Management (WPM) and Knowledge Products and Capacity Building (KCB) are two major thematic thrusts of this group. Through its WPM theme, group

focuses on studies of ecosystem processes operational at the watershed level, including the involvement of user groups and upstream-downstream linkages, with an overall aim of strengthening of mountain specific resource management practices using a systems approach. The KCB theme of this group conducts activities that lead to enhancement of Institutional outreach, based on its research products such as state-of-the art methodologies/approaches, models and policy briefs, etc. Achievements of this group include:

- Towards optimizing hydrological responses in a functional land use model geological map of Upper Kosi watershed in Uttarakhand Himalaya has been prepared (Fig. 65), which consist Almora is crystalline with gneisses and schists. The Almora crystalline zone consists of garnetiferous schists with interbedded flaggy quartzites. Geohydrological investigation in the Kosi watershed area has identified a total of 57 springs and has been marked based on the toposheet.
- Mass curve analysis of total water demand and available water for upper Kosi watershed was done. Cumulative work demand is less than cumulative available water on annual basis. However, in April and May ~33.5 HaM water shortage is recorded to meet both urban and rural water demand.
- The data obtained on energy loss/gain by the convection of heat from the leaves of 20 promising tree species revealed that six 'over temperature' species (namely, *Fraxinus micrantha*, *Alnus nepalensis*, *Celtis australis*, *Quercus leucotrichophora*, *Quercus serrata* and *Toona ciliata*) lost sufficient amount of energy by the convection of heat whereas leaves of rest of the 14 'under temperature' species gained sufficient amount of energy by the convection of heat.
- Towards assessing the energy demand, 3,300 households were surveyed in

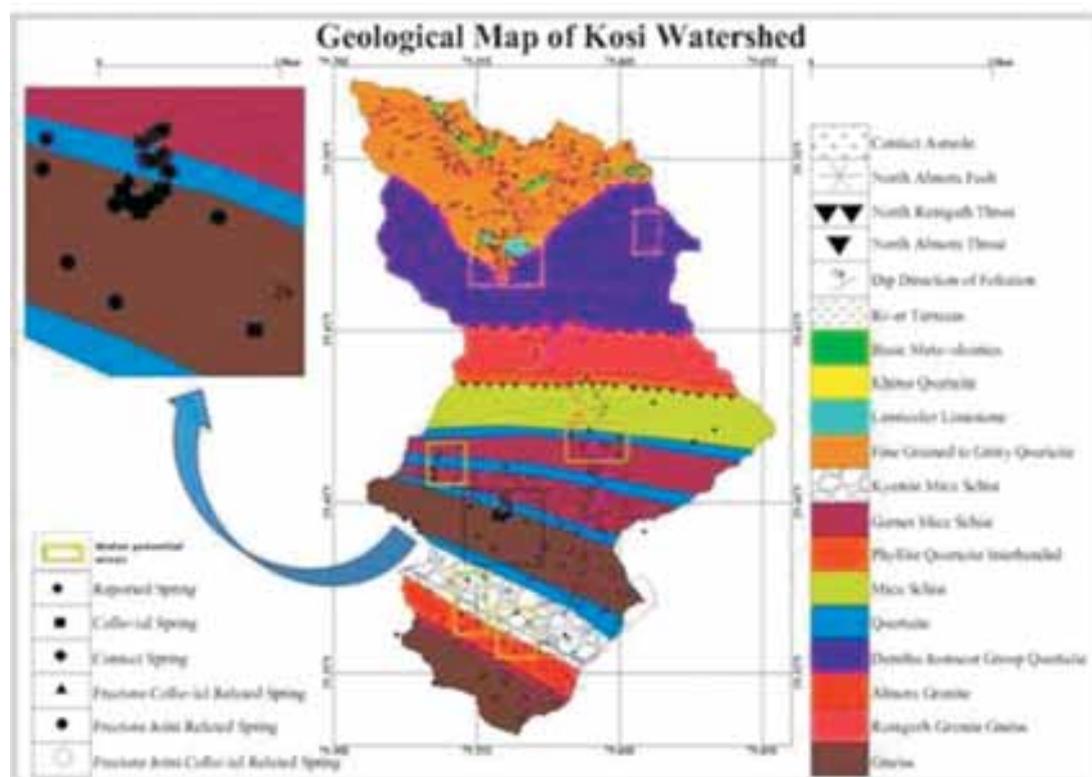


Fig-65. Geological Map of Upper Kosi Watershed showing the classification of springs and water potential sites.

different districts of the Uttarakhand state. Analysis of the data revealed that various kitchen fuels (firewood, kerosene oil, LPG, dung cake, charcoal, *gobar* gas, and electricity) are in use either single or in different combination.

- Under the indigenous knowledge system, survey was done on the selected villages of Uttarakhand region. Study reveals that Traditional *vaidyas* used about 155 plants belonging to 64 families. Besides, 93 herbal formulations were documented with their, composition; plant parts used and use method. Of these, 83 formulations were used for treatment of human ailments and 10 were used for treatment of cattle.
- In order to assess the ecological risk at mountain area rainfall and sediment load data of Gaula catchment in Uttarakhand, the annual rainfall and annual runoff (period 1958-2005) was investigated

using Double Mass Curve method (Fig. 66). The double mass curve and slope of trend curve shows the runoff of Gaula catchment in the period 1968-1977 is more than the periods 1958-1967, 1978-1986 and 1986-2005 with similar rainfall.

Group 2: Socio Economic Development (SED) & Environmental Assessment and Management (EAM)

The group includes two themes; (i) Socio Economic Development (SED) which focuses on activities, such as livelihood enhancement, sustainable tourism, entrepreneurship and self employment, indigenous knowledge, and socio-economic and cultural implications, migration, etc; and (ii) Environmental Assessment and Management (EAM) targeting on activities such as hill specific Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), valuation of ecosystem services, climate change impacts,

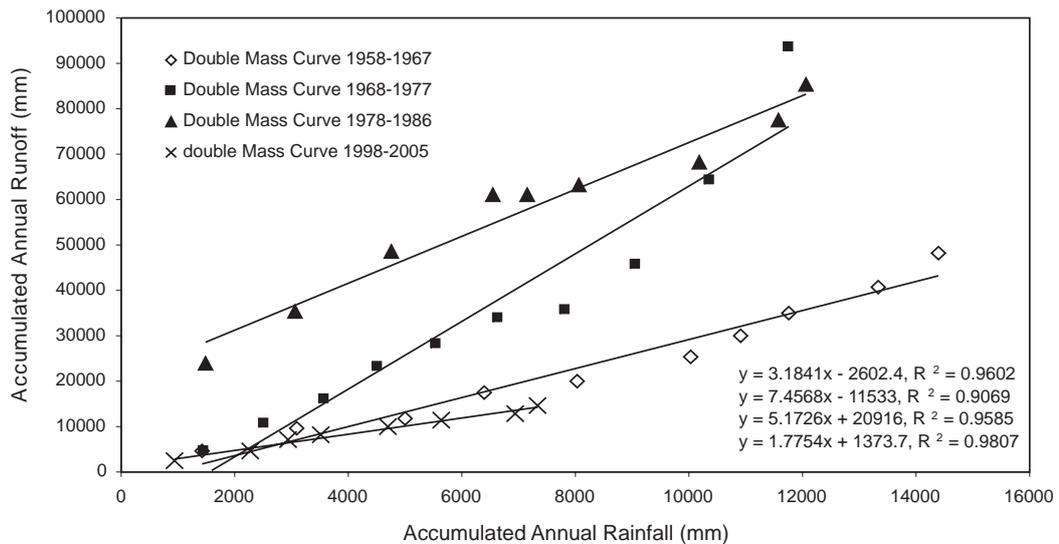


Fig-66.. Mass Curve of rainfall-runoff for the period 1958-2005 of Gaula catchment

disaster mitigation and management, and environmental management of urban areas, etc. The highlights of the R&D work include:

- To find out the values of Ecosystem Services (ES) such as soil and water conservation, availability of water, natural beauty, biodiversity, climate regulation etc., a scoring matrix was developed where the respondents were asked to assign value for these ES out of a highest scale of 10 marks. It was found that Oak forests scored distinctly higher marks as compared to Pine forests in most of the ES.
- Under the strategic environmental assessment (SEA) land use statistics of the Alaknanda catchments and influence zone map was illustrated based on remote sensing data sets of 2004. The total catchments of the River Alaknanda occupied about 6168 km² and 2344 km² (37.99 %) area was the snow bound and remaining area of 3825 km² was covered by different land use/ land cover classes (Table-25).
- In order to assess the gaseous exchange study was carried out at Himachal Pradesh. Diurnal variation of surface

ozone showed low concentration during early morning showing an increase during day time with a peak at afternoon, afterwards, it continued to decrease gradually.

- Smallholder farming system studies was carried out on 10 community managed forests in the Central Himalayan region to examine the structural and functional attributes and community management practices. This indicates that the Oak dominated forests are in better condition than the Pine and Oak-Pine mixed forests. A significant association was found between forest density and use value of the forest, forest condition and level of enforcement through rules, and between forest condition and leadership quality of the village headman (Sarpanch).

Group 3: Biodiversity Conservation and Management (BCM) & Biotechnological Applications (BTA)

The group includes two thematic areas (i) Biodiversity Conservation and Management (BCM), and (ii) Biotechnological Applications (BTA); the aim is to ensure long term conservation of sensitive Himalayan biodiversity

Table-25. Land use/land cover statistics of the Alaknanda catchment and influence zone

Land use/ landcover	Area (km ²)		Area (%)
	Alaknanda catchment	Influence zone	Alaknanda catchment
Moist mixed deciduous	9.02	7.18	79.60
Pine	121.62	93.08	76.53
Pine mix	107.98	75.67	70.08
Pine Deodar	99.99	33.59	33.59
Deodar	282.63	119.90	42.42
Coniferous mix	475.67	214.34	45.06
Temperate broad leaved	81.89	27.76	33.90
Scrubland	28.84	13.00	45.07
Grassland	384.95	215.06	55.87
Wasteland	2110.64	641.63	30.40
Agriculture	115.88	69.74	60.18
Water	5.75	4.53	78.78
Snow	2343.53	96.65	4.12

elements and improvement in the rural economy of the Indian Himalayan Region. Highlights of the R&D work carried out under this group are as follows:

- Response assessment survey at Nanda Devi Biosphere Reserves (NDBR), Uttarakhand, Nargu Wildlife Sanctuary (NWLS), Himachal Pradesh, Khangchendzonga Biosphere Reserve (KBR), Sikkim and Tawang-West Kameng Biosphere Reserve (proposed), Arunachal Pradesh revealed the following: (i) at community level and across altitude range seedling and sapling layers exhibit increasing trends of species richness and density, which is indicative of likely changes in forest communities in future (Fig-67); (ii) Inventory of plant species were made and analysed for nativity and endemism

(iii) Low species diversity index (1.07) was recorded compared to 2.04 (close) and 5.52 (open canopy) in lower forest but high species diversity (3.21) in upper forest compared to 2.8 (close) and 2.5 (open canopy) in earlier studies at Sikkim, and (iv) dependency of tribal of Twang West Kameng were analysed.

- In order to promote sustainable utilization of high value plants phytochemical and genetic investigation on *Valeriana jatamansi* revealed the variation in phytochemicals, antioxidant activity, and genetic composition.
- The effect of inoculation with an endophytic bacterium, isolated from cortical cells of *Ginkgo biloba* roots, has been studied with a view of its plant growth promoting potential. Bacterial inoculation

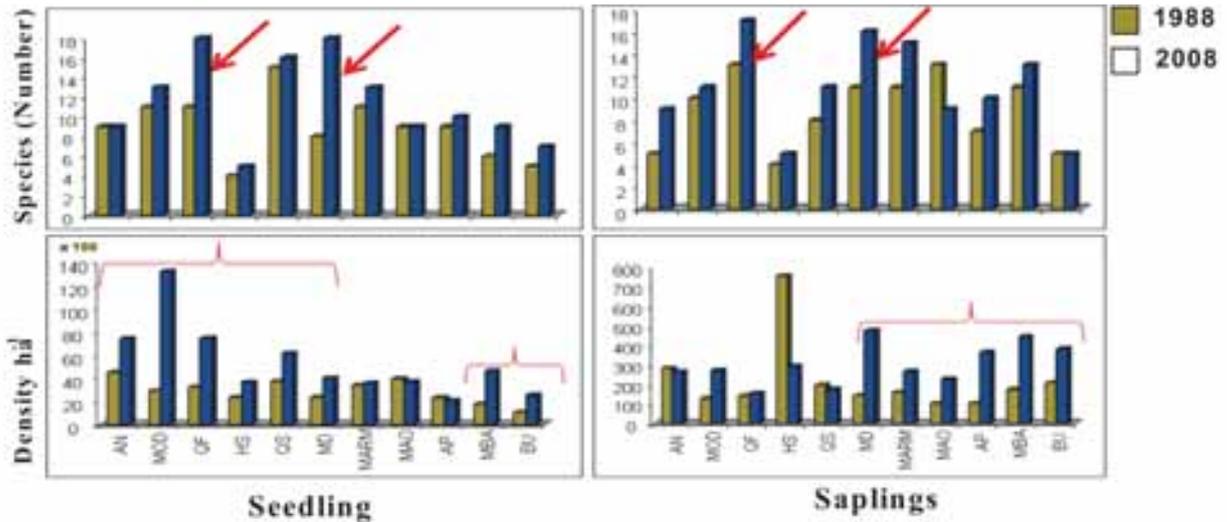


Fig-67. Trends in species composition during 1988 and 2008

resulted in enhancement in plant growth related parameters, such as biomass, chlorophyll content etc.

Application of R & D Outputs in Demonstration and Dissemination

Capacity building through Rural Technology Center (RTC)

- The participatory action research and training centre (RTC) Triyuginarayan got wide popularity and played a catalytic role in the capacity building of the user groups on various rural technologies introduced and developed. Five training programme were organized on "Demonstration/dissemination of rural technologies and conservation/management of natural resources" for local farmers of Kedar valley in which 312 farmers of Triyuginarayan & adjoining villages actively participated (Fig. 68).
- Towards capacity development and economic upliftment of rural women an Integrated Farming System (IFS) model has been

evolved for the first time in hills of Uttarakhand and investigations on IFS were carried out for its validation in the hilly region. IFS model comprising various complimentary components such as composite carp culture, poultry, vegetable, mushroom, fodder production and vermicomposting have been completed at village Patherkote in Hawalbagh block during 2009-2010.

- Using the IFS model the villagers



Fig-68. Demonstration of small processing units and products made of wild edibles at Rural Technology Centre, Triyuginarayan, Uttarakhand

produced around one ton different vegetables on land around the fish pond, exploiting overflow of pond for irrigation and utilizing vermicomposting produced in the model.

- On- site trainings and formal meetings were organized, covering over 30 villages, four Van Panchayats, six NGO groups, and 400 farmers in Uttarakhand, Himachal Pradesh, Arunachal Pradesh and Sikkim (Fig. 69). Two training programme and live demonstration for value addition of wild edibles and agri-crops while making a variety of local value added products has been organized in Garhwal region. Similarly, a training program on formulation of district disaster management plan for senior to middle level officers of line departments of Govt. of Sikkim jointly with National Institute of Disaster Management, New Delhi & Land Revenue, and Disaster Management Department, Govt. of Sikkim has been organized.
- Based on the participatory discussion, training manuals on various technology packages were prepared, and distributed to the farmers and user groups.



Fig-69. On site training to various stakeholders on different technologies organized by G.B.Pant Institute of Himalayan Environment and Development

Throughout the year, the R&D findings of the Institute were disseminated through publication of research papers in scientific journals and magazines, popular articles and books and through Institute publications: Pt. G.B. Pant Memorial Lectures by eminent thinkers and scholars, Hima-Paryavaran (Biannual-Newsletter), ENVIS Bulletin, ENVIS Newsletter, Himalayan Biosphere Reserve Bulletin (Biannual) by Lead centre, and Annual Report.

Services

Based on its competence gained over the years on different aspects of mountain-specific environment and development issues the Institute is fully equipped to extend services in diverse sectors.

Forestry Research

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 applications thereof.
- 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.

Research Institutes under the Council are

- 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 are

- 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

- The ICFRE participated in the 'Bonn Climate Change Talks' held on Bonn, Germany on 9th to 11th April 2010. The meeting consisted of the eleventh session of the *Ad Hoc* Working Group on Further Commitments under the Kyoto Protocol (AWG-KP) and the ninth session of the *Ad Hoc* Working Group on Long-term Cooperative Action under the United

Fig-70. *Commiphora wightii* -Guggal- somatic embryogenesis based mass propagation pathway

Nations Framework Convention on Climate Change (AWG-LCA).

- The ICFRE participated in the 32nd sessions of the UNFCCC subsidiary bodies from 31st May to 9th June 2010 and 12th session of the AWG-KP and 10th session on the AWG-LCA from 1st June to 11th June 2010 held in Bonn, Germany.
- The ICFRE participated in the 'Bonn Climate Change Talks' The thirteen session of the Ad Hoc Working Group on Further Commitments for Annex I Parties of the Kyoto Protocol (AWG-KP 13) and the eleventh sessions of the Ad Hoc Working Group on Long- term Cooperative Action under the convention (AWG-LCA 11) held in Bonn, Germany from 2nd to 6th August 2010.
- The CDM Assessment team (CDM-AT) from UNFCCC visited ICFRE Headquarters from 30th April to 1st May 2010 for on-site assessment of ICFRE and recommended for DOE status for validation and verification of CDM A/R projects.
- The ICFRE has been awarded with a one-time special grant of ₹100crore by the Gol considering its commendable performance.

Research

Forest Research Institute (FRI), Dehradun

Forest Research Institute (FRI), Dehradun is working on diversity in *Ganoderma lucidum* in North India and collected more than 75 specimens from Haryana, New Delhi, Punjab, Uttarakhand and Uttar Pradesh for conservation and utilization.

- The research work has been carried out by FRI on 31 *Ganoderma lucidum* ITS region sequences of nr DNA and were granted accession numbers and data were released by Gene Bank, USA (NCBI).

- Beta tubulin gene of forty isolates of *Cordyceps sinensis* were amplified and sequenced. The sequences were submitted in NCBI, USA.
- Under pathology herbarium digitization programme, a software programme was implemented on Linux platform with bar-coding mechanism for digitization of specimen records.
- One productive and stable clone each of *Dalbergia sissoo* and *Eucalyptus* hybrid (*E.camaldulensis* X *E.tereticornis*) was identified and recommended by the G & TP Division in RVTC for its release.

Arid Forest Research Institute (AFRI), Jodhpur

- Under lysimeter experiment carried out by AFRI, Jodhpur salinity significantly reduced root biomass. Highest root biomass of 19 kg per plant was in non-saline water logging at 50 cm soil depth in *E. camaldulensis* as compared to 2.2 kg per plant for *E. camaldulensis*, 3.24 kg per plant for *Tamarix aphylla* and 2.00 kg per plant for *A. nilotica* under saline waterlogged condition. Root depth of these species restricted to the depth of water logging.
- Conservation of soil and water in lower Aravalli through different rainwater harvesting devices enhanced water, fodder and fuel wood availability for the local people. Number of grass/herb species increased from 39 in 2005 to 82 in 2010 through 92 in 2009, reduced run-off by 2% of total rainfall and enhanced carbon stock, soil water and nutrient status and plant growth, while studies on restoring degraded Aravalli Hills.
- Under the project forests soil characterization and classifications, 383 soil profiles studied covering 335 forest blocks and 1406 soil samples in different districts of Rajasthan for soil structure,

7

consistency, colour, pH, electrical conductivity, organic carbon, NO₃ and NH₄ – nitrogen and phosphorus.

- Survey work for assessing population density of guggul was carried out at 25 sites belonging to five districts of Rajasthan. Guggula density was found maximum (56.3 plants/ha) but the population was relatively more uniform in Jaisalmer. Under network project of guggal, clonal performance trials were established using clonal material of the various region of Rajasthan and at 30 months age, survival varied for 40-100% and height 93.17-172.25 cm and mean crown diameter 96.69-162.91 cm.

Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore

- Studies on enhancing rootability and planting stock production of selected high yielding clones of Eucalyptus through Micro & Mini cutting technique were undertaken by IFGTB, Coimbatore. Rooting of clones using juvenile shoot technique for 13 clones was enhanced compared to conventional cutting method.
- Eighty-five clones of *C. equisetifolia* were assessed for their salt stress response under gradually increasing concentrations of sodium chloride ranging from 50 mM to 550 mM in Hoaglands solution, and highly tolerant and susceptible clones. Analysis of these clones revealed that the most susceptible clones had a shoot to root ratio of sodium ranging from 1.5 to 3.6, while in the tolerant clones the shoot to root ratio was lesser than or around one indicating that shoot to root ratio of sodium could be considered as one of the markers for screening of salt tolerant casuarina clones.
- IFGTB, Coimbatore observed that biopesticidal properties of Aegle seed oil

have been identified, and developed oil pre-formulations. The Bioefficacy was evaluated at 5000 and 10,000 ppm against the target teak pest *Hyblaea puera* in terms of larval mortality. Field level biopesticidal applications and experiments were carried out in State forest nurseries at Nilambur and Kulathupuzha, Kerala to confirm the insecticidal properties. During the field evaluation, it was observed that, no further insect attack was observed in teak nurseries, also observed as a growth promoter. The performance of bioactivity of different ranges of oil preformulations are in progress to recommend the suitable formulation for nursery application.

- IFGTB, Coimbatore reported a native parasitoid, *Megastigmus* sp. acting as a potential biocontrol agent on gall insect pest, *Leptocybe invasa* in the field from Andhra Pradesh and Tamil Nadu.

Institute of Wood Science and Technology (IWST), Bengaluru

- IWST, Bangalore conducted studies on performance of coatings on modified wood surfaces. Chemically modified (benzoylated and acetylated) wood specimens of Rubber wood and Radiata pine were coated with a transparent and opaque polyurethane exterior paint. The coated panels were exposed to outdoor weathering and samples were periodically examined for weathering deteriorations. Results indicate that performance of coating on modified wood was remarkably improved as compared unmodified specimens. Chemically modified wood improved coatings adhesion and enhanced performance of paints significantly.
- A total of 222 fungal isolates belonging to 40 genera were isolated from the fruits and seeds of endemic species of Western

Ghats. A new fungal species viz., *Penicilloopsis indicus* was identified from the seeds of *D. malabaricum* and *Beltraniella veteriae* from *Vateria indica*. New host records of fungi i.e., *Beltrania rhombica* on seeds of *P. indicum* and *Bartalinia lateripes* on seeds of *G. gummi-gatta* were reported

- Two new weevils were found as defoliators of sandal viz, *Peltotrachelus cognatus* Faust *Mylocerus delicatulus* Bohemman. Young sandal plantations grown along with *Acacia auriculiformis* revealed the incidence of two new stem borers *Purpuricenusa sanguinolentus*-Olivier.(Cerambycidae: Coleoptera) and *Exocentrus* sp. A new sandal seed borer *Araecerus fasciculatus* -De Geer was found to cause 25% damage to sandal seeds.
- Two new species of stem borers belonging to Coleoptera (Family Cemambycidae) viz *Tetraommatus filiformis* –Perroud and *Chlorophorus circulatus* Holzschuh were found to girdle the branches causing death to the branches of *M.dactyloides*.

Tropical Forest Research Institute (TFRI), Jabalpur

- Five hundred twenty nine medicinal plants of forest origin being utilized by 135 traditional herbal healers have been documented and identified from Madhya Pradesh by TFRI, Jabalpur. Sixty one traders involved in trading of herbal plants/parts have been contacted for marketing channels and price structure.
- Documentation, distribution and identification of forest invasive species in the forest area of Jabalpur, Katni, Mandla and Seoni districts of Madhya Pradesh are being carried out to find out the intensity of Invasive species in the forest and to workout their control measures.
- Two bamboo species, viz., *Bambusa*

nutans and *Dendrocalamus strictus* were selected for bamboo based Agri-silviculture system. Two agriculture crops viz. wheat in Rabi season and Urad in Kharif season were intercropped with these bamboo species. Successfully established bamboo-wheat and bamboo-urad Agri-silviculture system as an OSR.

Rain Forest Research Institute (RFRI), Jorhat

- RFRI, Jorhat, Assam has successfully induced agarwood with artificial inoculation of fungi in healthy agar trees (*Aquilaria malaccensis* Lamk.) under the project entitled "Investigations on the formation of agar wood in *Aquilaria malaccensis* Lamk.". Besides, the keys for identifications of initiation or formation of agarwood in agar trees.
- RFRI, Jorhat, Assam has developed Meleng Grant village (comprises of *Govindpur, Bhogpur & Madhupur*) as a demo village for technology transfer & demonstration of sustainable livelihood through forestry activities. Economy of the rural populace has been improved significantly with the adoption of vermi-composting techniques, post harvest preservation of bamboos, Bamboo & Patchouli Nurseries along with various Agro-forestry models etc. under this programme of technology transfer.

Himalayan Forest Research Institute (HFRI), Shimla

- HFRI, Shimla achieved a breakthrough in the germination potential for the seeds of *Juniperus polycarpus* – an endangered species of the dry temperate and cold deserts areas and a species of social relevance too for the local inhabitants - has been achieved.
- HFRI, Shimla and its network partners carried out extensive surveys in North-

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Western Himalayas for assessing the population status and identification of superior genetic stock of *Picrorhiza kurroa* Royle and *Valeriana jatamansi*. Data base generated which provided a lead towards identification of superior chemotypes for subsequent development of their conservation strategies and further multiplication.

- Continuing efforts in population genetic analysis and characterization of *Cedrus deodara* germplasm through DNA based markers, PCR conditions for *Cedrus deodara* standardized and screening of primers and scoring of polymorphic loci done at HFRI, Shimla.

Extension

- International Day for Biological Diversity and World Environment Day were observed by ICFRE institutes on 22nd May 2010 and 5th June 2010 respectively. Various activities like tree planting etc. were conducted to mark the occasion.
- AFRI, Jodhpur observed World Day to Combat Desertification on 17th June 2010. Besides planting ceremony, bilingual pamphlets on the theme declared by UNEP were released on the occasion.

Consultancies

- EIA consultants from ICFRE made a presentation on the baseline status of the project and the management plan proposed to overcome the negative impact on physical, biological and social environment during the two- days public hearing for Kuthar Hydroelectric Power Project at Chamba District of Himachal Pradesh on 16th April 2010 at Dalli Village and on 17th April 2010 at Garola village conducted by Himachal Pradesh State Pollution Control Board. A detailed plan proposed for tribal area development with proposed tentative financial target was discussed in depth with the public. An

overwhelming participation by the villagers affected by the proposed hydropower project was observed.

- ICFRE has been awarded five new EIA/EMP consultancy works.

Indian Institute of Forest Management (IIFM), Bhopal

The Indian Institute of Forest Management (IIFM), as a sectoral management institute, imparts education in forest management, which is a judicious mixture of forestry, social, and management science. 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 the area of forest management and ensures proper integration of external and indigenous knowledge suitable to Indian context.

The specific objectives of the Institute are:

Education and Training

- To meet the demand for the trained human resource with managerial and analytical skills in the areas of forestry, 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 training Programs.

Research and Consultancy

- To generate information on field realities and derive meaningful interpretation through systematic research.
- To offer consultancy services to the 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, seminars 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 for all 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.

Research

- Research being one of the key activities of the Institute, it actively undertook various research projects in diverse areas. IIFM completed seven research projects during the year, of which two were sponsored by IIFM and five were externally sponsored projects. Currently, there are 26 ongoing research projects at IIFM.

Centres of Excellence

International Centre for Community Forestry (ICCF)

The International Centre for Community Forestry (ICCF) is functioning as a "Centre of Excellence" to cater to the growing need and interest in Community Forestry (CF) initiatives.

It aims to promote community forestry initiatives and publications in the field of Joint Forest Management (JFM), Self-Initiated Forest Protection (SIFP) and other forms of community based forest management system.

The Centre began functioning actively in 2001, with fund support from the Sir Dorabji Tata Trust (SDTT), Mumbai. Later, it received many projects from various governments and non government agencies through which the Centre catered its other ongoing community forestry projects. The centre publishes a newsletter "People and Forests" based on its activities for dissemination of information to rest of the world.

The ICCF envisages programs implementation involving exchange of scientists, researchers and community forestry workers from India and other countries.

Center for Ecological Services Management (CESM)

The Center for Ecological Services Management (CESM) is being set up as an interdisciplinary center to address crucial policy issues associated with the complex relationship between ecological, social, economic, legal and institutional aspects of ecosystem management. Several initiatives have been taken by organizations on the issues of environment and development in south and south-east Asia, but the number of professional organization working on the related issues on valuation and developing markets and incentive based mechanism ecosystem services is very small. CESM specifically addressed this crucial gap and would undertake research, consultancy, teaching, training activities as well as prepare data base on the values of ecosystem service, develop and standardize techniques of valuation of ecosystem service and impact studies of degradation. It also networks with national and international organizations in the NRM Sector for promoting professional exchange. During the year 2009-10

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one international and one national training programmes; two dissemination workshops; two international research projects have been undertaken in the Centre.

Center for Sustainable Forest Management & Forest Certification (SFM & FC)

Forest Certification has emerged as an important market driven tool and a mechanism for assessment and monitoring of forest and forest products. It is a process that leads to the issuing of a certificate by an independent party, which verifies that an area of forest is managed to a defined standard.

The center for SFM & FC represents IIFM as member in both the National Working Group as well as the National Forest Certification Committee, constituted by Govt. of India.

The center is expected to generate the pool of knowledge and understanding on the emerging field of Sustainable Forest Management & Forest Certification for the benefit of forestry sector in the country.

Centre for Livelihood Management

Centre of Livelihood Management's mission is "Sustainable Livelihood Enhancement of communities including Poor, Marginalised and Women". The centre will act as a Resource Centre for Stakeholders in the area of training, research, documentation, consultancy, network and advocacy activities. It would provide a forum for influencing the programmes and policies related to livelihood. It would also strive for dissemination of technology and approaches which can sustain livelihood. The stakeholders would include government officials implementing various development projects for livelihood enhancement, personnel from NGO and Civil Society organizations, representatives of Panchayati Raj Institutions and Communities.

Regional Center for National Afforestation and Eco-development Board (RCNAEB)

The Regional Center for National Afforestation and Eco-development Board, (RCNAEB), was established in 1989 at Indian Institute of Forest Management, Bhopal, which is one out of seven in the country. The center looks after the States of Madhya Pradesh, Chhatisgarh 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 center. It also provides a forum for cross fertilization of ideas about afforestation activities. MoEF, New Delhi and Director, Indian Institute of Forest Management, Bhopal have signed a Memorandum of Understanding (MoU), which provides basis for the functioning of the centre. Apart from MoU an Advisory Management Committee and a Core Group of faculty members guide the functioning of the center. So far the center has organized and co-ordinated several training programmes, research projects (most of them on expressed needs of the Forest Department), evaluation of plantation works done by forest departments and NGOs, plantation assessment for Indira Priyadarshini Vriksha Mitra (IPVM) and Maha Vriksha Puraskar (MVP) awards etc.

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 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 2009-10, 24 MDPs, seven workshops/seminars and three awareness programmes were conducted which include

programmes conducted under long-term externally funded projects like ITTO and RCNAEB.

Consultancy

The Institute completed three consultancy assignments and five more are in progress during the year 2010-11.

Some of the client organizations for consultancy assignment include M.P. Forest Department; M.P. State Employment Guarantee Council, Department of Panchayat and Rural development, Government of M.P.; Haryana Forest Department; Institute of European and Environment Policy (IEEP), London; IPIRTI, Bangalore; Khadi and Village Industries Commission, Mumbai; Planning and Coordination Department, Government of Orissa; Tribal Welfare Department, Government of M.P. etc.

Publications

The Institute continues to disseminate its research findings to the larger audience through its own publications and also by publication of research papers in reputed journals, books and also by presentation of papers in national and international conferences. The faculty also participated and presented research papers in national and international conference.

Other Activities

The year 2009-10 was marked by significant progress in different areas of academic activities. The Students Council of IIFM has also been very active during this year and organized number of academic as well as extra-curricular events.

The Institute, apart from ranked as the top sectoral management institute in the country, has also been ranked among top 20 Business Schools, that include IIMs by leading business magazines.

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

Established in 1962 as a co-operative research laboratory at the initiative of the Indian Plywood Industry with participation of the Council of Scientific and Industrial Research, Indian Plywood Industries Research and Training Institute (IPIRTI) is now an autonomous Research and Training Institute under the Ministry of Environment & Forests, Government of India. From the inception, the Institute has been closely associated with development of plywood and panel industry in the country and also instrumental in the growth, from its infant stage. The Institute is an industry driven organization. Recognized (since 1989) as a Scientific & Industrial Research Organization by the Government of India under the Department of Scientific and Industrial Research Scheme.

The Institute is basically mandated to carry out research and development, training and education, testing and standardization and extension in the field of plywood and panel product manufacturing. The multidisciplinary research projects based on the problems identified by the industrial representatives, Institute Scientists and other similar interested organizations, are taken up. This is the only Institute of its kind in the country working for the plywood and panel industries. Due to expertise and credibility established over many years, the Institute has developed a strong relationship with the industry and well recognized for its contribution. As a result, industry continues to support our research efforts. An important and unique aspect of R & D works at the Institute is that lab scale findings are upscaled to industrial level to facilitate their adoption by the Industries.

7

Progress / Achievements made during the year

Research

Development of technique for production of Face Veneer

At present, imported timbers like Keruing/ Gurjan are peeled to make 0.23 to 0.28 mm thick face veneers for making plywood, due to non-availability of traditional Indian hardwoods. The sources of supply of these imported species are getting depleted drastically, day by day. Hence there is an urgent need to find out alternate methods of making face veneers to meet the challenges posed by the shortage of face quality veneers and it is very much necessary for continuing the production of plywood in the industry without disruption.

Fitches of size 2.5 m x 0.15m were made using plantation species Poplar, Eucalyptus and Rubber wood. Sliced veneers were produced with different grain patterns. Yield studies were carried out on recovery of veneers. Radially and Longitudinally curved were got fabricated based on the trials. Lab scale trials were completed on dyeing of veneer and pilot scale trials on dyeing of veneer is being taken up.

Upgradation of facility for commercialization of Bamboo Mat Corrugated Sheet (BMCS) with addition of Bamboo Mat Ridge Cap (BMRC)

Use of BMCS have already started in the housing activities as roofing material. It has become very much necessary to develop Ridge cap for covering the top/corners of roof made out of BMCS. Accordingly Institute has successfully developed technology jointly with Building Materials Technology Promotion Council (BMTPC) for manufacture of Bamboo mat ridge cap (BMRC) on a pilot plant scale. This technology is commercialized through M/s Timpack (P) Ltd., Meghalaya, which is presently manufacturing BMCS with IPIRTI & BMTPC technology. Commercial Scale Press with Specially designed Dies for making BMRC were installed and commissioned successfully at M/s Timpack (P) Ltd., Meghalaya.

Standards for Emission of formaldehyde and other Volatile Organic Compound (VOC) from Wood and particle board

Formaldehyde is a health hazard when inhaled by living organism and hence its continuous emission from wood based panel products is harmful to workers and users. However, no National standard has so far been formulated to safeguard the users. It is therefore, utmost necessary to standardize manufacturing process and test method of the level of formaldehyde and VOC emission from wood and finished wood products and formulate national standards.

The process of measurements were optimized for emission of formaldehyde from wood based panel products as per EN 717-1 and ISO standards. It was observed that the panels made using modified

Fig-71. Bamboo Mat Ridge Cap (BMRC)

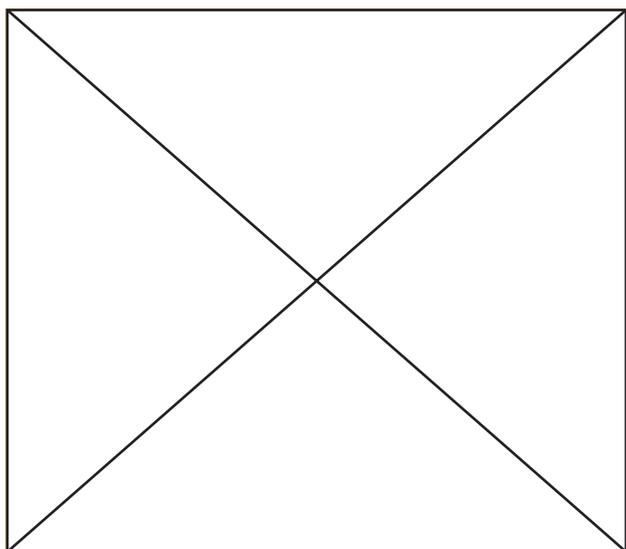


Fig-72. Volatile Organic Compound (VOC) Chamber

resin system indicates very less emission value when compared with conventional resin system and is well within the limits of E1 emission level. Samples received from industries were evaluated for emission of the products. Facilities have been established for testing of emission of volatile organic compound from wood and panel products. Based on the results national standards are being worked out.

Development of Bio-Adhesives with less emission of formaldehyde for Wood and Panel Products

One of the major problems associated with use of synthetic formaldehyde based wood adhesive is the release of formaldehyde from the products made with these resins. Urea formaldehyde resin based adhesive is the worst which, due to slow decomposition, continues to emit formaldehyde until the usable life of the product. Formulations for resin were worked out using furfuraldehyde in phenolic and amino resins. Partial replacement of formaldehyde by furfuraldehyde was also carried out. It was observed that phenolic resins developed on laboratory scale gave encouraging results and conformed to boiling water resistance grade while amino resins needs some more study for achieving the requisite properties.

Technology for manufacture of single/3-layered Particle Board from Rice Husk

Among all the agricultural residues, the most abundantly available is rice husk. It is the by-product of the most important agro-based industry in the country, namely paddy milling. Rice husk is available in the country to the extent of 2 million tones per annum. Particle size, drying schedules and process parameters for making single and 3 layered particle boards from rice husk were optimized on laboratory scale. The panels were evaluated for strength properties as per IS:3087 - Specification for medium density particle board. The physical and mechanical properties of the panels conforms to the requirement of IS:3087 with excellent fire resistance properties. Pilot plant trials were also taken up by adopting the process optimized on laboratory scale. 2ft x 4ft boards were made. The panels are being evaluated for physical and mechanical properties.

Development of Soya based Adhesive

A study of making ply boards with phenolic and amino resin where replacement of phenol and urea/melamine has been made with soya flour. In this study the condition for denaturing soya flour was optimized to

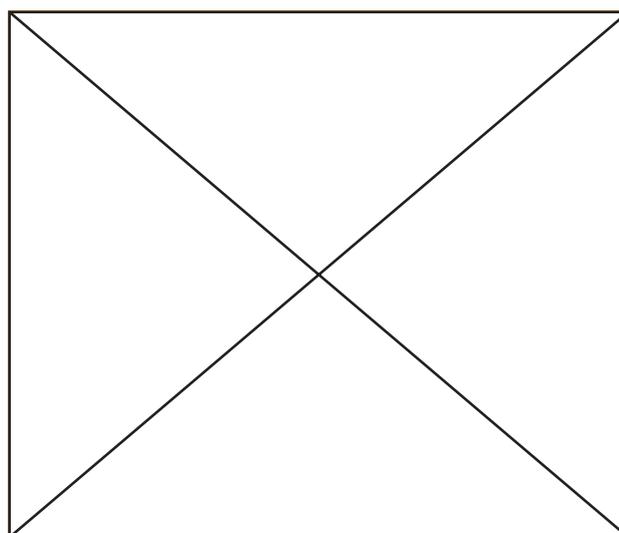


Fig-73. Rice Husk Particle Board

maximize its incorporation into the final polymerized resin. Soya flour was made to react with phenol, formalin and caustic to make durable adhesives for the manufacturing of exterior grade plywood. Soya was partially substituted for phenol in the phenol formaldehyde resin. The percentage substitution was optimized for achieving exterior grade plywood. The products made from soya adhesives have shown excellent results as per relevant specifications and the products found to be completely free of formaldehyde emission. The studies were limited to lab scale.

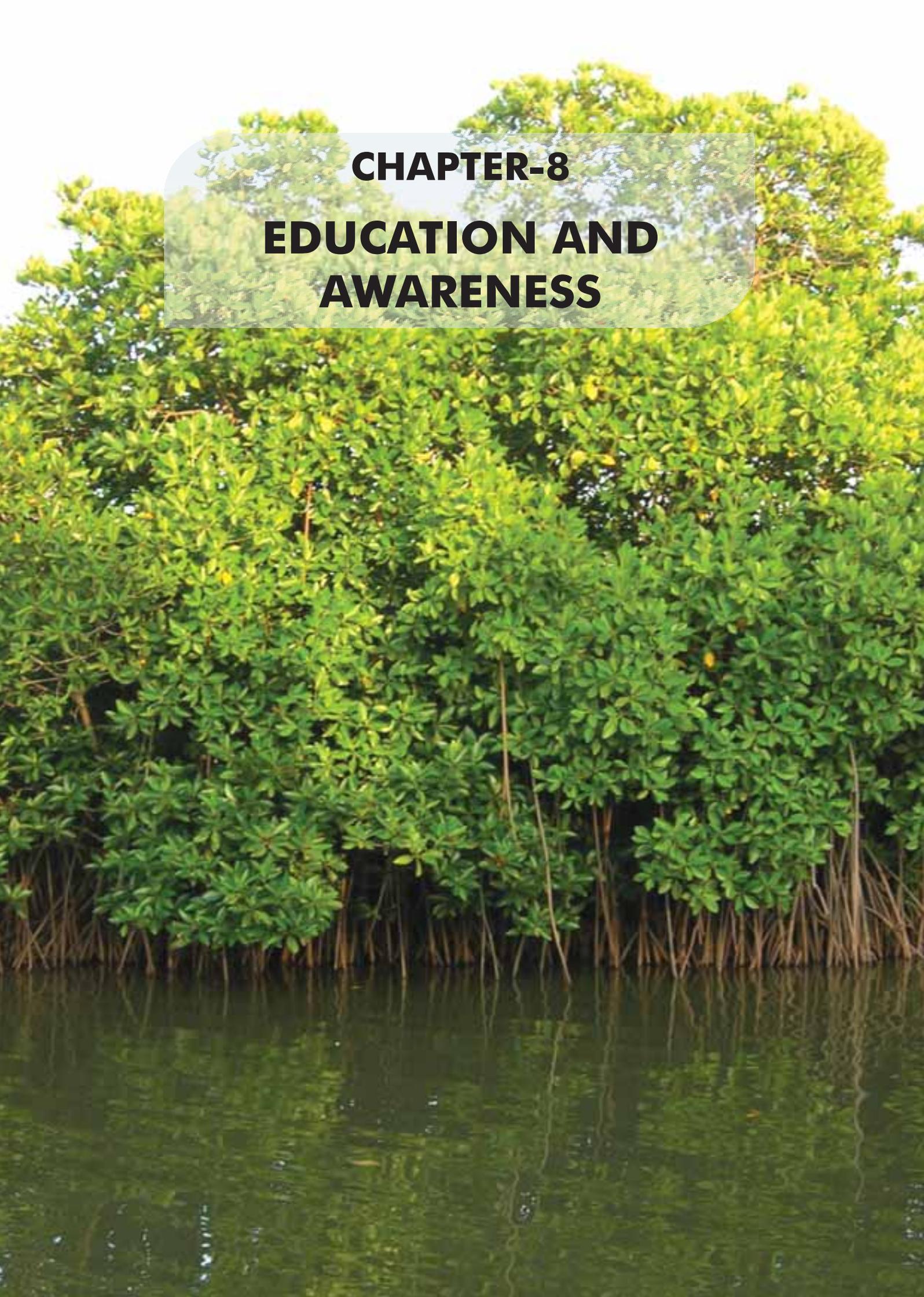
Wildlife Institute of India (WII), Dehradun

Wildlife Institute of India (WII) is a premier research and training institution in the field of wildlife and protected area management in South Asia. Wildlife research at the Institute covers ecological, biological, socio-economic and managerial aspects of wildlife conservation. The research project generates

valuable academic data, help evolve study techniques relevant to the Indian ground conditions 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 skill and update its teaching inputs.

The research agenda is decided and guided by the Training Research Advisory Committee (TRAC) comprising eminent conservationists, academicians and representatives of scientific organizations as well as state wildlife organizations, which ensures that research conforms to the national conservation priorities.

During the reporting period 45 research projects were ongoing in the Institute.

A photograph of a mangrove forest with dense green foliage and visible roots extending into the water. The text is overlaid on a semi-transparent white box in the upper portion of the image.

CHAPTER-8
EDUCATION AND
AWARENESS

Environmental Education, Awareness and Training

Introduction and Objectives

The emergence of environmental issues at the top of the global agenda in the context of climate change concerns underline the need for collective endeavour for protection of environment. This warrants informed and voluntary participation of all sections of the people in the movement for conservation and participation of environment. Awareness of people about emerging environmental issues and the interconnections between the life styles and environment is an essential prerequisite for such participation.

Population increase, rapid urbanisation and industrialisation, increasing needs of energy etc., have impacted the availability of natural resources besides denting the quality of environment. 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 adequate awareness of the impending challenges and their implications, 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 promote environmental awareness among all sections of the society;
- To spread environment education, especially in the non-formal system among different sections of the society;
- To facilitate development of education/training materials and aids in the formal education sector;
- To promote environment education through existing educational/scientific/research institutions;
- To ensure training and manpower development for environment education, awareness and training;
- To encourage non-governmental organizations, mass media and other concerned organizations for promoting awareness about environmental issues among the people at all levels;
- To use different media including films, audio, visual and print,, theatre, drama, advertisements, hoarding, posters, seminars, workshops, competitions, meetings etc. for spreading messages concerning environment and awareness; and
- To mobilize people's participation 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 recognised fact that the children can be catalysts in promoting a mass movement about the ensemble of the environmental issues. Being future citizens, inculcation of environment friendly attitudes and behavioural patterns

amongst them can make a significant difference to the long term efforts for protection of environment. Children are triggers for a chain reaction, making a difference at the local and community level which in due course lead to awareness at village, city, state, country and global level. MoEF has hence, embarked upon a major initiative for creating environmental awareness among children by formulating National Green Corps (NGC) in 2001-02. In less than nine years, that the programme has been in operation, it has been catapulted into a mass movement of children for maintaining and preserving the environment. 1,30,931 Eco-clubs have so far been established in NGC Schools across the country.

During financial year 2010-11 (as on 8th February, 2011), 87,586 Eco-clubs were supported by the Ministry across the country.

National Environment Awareness Campaign (NEAC)

The need for a mass movement for protection of environment needs no emphasis. The concerns of the people for environment need to be harnessed into voluntary action. This requires a network of nodal agencies and grass-root level organisations.

The NEAC was hence launched in mid 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 organisations, army units, government departments etc. from all over the country for conducting awareness raising and action oriented activities. The awareness activities could be seminars, workshops, training programmes, camps, padyatras, rallies, public meetings, exhibitions, essay/debate/painting/poster competitions, folk dances and songs, street theatre, puppet shows, preparation and

distribution of environmental education resource materials etc. Action components could be plantation of trees, management of household waste, cleaning of water bodies, taking up water harvesting structures, use of energy saving devices etc. Diverse target groups encompassing students, youths, 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 'Bio-diversity'. The following sub-themes for action components were considered for financial assistance:

- (i) Wetland conservation,
- (ii) Conservation of rare indigenous plants including medicinal plants,
- (iii) Community participation in biodiversity conservation, and
- (iv) Bio-diversity and pollution control.

Thirty four Regional Resource Agencies (RRAs) appointed by the Ministry are involved in conducting, supervising and monitoring the NEAC activities during the year. A total of 12,078 organisations have been involved in the campaign across the country. The Ministry released a grant of ₹11.25 cr to the RRAs for further disbursement among the approved participating organisations.

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 51 national/international journals covering diverse areas of environment. Being the scientific Ministry,

8

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, decision makers etc.

Research scholars from various organisations, institutions and other professional bodies visited the library for a variety of information required by them from time to time.

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 organise 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 constant 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 financial year 2010-11 (as on 8th February, 2011) twenty six organisations were provided financial assistance for conducting seminars/ symposia/ workshop etc.

Mass Awareness

Media Cell of the Ministry is mandated with taking up awareness campaigns using print and electronic media besides other mass media to enhance awareness about various environmental issues which would in turn facilitate better compliance with environment regulations. Media Cell is guided by an Advisory Committee of Experts on Media Matters under the Chairmanship of Secretary (E&F) in this regard. During the year, as per the Media Action Plan (MAP) adopted by the Ministry, the following major activities were supported/sponsored/ completed:

- The World Environment Day (WED) was commemorated on 5th June 2010 on the theme: 'Bio-diversity: Connecting with Nature'. A commemorative postage stamp on biodiversity was released on the occasion. To generate awareness among the common people, a coloured advertisement was also released on 5th June, 2010 in leading National and Regional newspapers in English, Hindi and Regional languages. The occasion was graced, among others, by the former President of India Dr. A.P.J. Abdul Kalam.
- Launched a Low Carbon Campaign through Prasar Bharti Broadcasting Corporation of India during the Commonwealth Games, 2010 in collaboration with Ministry of New and Renewable Energy Sources and Bureau of Energy Efficiency by Telecast of 30 Public Service Messages and 10 Shera pop ups innovatively linked with energy and environmental related issues.
- Supported production of 13 episodes each of 30 minutes duration on 'biodiversity' in the context of declaration of 2010 as International Year of Biodiversity.
- Supported production of two films each of 45 minutes duration on 'Man-Animal Conflict' & 'River Pollution'.

- Presented a tableaux on 'Biodiversity and sustainable livelihoods' in the Republic Day Parade 2011.
- Supported the CMS Vatavaran 2010 – 4th Environment & Wildlife Travelling Film Festival in six cities i.e. Shimla, Shillong, Trivandrum, Ahmedabad, Bhubaneswar and Patna.
- Supported Regional Museum of Natural History, Mysore for organisation of Travelling Exhibition on "Biodiversity of the Western Ghats" in the context of declaration of 2010 as International Year of Biodiversity covering Hyderabad, Chennai, Puducherry, Kochi, Kavaratti, Panaji and Mysore.
- Extended financial support for publishing advertorials on Environmental Awareness and full-page advertisement of the Ministry of Environment & Forests in the Magazine 'Geography and You' (English) and "Bhugol Aur Aap" (Hindi).
- Released Half Page advertisement in National and Regional Newspapers in English, Hindi and Regional languages on completion of 25 years of the Ministry.

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 Course. 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.

Grants-in-Aid to Professional Societies and Institutions

The objective of the programme is to facilitate optimum utilization of expertise

available with professional societies and institutions for promotion of environment education and awareness. The programme aims at utilizing the existing capacities while simultaneously providing for enhancing the capacities of such institutions. The projects to be financially supported would interalia include development/extension of exhibition galleries, interpretation centres and education materials relating to ecology, wildlife and environment. The financial assistance is not provided for procurement of capital goods/ equipment. However, some office equipment like computer, projector etc can be purchased if they are incidental to or essential part of exhibition galleries, interpretation centres and educational focused activities. This one time grant is also not available for research, collection and compilation of data and information or to any individual / business houses.

Publication of resource material related to environment

The objective of this programme is to utilize expertise available with professional societies, voluntary organizations, institutions etc. for developing and publication of innovative and high quality resource material for promoting environmental education and awareness by providing financial assistance for development and publication of such material. The publication material must popularize the understanding about the environment, emerging issues and out of the box solutions including innovative approaches for protection and should be relevant and of high standard and should 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 individuals.

8

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.

Other Awareness Programmes

Since the financial assistance provided for awareness programmes under the NEAC is for activities to be conducted in a specific time frame and are short-term projects restricted to a specific area, other proposals for creating awareness among diverse target groups are 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 mentioned below:

- Vacation Programme on Natural Resources – A four weeks residential programme on Natural Resources involving children from Bhopal (Madhya Pradesh) was sponsored.
- Srishti: The Environment Quiz – 8452 plus secondary schools from 25 Districts in the State approached and 579 schools registered their teams. Winners took home armloads of eco-friendly prizes and camping trips. TV audiences across the

State watched the broadcasts on Doordarshan-1.

Progress/Achievements made during the year

- 87,586 Eco-clubs supported during 2010-11 (as on 8th February, 2010).
- Record level of financial assistance of ₹11.25 crore approved under NEAC.
- Numbers of participating organisations in NEAC reached an all time high of 12,078.

Comparison of progress during the year

Progress made in supporting Eco-clubs under NGC since 2003-04 is shown in Fig.74.

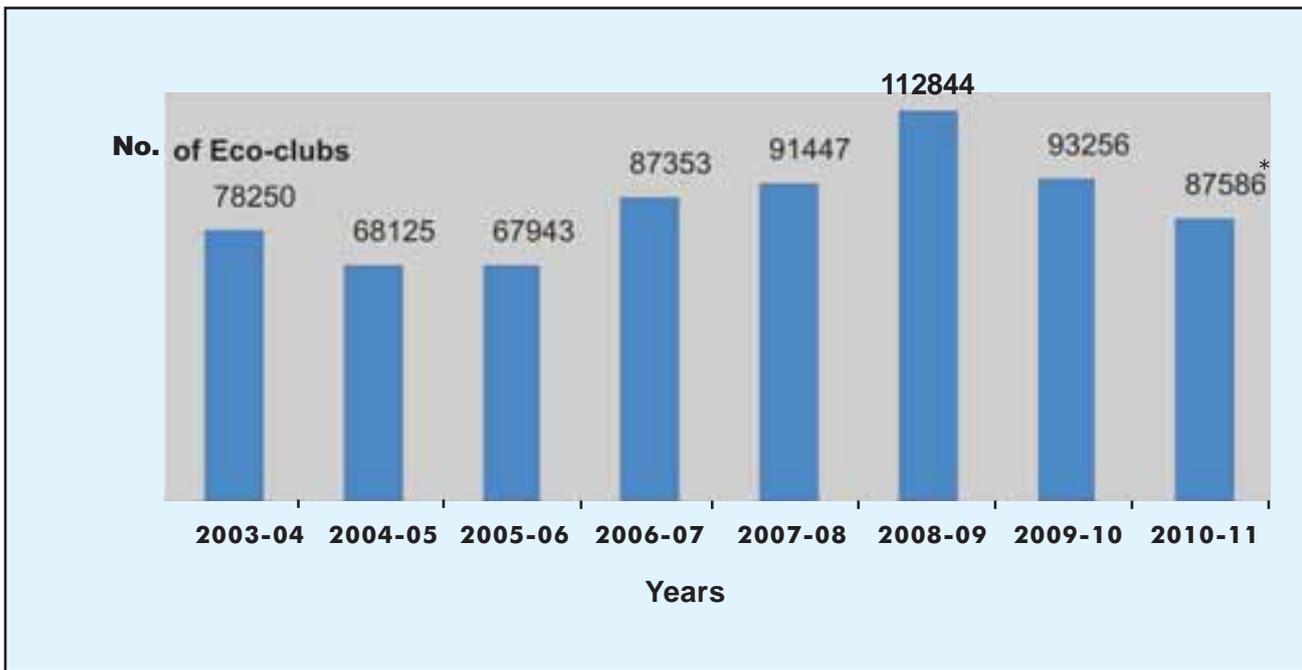
State-wise status

- Number of eco-clubs established in States / UTs since 2004-05 is given in Table-26.
- A detail of financial assistance released under the NGC programme is given in Table-27.
- Amount sanctioned under NEAC programme since 2004-05 is given in Table-28.

Implementing organisations along with details

The National Green Corps Programme is implemented throughout the country through State Nodal Agencies. A list of nodal agencies in States / UTs is at Annexure-VII. The Regional Resource Agencies help the Ministry in conducting, supervising and monitoring the NEAC activities throughout the country. The agencies assisting the Ministry in conducting the campaign in 2010-11 are given in Annexure-VIII.

The number of participating organisations in NEAC rose from 115 during 1986-87 to 12,078 during 2010-2011. (Fig-75)



*2010-11 (as on 8th February, 2011)

Fig-74. Progress made in supporting National Green Corps (NGC)

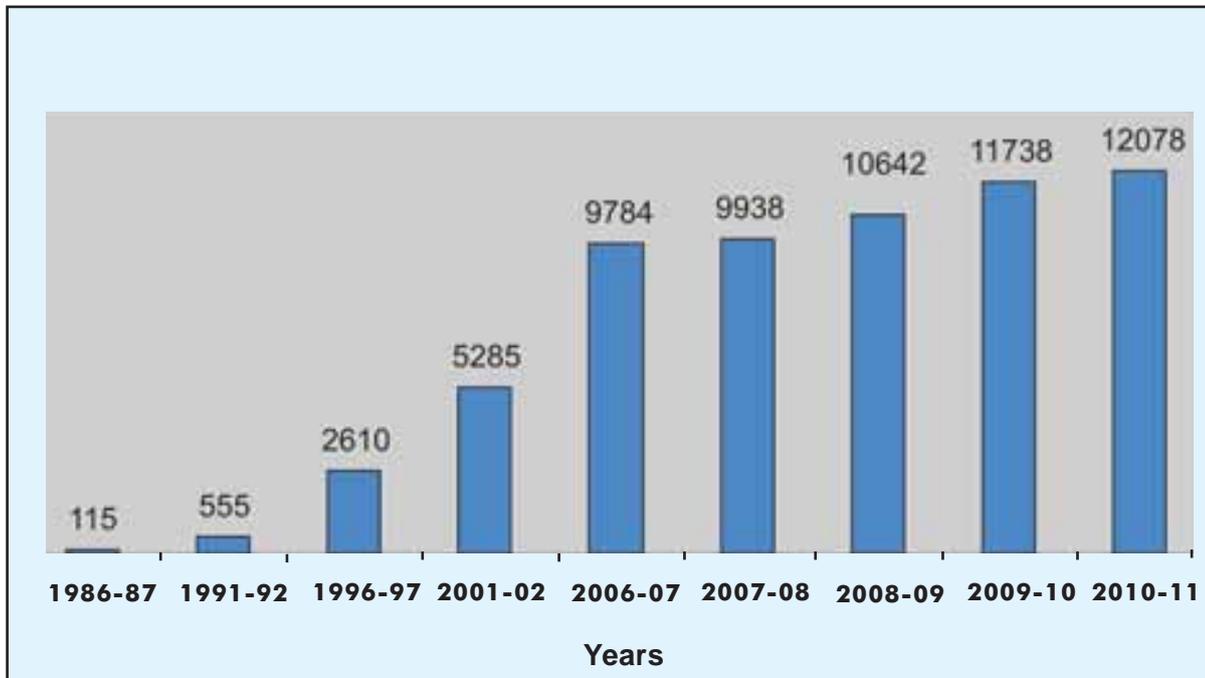


Fig-75. Participating organizations in National Environment Awareness Campaign (NEAC)

Table-26. No. of Eco-clubs established under the NGC Programme (since 2004-05)

S. No.	State/UT	No. of Eco-clubs						
		2010-11*	2009-10	2008-09	2007-08	2006-07	2005-06	2004-05
1	Andhra Pradesh	5750	5750	5750	5750	5750	3900	3900
2	Arunachal Pradesh (NE)				525			
3	Assam (NE)	5207	5207	4695				
4	Bihar	8971	8971	8473	7200		5266	5700
5	Chandigarh (UT)			115	113	112	110	
6	Chhattisgarh	3932	3932	3932	3932	4000	2373	2400
7	Dadra & Nagar Haveli (UT)							
8	Daman & Diu (UT)							
9	Delhi (NCT)	1796	1874	2000	1600	1600	1500	1500
10	Goa		500		500	500	441	300
11	Gujarat	6750	6750	6500	6500	6250	3750	3750
12	Haryana			5000		5000	2850	2750
13	Himachal Pradesh			3000		1693	1800	1800
14	Jammu & Kashmir			5500				
15	Jharkhand							3300
16	Karnataka			8000	8000			4800
17	Kerala	3500	3500	3500	3500			2100
18	Lakshadweep (UT)							12
19	Maharashtra	8905	8898	8898	8844	8844	5400	5400
20	Manipur (NE)				1350	1350		900
21	Meghalaya (NE)							
22	Mizoram (NE)		1235	1235	1235	1200	1200	1200
23	Madhya Pradesh	12500	12500	12000	12000	7200	7200	7200
24	Nagaland (NE)	2275	2227		2048	2107	800	800
25	Orissa	7500	7500	7500		5900	4500	4500
26	Puducherry (UT)			550	550		513	513
27	Punjab	5000	5000	5000	5000	4250	2550	2550
28	Rajasthan	8000	8000	8000	8000	8000	4800	4800
29	Sikkim (NE)						540	
30	Tamil Nadu	7500	7500	7500	7500	7500	4500	4500
31	Tripura (NE)			600	600	600	600	600
32	Uttar Pradesh					10747	10500	
33	Uttaranchal				1950			
34	West Bengal		3912	4750	4750	4750	2850	2850
	Total	87586	93256	112844	91447	87353	67943	68125

* as on 8th February, 2011

Table-27. Details of Financial Assistance Released to Eco-clubs under the NGC Programme (since 2004-05)

(Amount in ₹)

S. No.	State/UT	2010-11*	2009-10	2008-09	2007-08	2006-07	2005-06	2004-05
1	Andhra Pradesh	15697500	15697500	15697500	15697500	15466250	10325000	4922500
2	Andaman & Nicobar Islands (UT)			896112				
3	Arunachal Pradesh (NE)					1620929		
4	Assam (NE)	14377125	13163586	12313583				
5	Bihar	24546375	24330707	23080000	19598456		13393300	6191923
6	Chhattisgarh	10741500	10741500	10741500	10741500	10715207	6304150	2940000
7	Chandigarh (UT)			324529	322750	303338	264650	
8	Dadra & Nagar (UT)							
9	Daman & Diu (UT)							
10	Delhi (NCT)	4791182	4681243	4887587	4066733	4237079	3665134	1258491
11	Goa		1287721		1323190	1357625	1158021	353158
12	Gujarat	18372375	18395000	17745000	17712500	16750000	10082640	3289268
13	Haryana			13242978		13242978	6594998	740000
14	Himachal Pradesh			7877425		4391975	4735777	2152205
15	Jammu & Kashmir			14300000				
16	Jharkhand							3343673
17	Karnataka			18648000	23189957			1396046
18	Kerala	9450000	9447375	9439500		9119252		1221850
19	Lakshadweep (UT)							26299
20	Madhya Pradesh	34125000	34060000	32760000	32160000	20160000	19620000	8793750
21	Maharashtra	23718362	23709110	23635348	23253249	23730000	14715000	6300000
22	Manipur (NE)				3663018	3663018		450,000
23	Meghalaya (NE)							
24	Mizoram (NE)		6903750		3447500	3128200	3128300	1150814
25	Nagaland (NE)	12097125	539500		5247500	5652500	2256044	400000
26	Orissa	20474511	20228019	20275000		16100000	12235225	5250000
27	Puducherry (UT)			1519640	1477270		1301567	524973
28	Punjab	13650000	13650000	13650000	13552500	11390000	6948750	2975000
29	Rajasthan	21840000	21837661	21725002	21440000	21440000	13080000	5452540
30	Tamil Nadu	20475000	20361310	20327027	20107802	20099609	12080000	5154797
31	Tripura (NE)			1680000	1680000	1680000	1600000	735000
32	Sikkim (NE)					1025000		
33	Uttarakhand				5111829			
34	Uttar Pradesh					9683084	19100000	
35	West Bengal		10872500	13585000	12350000	12730000	7766250	4660543
	Total	244356055	249906482	298350731	236143254	226661044	171379806	69682830

* as on 8th February, 2011

Table-28. Amount Sanctioned under NEAC

(Amount in ₹.)

S. No.	State/UT	Amount sanctioned (2010-11)	Amount sanctioned (2009-10)	Amount sanctioned (2008-09)	Amount sanctioned (2007-08)	Amount sanctioned (2006-07)	Amount sanctioned (2005-06)	Amount sanctioned (2004-05)
1	Andhra Pradesh	6687600	5586000	4412000	3065000	3490500	3929000	3558500
2	Andaman & Nicobar Island	162000	114000	83000	81000	103000	57000	38000
3	Arunachal Pradesh	164000	-		152000	300000		
4	Assam	3708000	2681000	2660000	2250000	1982000	2550000	2022000
5	Bihar	6000000	4982000	3985000	3303000	3033000	4313000	2426000
6	Chhattisgarh	844000	619000	602000	734000	525000	741000	649000
7	Dadar & Nagar Haveli	-	-	12000	10000		10000	13000
8	Daman & Diu	85000	55000	59000	42000	49000	30000	17000
9	Delhi	1560000	1171000	778000	595000	751000	808000	461000
10	Goa	7000	14000	30000	26000	36000	37000	16500
11	Gujarat	4485000	3254500	1939000	2174550	1927000	1919000	1276000
12	Haryana & Chandigarh	10035500	3313000	1799000	1255000	809500	1078000	1086000
13	Himachal Pradesh	1735500	1251000	1200000	1256000	1026500	1130500	677000
14	Jammu & Kashmir	8376500	4470000	2811000	2638000	2534000	1041000	769000
15	Jharkhand	4456000	3322000	2473000	1768000	1616000	1425000	1041000
16	Karnataka	2784600	2320000	2135000	1078500	1539500	1652000	2001000
17	Kerala	2230000	1858000	1633000	1362000	1500000	1366000	614000
18	Lakshadweep						9000	
19	Madhya Pradesh	6551000	6953000	5013000	4591000	4464000	4140000	3903000
20	Maharashtra	5307500	5260000	4730000	4021000	3871000	3939000	3504000
21	Manipur	2383000	2260500	2585000	2130000	1950000	2400000	2840000
22	Meghalaya	88000						
23	Mizoram	2065000	515000	800000	430000	283000		
24	Nagaland	1339000	606000	1063000	744000	501000		
25	Orissa	8112000	7022000	4428000	3462000	3138000	2748500	3021400
26	Puducherry	571000	476000	550000	347000	264000	156000	150000
27	Punjab & Chandigarh	3536000	1755000	1415000	929000	805000	688000	602000
28	Rajasthan	3044000	2201000	1742000	1956000	1152000	1517000	1321500
29	Sikkim	507000	398000	261000	771000	806000	563400	
30	Tamil Nadu	6230300	5214000	4397000	3129000	3402500	2813000	3249000
31	Tripura	2148000	1666000	1776000	1119000	1097000	1262000	949000
32	Uttar Pradesh	10772000	8852000	6504000	5013000	5719000	5744000	4291000
33	Uttarakhand	624000	683000	565000	596000	379000	770000	349000
34	West Bengal	5881000	5046000	2942000	1739000	1576000	1766000	1280000
	Total	112479500	83918000	71992593	52767050	50629500	50602400	42124900

Note: During 2003-04 to 2006-07 amount released under NEAC for Haryana & Chandigarh was combined. From 2007-08 onwards Chandigarh is clubbed with Punjab.

National Museum of Natural History

Introduction

The National Museum of Natural History (NMNH), New Delhi, a subordinate organisation 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 regions.

Rajiv Gandhi Regional Museum of Natural History (RGRMNH) is being established at Sawai Madhopur (Rajasthan). Building Construction work is under progress at RGRMNH Sawai Madhopur and will be completed shortly. A temporary office has been set up to conduct educational and 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 allotted six acres of land, adjacent to the

Sikkim Science centre, East Sikkim, which is 12 kms from Gangtok and approachable from National Highway No.31, for the RMNH building. Possession of the allotted land has already been taken and action is being taken for getting necessary administrative and financial approvals for the establishment of this RMNH.

Progress of Activities undertaken

Educational Activities: NMNH along with its Regional Museums of Natural History organises 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 World Wetland Day, World Day for Water, World forestry Day, International Ozone Day, conservation Day, Earth Day, Environment Day, World Heritage Day, International Bio-diversity, World No. Tobacco Day, Wildlife Week, World Habitat Day and National Environmental Awareness Campaign were observed and different programmes for school children and challenged children were also organised. The Museum organises different educational activities and competitions like Quiz, Declamation, On-the-spot Painting, Poster Making, Slogan writing, Essay writing, Model making, Bird Watching and Tree-spotting for the participating students on these occasions.

Publication

NMNH and its Regional Centres published a number of publications in English, Hindi, Kannada and Oriya on the topics related to animals, plants, biodiversity and other environment related issues. As part of the programmes related to the 2010 International Year of Biodiversity, the NMNH published a Desk Calendar involving creative expressions and perspectives on bio-diversity by children of various nomadic communities such as Bhopas, Maru banjaras, Kalbelyas, Bawariyas and Gadiya lohars belonging to Rajasthan,

8

Haryana and Uttar Pradesh. The programme was arranged by NMNH in collaboration with CHINH-India at Rajiv Gandhi Patashala, Bamanvas, Jaipur. The NMNH and its Regional Museums also published posters and booklets including the Summer Programme magazine, on topics related to nature and environment.

Exhibitions

- NMNH New Delhi – An exhibition on Botanical expedition of Colombia was organised in collaboration with embassy of Colombia. The exhibition was open to public for one month from 22nd September to 23rd October 2010.

An exhibition “ Biodiversity of Western Region with special emphasis on Gujarat “was organised in Baroda University from 18th to 23rd December 2010. The exhibition highlighted the concern about sustainable development and global concern on environmental issues and Indian tradition of conservation.

- RMNH, Bhubaneswar – Exhibition on Wheels: The exhibition on wheels on the theme “ Forest Wealth” travelled to different places like Nandankanan Zoo, Nilagiri and Bahanaga of Balasore, Power grid all Odisha science festival of Khorda Zilla Lok Utsav, Gopalpur, Anjali National Children’s Festival, Demonstration Multipurpose school of Regional Institute of Education, and Bhagvatdev Vidya Peetha, Jankia for the benefit of students, tourists, visitors and villagers. More than 98,389 visitors visited the mobile exhibition van and gathered information on forest wealth.
- Cartoons for climate exhibition: The museum in association with British Council & CEE organized an exhibition titled “Cartoons for Climate” from 16th February 2010. About 25 prize winning cartoons from Greece, Syria, Croatia, Thailand, France, Delhi, Gujarat, Andhra

Pradesh, Maharashtra, Chennai, Karnataka, Madhya Pradesh and West Bengal are on display in the museum.

A new gallery depicting Biodiversity of North East region is ready for inauguration.

- RMNH, Bhopal-Scrap Book Exhibition – RMNH-Bhopal organized a temporary Scrap Book Exhibition in collaboration with Dainik Bhasker Media Group/DB Corp.Ltd. on July 13, 2010. 500 Scrap Books were displayed in this exhibition. 681 public visited that exhibition. The aim of the exhibition was to inform and educate kids on environmental topics like global warming and water conservations.

A Temporary Exhibition on House Sparrow: A temporary exhibition inaugurated on House Sparrow on 20th March 2010 as a part of International Biodiversity Year 2010 was kept open for public upto 28th March 2010. This simple exhibition drew the public attention.

- RMNH, Mysore – A travelling exhibition on biodiversity of Western Ghat is being organised and ready for inauguration as a part of celebration of International year of Biodiversity

Workshops/Conference/Seminars

- NMNH, New Delhi – A three day workshop for trainee teachers from B. El. Ed in the Department of Elementary Education of Mata Sundri College for Women (University of Delhi) on the theme “Using Museum Resource for Teaching Environmental Science was organized from 11th to 13th August 2010.
- To commemorate National Education Day (11th November) an orientation workshop for trainee teachers of early childhood care & education at Khazani women’s polytechnic Delhi was organised to enrich teachers in making of low cost science models.

- RMNH, Mysore – National Seminar on “E.K. Janaki Ammal and her contribution to Indian Science” Organized by National Museum of Natural History, New Delhi through Regional Museum of Natural History, Mysore in collaboration with Govt. Brennen College, Malabar Botanical Garden & Kerala Shastra Sahitya Parishad on 4th November 2010. A painting competition was also organised in the memory of Dr. E.K. Jankai Ammal for the all age group of children at her birth place Thalassery on 31st October 2010.
- RMNH, Bhopal – A workshop on Young Climate Savers (YCS) on August 17, 2010 was organized in collaboration with W.W.F. in RMNH, Bhopal. There were 60 participants including teachers and students from 20 YCS schools participated in the workshop.
- Seminar on Ecological Traditions of Orissa – A one day seminar on Ecological Traditions of Orissa was organized on 26th February 2010 in association with CPR Environmental Education Centre, Chennai.

Meetings of the Advisory Committee

- RMNH Bhubaneswar: The first sub committee meeting of the Advisory planning Committee of the RMNH Bhubaneswar was held on 9th August 2010 in the museum under the chairmanship of Prof. H.N. Das. The meeting discussed various developmental activities of the museum including review of progress of work of CPWD to be undertaken during the year on priority basis.
- RMNH Bhopal: Under the chairmanship of Dr. Ram Prasad, the 18th Advisory Planning Committee meeting was arranged at the RMNH, Bhopal on 8th April, 2010.

Collaborative Programme

- NMNH New Delhi: A three day workshop in collaboration with CHINH INDIA TRUST on “Growing up with Biodiversity” – A Media Literacy Project with children and young people was held from 26-28 July 2010. The children of Delhi and NCR participated in the programme to celebrate International year of Biodiversity with children. The films made by the children were on the website of Chinh Web Channel www.chinh.in.
- NMNH in collaboration with Hindustan Times organized annual Inter-school essay writing competition. The winners of the competition were taken to Yamuna Biodiversity Park, Delhi for Nature Study Tour.
- RMNH Bhopal-organised the activities of “Museum school “ in collaboration with NGO- Parvarish.
- RMNH Bhubneshwar- 13th Orrisa Vigyan congress –The Indian science congress association (Bhubneshwar chapter), the Orrisa environmental society and the RMNH Bhubneshwar collaboratively organise the 13th Orrisa Vigyan Congress from 9th to 11th December 2010 on the focal theme of “ New Frontiers of Life Science”.



Fig-76. Nature Study Tour for the Winners of NMNH-HT PACE Essay Writing Competition at Yamuna Biodiversity Park

- The museum in association with Centre for Environment and Development Human Development Foundation, Odisha organized Odisha Environment congress from 22nd Dec. to 24th December 2010 with the focal theme "Water Resources of Odisha: Reflections for the 21st Century" with the open session "Water for Future". The congress was inaugurated by Shri. Naveen Patnaik, Hon'ble chief Minister of Odisha in the presence of Shri. Debi Prasad Mishra, Hon'ble Minister, Higher Education, Culture and Tourism, Shri. Rajendra Singh, Magssassay Awardee.
- Capacity Building Programme for field Officers and research fellows –RMNH in collaboration with Nandan Kanan Zoological Park organised a capacity building programme on elephant management and tranquilization technique.
- Bhubaneswar CMS vatavaran: The Regional Museum of natural history in association with CMS Environment organized CMS Vatavaran Environment and Wildlife Film Festival and Forum 2010 from 30th November to 5th December 2010. During the festival besides selected film screening daily, painting competition, eco-tour, waste craft competition, creative expression competition, clay modelling competition and workshop for teachers on low carbon practices and a panel discussion on confronting climate change towards carbon neutral cities was organized during the festival

World Environment Day

- World Environment Day and the 32nd Anniversary of the NMNH Foundation Day were

observed on 05 June, 2010. The function was organized at the Plenary Hall of Vigyan Bhawan, New Delhi. Ex. President of India Dr. A.P.J. Abdul Kalam was the Chief Guest at the function. Ms Ishita Vishnoi a student of class Xth New Delhi from St. Thomas School Mandir marg New Delhi was decorated by the Ex. President as the Young Environmentalist of the year 2010. The function was great success.

Earth Day

- On the occasion of Earth Day a National Level "Written Quiz Contest" was conducted in NMNH New Delhi and its regional centres at Mysore, Bhopal, Bhubaneswar and Swai Madhopur on 22nd April 2010 for the students of class IX & X to select the candidate for the Young Environmentalist of the Year Award-2010". The theme of the contest was "Our Rich Biodiversity".

Van Mahotsava 2010

- NMNH, New Delhi - Van Mahotsava 2010- A special programme ("Importance



Fig-77. Former President Dr. A. P. J. Abdul Kalam giving Young Environmentalist Award for the Year 2010



Fig-78. Museum Gallery Interpretation for underprivileged students at NMNH, New Delhi

of plants” in the network of Nature through the exhibits of photosynthesis, food chain, Man & Nature, Two faces of forest, etc.) was organised for the under privilege children of Salam Balak Trust (NGO) also an out reach programme “make birds and animal shape out of clay” for specially challenged children of Anchal NDMC School for Mentally Retarded and Hearing Impaired Was organized.

- RMNH, Bhubaneswar – Van Mahotsav celebration in the museum: The museum celebrated Van Mahotsav on 7th July through planting of sapling of 50 different species in the campus.

Summer Nature Study Programme

- NMNH New Delhi- The summer vacation programme was organised from 15th May to 29th May 2010 for the student of class VII to X (green teens) and for the student of class Vth to VII (green cubs) in which 60 student from all over Delhi & NCR participated. The programme included Lectures, Slide/CD presentation on our rich biodiversity, working with microscope, nature photography contest, art out of clay on potter’s wheel, preparation of nature magazine and nature study tour to Botanical Garden Noida etc.

- RMNH Mysore- Summer programme: Green teens organised for the class 8-10 students from 13th to 27th May 2010. Summer programme Green Cubs organised for the class 5-7 students from 13th to 27th May 2010. The participants of Green Teens were taken to nature camp Nagarahole National Park for study of nature and wild life.

- RMNH Bhopal- RMNH, Bhopal organized a summer vacation programmes from 10th May to June 5th, 2010. Prof. Dr. Nisha Dubey, Vice Chancellor, Barkatullah University Bhopal was the Chief Guest while Dr. D. P. Sharma, Former Vice-Chancellor, Barkatullah University, Bhopal presided the valedictory function and gave away the prizes.

- RMNH Bhubaneswar- The Summer Vacation Programme was held from 5th May to 14th May 2010 for two groups i.e. Green Teens (Std. VIII-X) & Green Cubs (Std. V-VII). A total of 30 students with 15 each participated in the programme. The summer camp was organized for nine days with various in-house and outreach educational activities. Students were exposed to the rich biodiversity of Orissa.
- RMNH Swai Madhopur- Summer vacation programme Green Teens of class (8th -10th) Green cubs of class (5th-7th) was organised from 13th to 27th May 2010. The participants were taken to Ranthambore National Park for study of nature and wild life.

International Ozone Day

- NMNH New Delhi- A declamation contest was conducted for students of Delhi and NCR on 16th September 2010. The topic of the contest was “Save the Ozone Layer: Ozone Friendly Planet, Our Target”.

- RMNH Mysore-A painting competition and a lecture was organised for the school children in collaboration of Geetha Shishu Shikshana . Geetha school, Mysore .Lecture on Ozone was delivered by Dr.H.N. Visvanathan, Professor, Department of Education,Sharda Vilas Teacher college, Mysore.
- RMNH Bhubaneswar- A two days orientation programme for Teachers-in-charge of eco-clubs, Khurda district was organized on 15th & 16th September 2010 in association with Centre for Environmental Studies, Forest & Environment Deptt, Govt. of Orissa. Presentation and discussions were held on the topics like Climate Change & Ecosystem, Green House Effect, Energy Audit, Strengthening NGC programme, Eco Club-School to village approach, Role of Eco Club in awareness generation, Medicinal Plant Conservation, Understanding Biodiversity, Collection, Preservation & documentation for understanding biodiversity etc. About 100 teachers of eco-clubs schools of Khurda district participated in the programme. Programme concludes with distribution of certificates to the participants.

Wildlife Week

- NMNH New Delhi- The best entries were invited from the student of Delhi and NCR "Paint Nature and Wildlife" for students of class IIIrd to VIIIth and Design a Poster for students of class IX to XII. The theme of the contest was "Our Diverse Wildlife".
- RMNH Mysore- A painting Competition was organised for the rural school students from 6th to 9th October 2010.The selected prize winners were taken to Chamarazendra Zoological Garden Mysore as field visit to study wild animals in captivity.
- RMNH Swai Madhopur A painting

competition was organised in the scout ground in Sawai Madhopur for the student of class.

National Environment Awareness Campaign (NEAC)

- NMNH New Delhi-NMNH New Delhi organised a written quiz contest for the student of class IX & Xth on 19th November 2010.

A two day special programme of "Orientation to the children to the concept and issues of Environment and biodiversity through Museum resources and Nature Walk was organised on 28th & 30th November 2010 for under privilege children of Khushi Centre for Rehabilitation and Research (NGO).

- RMNH Mysore-The RMNH Mysore organised various competitions like Painting, Elocution and written quiz competition for primary, Higher Primary and High School students.
- RMNH Bhopal- RMNH Bhopal organised written quiz competition on the theme biodiversity for the student of class 9th and 10th on 19th November 2010 and essay writing competition for the student of class 11th and 12th on 26th November 2010 .The winners of the quiz competition and essay writing competition were taken to nature camp at Patchmarhi from 8 to 10th December 2010.

Regional Museum of Natural History (RMNH), Bhopal organized a Poster Design Contest for hearing impaired students on November. The theme of the contest was 'The State Animal and Bird of M.P.'. Ninety two hearing impaired students participated from four schools of Bhopal.

Special programme for Specially Challenged children

- NMNH New Delhi-Essay writing in Braille,

declamation contest for visually challenged student's nature painting competition for hearing impaired physically challenged and mentally challenged will be organised in the month of February.

- To commemorate "International Day for Disabled " (3rd December) an outreach programme for specially challenged children were conducted at Handicapped Welfare Federation, and Institute for the Blind New Delhi.
- RMNH Bhubaneswar- Conducted a special programme for visually challenged children was conducted on 4th September 2010 at Hellen Keller School for Blind, Berhampur. The museum has organized special programme for hearing impaired on 6th August 2010 in the museum. The programme included exposure visit to the museum galleries and competitions like clay modelling, sand art, craft and painting. About 80 students from BBC school for the Deaf and Shree Harsha Mishra Memorial School participated in the activities.
- RMNH Mysore-Quiz competition ,Singing competition, clay modelling competition and painting competition will be

organised on for the primary and higher primary students.

Reserve collection enrichment in museum

- RMNH, Bhopal - The museum has obtained the distinction of having largest skeleton of a 47.3 ft dead baleen whale washed ashore on Gopalpur Beach, Berhampur on 29th June which was processed for retrieval of its skeleton for display, education and research in the museum. A dead specimen of Sarus Crane (41/2 ft) was collected from Nandankanan Zoological Park on 9th April 2010. Dead specimen of Silver pheasant was collected from Nandankanan Zoological Park on 12th April 2010.

Film shows

- Regular film shows were arranged for visitors in National Museum of Natural History, New Delhi and its Regional Centres at Mysore, Bhopal and Bhubaneswar to sensitize and create awareness among general visitors on issues of nature and environment.

Forestry Education, Training and Extension

The present system of forestry education and training is tailored to produce skilled forest managers to manage, protect and conserve the forests in consonance with National Forest Policy, 1988, forestry action programmes etc. The activities related to forestry education, training and extension are performed by the different institute of the Ministry like Indira Gandhi National Forest Academy (IGNFA), Dehradun; Directorate of Forest Education (DFE), Dehradun; ICFRE, Dehradun; IIFM, Bhopal; IPIRTI, Bengaluru.



Fig-79. Outreach Programme for Physically Challenged Children organized by NMNH, New Delhi

Progress of activities undertaken by various institutes

Indira Gandhi National Forest Academy (IGNFA), Dehradun

Indira Gandhi National Forest Academy is the training centre for IFS Officers. The institution undertakes training of new recruits to the Indian Forest Service which is spread over a period of twenty months. Besides this, the institution also undertakes training of IFS Officers at various years of seniority and also of other Stakeholders. The Academy was a part of FRI in Dehradun. This institution earlier functioned as Indian Forest College from 1938-1987. In 1987, when the Indian Council of Forestry Research and Education (ICFRE) was established as an autonomous institution, the Indian Forest College was named as Indira Gandhi National Forest Academy (IGNFA) in recognition of the late Prime Minister to the forestry sector in the country. The IGNFA functions as an institution directly under control of the Ministry.

Activities during the year

Mid Career Training Programme

- Started in the year 2009-10, the Academy this year has conducted three Phase-IV Mid-Career Training Programmes for Indian Forest Service Officers of 16-18 years service, two programmes of Phase-V for Officers of 26-28 years of service, while one Phase-III programme for Officers of seven to nine years of service would commence on 31st January, 2011 and one Phase-V programme would commence in March, 2011.

The Convocation of 2008-10 batch

- The 2008-10 batch of Indian Forest Service Officers passed out in August, 2010. The Convocation Ceremony was held on 8th August, 2010, in Convocation Hall of FRI building. The Chief Guest for the function was the Minister for Corporate

Affairs and Minority Affairs Shri Salman Khursheed presided over by Dr.P.J.Dilip Kumar, Director-General and Special Secretary, MoEF. A new feature of this year was the award of 'Hari Singh Fellows' to seven shortlisted probationers for pursuing specialization in wildlife.

Coordination Training Programmes

- During the year, IGNFA undertook three coordination training programmes for the three All India Service Officers. The four days' training programmes for IAS, IPS and IFS Officers included one day field visit to Rajaji National Park. These training programmes were conducted between July, 2010 to January, 2011 and were well received.

New batch 2010-11 of IFS trainees

- The intake to the Indian Forest Service over the last 10 years had been ranging between 25-30. However, since the current year the intake has increased and the new batch of IFS probationers of 2010-12 course consists of 76 young officers.

Teaching of Wildlife & Biodiversity Conservation

- Keeping in view the need for enhanced inputs on wildlife conservation to IFS probationers, the syllabus of Wildlife and Biodiversity subjects was revised and training of IFS probationers with increased inputs on wildlife conservation started in this current year. A net increase of 72% in the inputs on the wildlife management has been effected through revision of the syllabus.

Induction Training

- Induction training of forest officers inducted into the Indian Forest Service by promotion from State Forest Service was conducted in the month of September to November in which 15 officers participated.

Reunion of Old batches

- Two reunion workshops for the retired forest officers who underwent training in this institute during 1960-62 and 1981 were held in the Academy in April and August, 2010. In these workshops, the old retired officers interacted with the young IFS probationers and shared their past experience and knowledge.

Training of members of Higher Judiciary and Indian Revenue Service Officers

- A three day sensitization course members of higher judiciary was held in the month of December, 2010 in which 23 members from various parts of the Country participated. The training was well received. One four day orientation course for Indian Revenue Service Officers is scheduled to be held in the month of March, 2011.

Memorial Lectures

- Kirti Chakra Late P. Srinivas Memorial lecture was organized on 10th November, 2010. Shri A.K. Singh, PCCF Jharkhand delivered the lecture. Sanjay Singh Memorial lecture is scheduled in Feb. 2011. Hari Singh Memorial Lecture was held on 11th December, 2010 which was delivered by N.S.Adkoli, IFS(Retd.).

Directorate of Forest Education (DFE), Dehradun

Introduction

The Directorate of Forest Education (DFE) under the Ministry is responsible for imparting professional/technical training/education in the Country to the State Forest Service (SFS) Officers and Forest Range Officers (FROs). The Directorate also supplements the efforts of Forest Training Institutes of various States for the training and capacity building of the Forest Frontline Staff (Deputy Rangers, Foresters and Forest Guards) through the respective Forest

Training Institutes. There are three Academies and One College under the Directorate and the names and intake capacity (Per batch) of these academies and colleges are as under.

- Central Academy for State Forest Service, Dehradun 40
- Central Academy for State Forest Service, Coimbatore 40
- Central Academy for State Forest Service, Burnihat 40
- Eastern Forest Rangers College, Kurseong 30

Objectives

- To cater to the training needs of SFS Officers and 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 supplement the efforts of State Governments in the training of Forest Frontline Staff (Forest Guards, Foresters and Deputy Rangers)

Activities undertaken/ achievements during the year

- Induction training in the form of “Two year Diploma Course” for the newly recruited State Forest Service (SFS) Officers of various States/Union Territories has been undertaken. Two batches, (Course 2009-11) & one batch (Course 2010-12) of newly recruited SFS Officers are undergoing training at Central Academy for State Forest Service (CASFOS), Dehradun & Coimbatore.
- One batch, Course (2008-2010) of newly

8

recruited SFS officers passed out from CASFOS, Dehradun.

- Induction training in the form of “Eighteen months certificate course” for the newly recruited FROs of various states/Union Territories has been undertaken. Two batches, (Course 2010-11) & one batch (course 2010-12), are undergoing training at CASFOS, Coimbatore & Burnihat.
- One batch of newly recruited FROs (Course 2009-10) passed out from CASFOS, Burnihat.
- Five General Refresher courses, each of two week duration, were conducted for in-service SFS Officers at CASFOS, Dehradun and Coimbatore.
- Two General Refresher courses, each of two week duration, were conducted for in-service SFS Officers at CASFOS, Coimbatore and Burnihat.
- Four Computer Application courses in Forestry, each of two weeks duration, were conducted for in-service SFS Officers/FROs at CASFOS, Dehradun/Coimbatore/Burnihat and Eastern Forest Rangers College (EFRC), Kurseong.
- Eight Workshops each of one week duration on Forestry prospective in Global warming and climate change/ Soil conservation and watershed Management /Bio-diversity Conservation and Eco-Tourism/Human Resource Management Issues in Forestry/Wildlife Management/ Training of Trainers/Policy & Legal Issues, were conducted for in-service SFS Officers/FROs at CASFOS, Dehradun/Coimbatore and EFRC, Kurseong.
- One theme based course in Forestry/Wildlife management of two weeks duration for in-service FROs was conducted at EFRC, Kurseong.
- Seventy Nine General Refresher Courses,

each of two weeks duration, were conducted for in-service Forest Frontline Staff (Deputy Rangers, Foresters & Forest Guards) through 49 Forestry Training Institutions of 29 states.

- One Theme based workshops of one week duration was conducted for in-service FROs through State Forest Training Institute.
- Three weeks Orientation Course for ACFs of Uttarakhand Forest Department conducted at CASFOS, Dehradun.

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 28 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 CAPS – Communication and Presentation Skills, Ecotourism – Assessment and Development, Latest Concepts of Formulation and Usage of the Management Information System, various Applications and their Adaptations to the Forestry, Sharing of Experiences in Wildlife Management in Assam, Effective Leadership and Conflict Resolution, Collection, Compilation, Validation and Dissemination of Forest Statistics, Financial Management & Audit Sensitization, Ecotourism, GIS: A Decision Tool for Forestry Planning & Management, Good Governance, Enhancement of Livelihood Security through Community Participation, Illegal Trade in Wildlife and its Protection Strategies: Intelligence Gathering, Anti-Poaching Strategies and the Role of Wildlife Forensics in Dealing with Wildlife Crimes, Management of Change in the Forestry and Wildlife Sector, Development of Afforestation/Reforestation Clean Development Mechanism Project with

Special Reference to Baseline Data Collection, Water Conservation and Rain Water Harvesting, Forest Research Methodologies Conservation and Development of Medicinal Plants and Benefit Sharing with Local Communities, Forest Certification, Prevention, Detection and Investigation of Wild Life Crimes, Forest Tribal Interface, Integrated Approach for Sustainable Development of Fragile Desert Ecosystem, Environmental Economics and Accounting, Micro Management in Forestry Sector, Bamboo Resource Development for Addressing Livelihood Concerns of Communities, Ecotourism and Habitat Management, Train The Trainers (TTT), Micro-Credit and Micro-Enterprise Management in Forestry, Community Participation, Resource Augmentation & Value addition in NTFP Sector etc. Besides this, IFS officers will also be sponsored to pursue long-term training courses in the areas of interest offered by premier institutions of the country.

Besides this, six IFS officers have been sponsored to pursue long-term courses offered by the Indian Institute of Management (IIM), Bengaluru and Indian Institute of Public Administration (IIPA), New Delhi.

During the year, the Ministry sponsored 18 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.

Participation in the training courses/training workshops has been satisfactory.

The Budget allocation during 2010-11 of this scheme was ₹2.00 crore (Plan).

Capacity Developmental Forest Management and Training of Personnel

This is an externally aided component

aimed at improving training of frontline forestry force. This component will be in a project mode with financial support from JICA. The total cost of the component is Rs.225.00 crore for a period of five years. The loan component is of Rs.206.00 crores and the rest is Central Plan component. The Project will be initially implemented in nine States namely Assam, Bihar, Chhattisgarh, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Uttarakhand, and West Bengal. There are three buffer states namely Mizoram, Arunachal Pradesh and Manipur. The states have been selected based on certain criteria, including non-existence of any external aided project in the forestry sector in the concerned state and paucity of training infrastructure, during the project development stage.

For implementing this component there will be a Steering Committee and a Central Project Monitoring Unit (CPMU) in the Ministry and a State Project Monitoring Unit (SPMU), one in each implementing State. The central PMU would release/reimburse funds to implementing States for their Annual Plans of Operation. The CPMU would utilize funds for activities such as Master trainings, consultancies and monitoring, etc. The proposal has two major objectives:

- To strengthen infrastructure of the forestry training schools of SFDs by:
- Improving existing State Forest Training Schools (SFTs)
- Establishing new training schools in those States that do not have one.
- To strengthen training of frontline forestry personnel through:
- Syllabus revision
- Building up a pool of Master Trainers/Trainers
- Training of frontline forest force in the States

Indian Institute of Forest Management (IIFM), Bhopal

The Indian Institute of Forest Management (IIFM), Bhopal as a sectoral management institute and an autonomous institute of the Ministry imparts education and training in forest management. The Institute offers two academic programmes. Post Graduate Programme in Forestry Management (equivalent to Masters Degree) and Fellow Programme in Management. The Institute is also recognized as Nodal Centre for Research by Forest Research Institute, Deemed University (FRI), Dehradun for Doctoral programmes.

Post Graduate Diploma in Forest Management (PGDFM)

The two year postgraduate programme leading to the award of the Post Graduate Diploma in Forestry Management (PGDFM) was launched in July 1988. The students with diverse academic backgrounds drawn from all over the country are groomed to meet the managerial requirements of the corporate and development sectors. The structure of the programme has been designed to ensure that the skills acquired are put in application during the course itself. The programme is designed to produce young managers who are sensitive to both natural and social environment.

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. To address changing needs of the sector, the PGDFM programme was made broad based by introducing three major specialisations in Conservation and Livelihood Management (C&L), Environmental Management (EM) and Development Management (DM).

The 22nd batch of the PGDFM course (PGDFM 2009-11) consists of 72 students. Among these 47 come under General Category; 11 belong to SC category; five

belong to ST Category; seven belong to OBC and rest two are admitted under PD quota. The batch also consists of 25% female students and they all come from almost all the parts of the country. Following the general trend in the management education, in this batch also the engineers is the dominant group, consisting almost 50% of the total strength. This is followed by the students of Science stream (25%), Arts (8%), Commerce (6%), Veterinary graduates (4%) and Management graduates (7%). The profile of the students reveals that they exhibit varied range of extra curricular interest and talent.

All the students of PGDFM being passed out in March 2010 got placed through campus recruitment held during January 2010 registering an improvement over the last year's campus placement. The Institute received overwhelming response for the Summer Internship for the PGDFM 2009-11 batch.

Fellow Programme in Management (FPM)

The Institute launched its Doctoral level Fellow Programme in Management (FPM) 2010-14. The Fellow Programme in Management (FPM) offers financial assistance and contingency grants to selected non-sponsored candidates. The programme is open to postgraduates from various disciplines and is designed to provide specialized knowledge, skills, and attitudes for positions requiring conceptual and visioning skills. The FPM programme aims to develop and equip students for career opportunities in management education and research.

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.

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 focus of these programmes is on evolving, analyzing and synthesizing various management techniques/tools, ideas and concepts relevant to the forestry and allied sector.

Consultancy

The Institute completed three consultancy assignments and five more are in progress during the year 2010-11.

Publications

The Institute continues to disseminate its research findings to the larger audience through publication of research papers in reputed journals, books etc. The faculty also participated and presented research papers in national and international conference.

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

Training is an important tool to facilitate the industries for efficient utilization of man power resources, increase the productivity and reduce the overall cost of production. HRD needs of the mechanical wood industries are met by the Institute by conducting one year post graduate diploma course and short term vocational courses. Training enhances the professional competency of managers, supervisory staff and industrial workers. IPIRTI is the only training institute of its kind in the country in the field of mechanical wood industries.

Post Graduate Diploma Course in Wood and Panel Product Technology

Twenty one Trainees of PGD Course (21st Batch) have successfully completed the course

and got 100% placement in Plywood and other Wood based industries. Twenty second Batch PGDC course was commenced on 8th November, 2010 with 22 candidates.

Training Courses conducted

- Training Course on "Testing of plywood and block board" was conducted at IPIRTI Centre, Mohali during 5th - 9th April, 2010.
- Training course on "Resin manufacturing course" was conducted at Field Station Kolkata during 19th - 23rd April, 2010 and 26th - 28th April, 2010
- A Special Training course on "Saw doctoring" was conducted at IPIRTI Bangalore from 24th - 26th April, 2010
- Training Course on "Retention of preservative chemicals" was conducted at Field Station Kolkata from 17th - 21st May, 2010
- One Special Training course, sponsored by MOEF, was conducted for senior IFS officers from various states of India.
- One training course was conducted for M.Sc. students in Wood Science & Technology from Kannur University.

8



Fig-80. Training course on "Veneer Manufacturing" was conducted for the candidates by Indian Plywood Industries Research and Training Institute, Bengaluru

- Five day Training Programme on Bamboo based housing system for the Master trainers was conducted during 9th August to 13th August, 2010 at IPIRTI, Bangalore sponsored by Institute for Vocational Education and Training (IIVET), IGNOU, Shillong, Meghalaya.
- Three months training programme on “Plywood manufacturing technology” was conducted for 8 candidates during July – Sept, 2010
- A Special Training course on “Testing of Plywood & Block Board” was conducted at IPIRTI Centre, Mohali during 5th – 9th July, 2010 at IPIRTI, Centre at Mohali.
- A Special Training course on “Particle board Quality Control” was conducted for 10 candidates sponsored by M/s. Hallmark Ltd., during 11-13th August, 2010 at IPIRTI, Bangalore.
- Short Term Training Course on “Block board and Flush door manufacturing” was conducted for six candidates sponsored by Industries during 13th to 16th December, 2010.
- Two training courses were conducted for the candidates from Kenya and Nepal

Extension

Long Span Bamboo Trusses for Industrial Shed (Biomass Plant)

A bamboo shed of size 25' X 45' has been constructed for Bio mass plant near Hosur for M/s. Pointec Pvt. Ltd. Technology including design was provided by IPIRTI. IPIRTI-TRADA walling system has been used. For the first time, 25' span bamboo trusses were designed for this purpose. BWP grade plywood gussets were used in trusses.

Patent

A Patent (No. 242299) has been granted by the Patent Office, Government of India to IPIRTI, Bangalore for an invention entitled “A Process for the manufacture of Bamboo Mat

Moulded Skin Board for Door” on 23rd August 2010 through NRDC, New Delhi.

Wildlife Education and Training

Wildlife Institute of India (WII)

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 as follows:

Academic and Training

Courses and Training Programmes

- XII M.Sc. (Wildlife Science) Course, A total of 11 candidates (nine Indians and two foreign nationals) joined the course. Besides, classroom teaching of III semester, the students were taken for the field visits, such as High Altitude Ecology and Techniques tour to Kedarnath Wildlife Sanctuary from 27th April, 2010 to 6th May, 2010; Captive Breeding & Wildlife Utilization – tour for training workshop at Delhi & Agra during 27th-31st July, 2010; and Wildlife Management & Conservation Practice tour to Southern India (Tamil Nadu & Kerala) tour from 24th September, 2010 to 16th October, 2010. The students have been allotted the dissertation topics for their field work.
- XXXI Post-Graduate Diploma Course in Wildlife Management, 1st September, 2009 to 31st May, 2010. The Course commenced on 1st September, 2009 for duration of nine months with a total of 11 participating officer trainees of the rank of DCFs/ACFs and equivalent ranks from different States within India and from abroad. A 2-month Modular Training Course on 'Integrated Wildlife

Management Planning' (1st April, to 31st May, 2010) was organized for lateral entrants. Management Planning exercise tour was conducted at Kanha Tiger Reserve. The officer trainees were awarded the P.G. Diploma in Wildlife Management on their successful completion of the course.

- XXXII Advanced Post-Graduate Diploma Course in Wildlife Management, 1st September, 2010 to 30th June, 2011. The 10-month Advanced Postgraduate Diploma Course commenced on 1st September, 2010. This is the first Diploma Course with the increased duration of 10 months from the earlier duration of nine months. A total of 20 Officer Trainees of Assistant Conservator of Forests/Deputy Conservator of Forests & equivalent, including 19 from India and one from Nepal joined the course. This is the first Diploma Course when seven IFS Probationers gave joined directly after completing their training at the Indira Gandhi National Forest Academy, Dehradun as 'Hari Singh Fellows'.

After the inaugural session, the officer trainees were taken to a bird-watching trip around the WII Campus followed by a visit to the Rajaji National Park. The orientation tour took place during September 25-30, 2010 at Chilla in the Rajaji National Park. It familiarized the officer trainees to the Shivalik landscape and issues related to corridor management, people-park interface, 'Gujjar' relocation and mass tourism.

- XXVI Certificate Course in Wildlife Management, 1st November, 2010 to 31st January, 2011. The XXVI Certificate Course in Wildlife Management commenced on 1st November, 2010 for three-month duration. A total of 15 Indian and four foreign nationals, i.e. one each from

Vietnam Nepal, Bhutan and Bangladesh have joined the course. The officer trainees were taken to Chilla, Rajaji National Park for their Orientation-cum-Techniques tour from 22nd November, 2010 to 3rd December, 2010.

Meetings, Workshops, Seminars and Conferences

- 30th Annual Symposium on Sea Turtle Biology and Conservation, Goa, 24-30 April, 2010 was held at Panaji. It was for the first time that the symposium was held in South Asia region. Nearly 400 people from across the globe attended the symposium and included more than 100 talks and 250 poster presentations. The Wildlife Institute of India had a major presence at the symposium and a stall was put up where the Institute's two decades of sea turtle research were displayed. During the course of the symposium five oral and three poster presentations on WII's sea turtle research activities dealing with different aspects were made.
- Second Meeting of the Global Biodiversity Information Facility (GBIF) India Nodes, Dehradun, 3rd May, 2010 was held in the Institute. Thirteen participants from seven organisations participated in the meeting. The Chairman informed that MoEF has designated five nodes for dealing with all matters relating to development of bioinformatics in India.
- GBIF Workshop on Biodiversity Data Discovery and Publishing, Dehradun, May 4-7, 2010. Global Biodiversity Information Facility (GBIF) was established March 2001, as an open ended international coordinating body to promote compilation, linking, standardization and dissemination of world's biodiversity data in form of distributed open access system, within an

8

appropriate framework for property rights and due attribution. Wildlife Institute of India has been designated as the Coordinating Agency for GBIF activities in India. The workshop is the first of the series workshops to be held in collaboration with GBIF. Thirty two participants from 10 different national and international institutions participated in the workshop. The workshop focused on the following : (i) Developing institutional data recovery and mobilization strategy; (ii) Digitisation of primary biodiversity data; (iii) Biodiversity Data Standards and Protocols; (iv) Introduction to GBIF-IPT; (v) IPT and publishing of biodiversity data; (vi) IPT requirements and base technologies; (vii) IPT customisation, expansion and internationalization; (viii) IPT demonstration; (ix) Introduction to Darwin Core; and (x) Addressing social, political and intellectual property barriers inhibiting data recovery and mobilization followed by hands on practical session.

- **GBIF-Asian Nodes Regional Meeting and Biodiversity Informatics Workshop, Dehradun, 28-30 June, 2010.** The Global Biodiversity Information Facility Secretariat (GBIFs) in collaboration with the Wildlife Institute of India (WII) organized the Regional Meeting and Biodiversity Informatics Workshop. The meeting was chaired by Mr. Pando Francisco (GBIF NODES Chair). Representatives from University of Tokyo (Japan), Korea Institute of Science and Technology Information (South Korea), Wildlife Institute of India (India), Asian Centre for Biodiversity (Phillippines), Biodiversity Research Centre (Chinese Taipei), ICIMOD (Nepal) and BioNet-EASIANET (Mongolia) participated in the meeting. The GBIF secretariat was represented by Mr. Juan Dello and Dr. Vishwas Chavan. The participants discussed the following: (i) Regional

priorities and targets; (ii) Requirements/opportunities for the implementation of the Regional Action Plan; (iii) Mechanisms to improve the regional coordination, communication, collaboration, and participation; (iv) Suggestions on how to streamline the structure and functioning of the Nodes Committee; (v) Recommendations on how to advance the implementation and uptake of the GBIF Work Programme within each region; (vi) Regional, national, or thematic priorities for the 2011 Work Programme; and (vii) Regional, national, or thematic priorities for the 2012-2017 Strategic Plans.

- **Consultative Meeting for Nanda Devi – Askot Landscape Biodiversity Conservation and Livelihood Security for Local Community, Dehradun, 2nd June, 2010.** The meeting was jointly organized by Wildlife Institute of India and Kalpavriksh using WII's Grant-in-aid funds. The objectives of the Consultative Meeting were to: (i) understand the conservation importance of Nandadevi-Askot Landscape; (ii) discuss the issues concerning conservation of natural resources and livelihood security of the local people in the region; and (iii) decide on various steps required for development of an integrated strategy for long-term conservation of this landscape by involving different stakeholders and communities and through their better coordination.

The participants discussed major issues concerning the long-term conservation of this landscape and evolved the future strategy of this initiative.

- **VI-Internal Annual Research Seminar (IARS), 13-14 September, 2010 and XXIV Annual Research Seminar (ARS) of WII, Dehradun, 15-16 September, 2010.** During the IARS, a total of 22 presentations were made in five sessions. The presentations were based on recently

initiated and ongoing research studies and were made by research fellows and faculty members of the Institute. The presentations were evaluated by a panel of judges. Five presentations were adjudged as the 'five best presentations'.

- During the XXIV Annual Research Seminar of the Institute the following publications were released in the inaugural session of the ARS: (i) ENVIS Bulletin on Freshwater Turtles and Tortoises of India; (ii) Power Fence Manual; and (iii) Amphibians and Reptiles of Uttarakhand. A total of 23 presentations were made in six technical sessions. The presentations were based on the ongoing research studies and were made by research fellows and faculty members of the Institute. About 300 delegates/participants attended the ARS. A photography competition was also held during the ARS and the winners were awarded with book prizes.
- **One-week Compulsory Training Course for the Indian Forest Service Officers on "Illegal trade in Wildlife and its Protection: Intelligence Gathering, Anti-Poaching Strategies and Role of Wildlife Forensics in Dealing with Wildlife Crime", Dehradun, 11-15 October, 2010.** The training course has been designed to achieve the objective of curbing illegal trade in Wildlife through innovative conservation strategies. The course organized by the Institute and is was sponsored by the Ministry of Environment & Forests. A total of 23 participants attended the said training programme. Besides, lectures on relevant topics, case studies, panel discussion, a day's field visit to Rajaji National Park was also the part of the training.
- **National Level Training Programme for Scientists and Technologists in Biodiversity Conservation, Dehradun,**

8-13 November, 2010. Thirteen scientists and technologists working in the Government departments, institutions and universities participated in this workshop. The science involved in biodiversity conservation and management has developed manifold in recent years. One of the reasons for it, the rapid transformation of this field is due to the influence of technology. It is important that scientists involved in biodiversity conservation in the country are exposed to these innovative applications and societal needs and update themselves of the recent advances in the field. This course has the following objectives: (i) to make fully aware scientists on principles/approaches in Biodiversity Conservation; (ii) to make them scientists aware of causes of decline in natural resources/habitats and species; (iii) to make them aware of good practices in Biodiversity Conservation; (iv) to establish linkages and facilitate sharing of information among scientists; (v) to reiterate their role in creating of baseline information and database management. The one week course was packed with 21 different lecture inputs and field visits covering various thematic areas.

Other Activities

Celebration of World Environment Day

June 5, 2010, like every year, the World Environment Day was celebrated by the Institute. It was an occasion to create awareness in younger generation. The theme for the World Environment Day 2010 was "Many Species, One Planet, One future." It echoes the urgent call to conserve the diversity of life on our planet. Various activities were organized for school children by the Institute on this day. More than eighty children participated in these activities. A workshop was also organized for the families of the

8

Institute's faculty members in the afternoon session at the Institute.

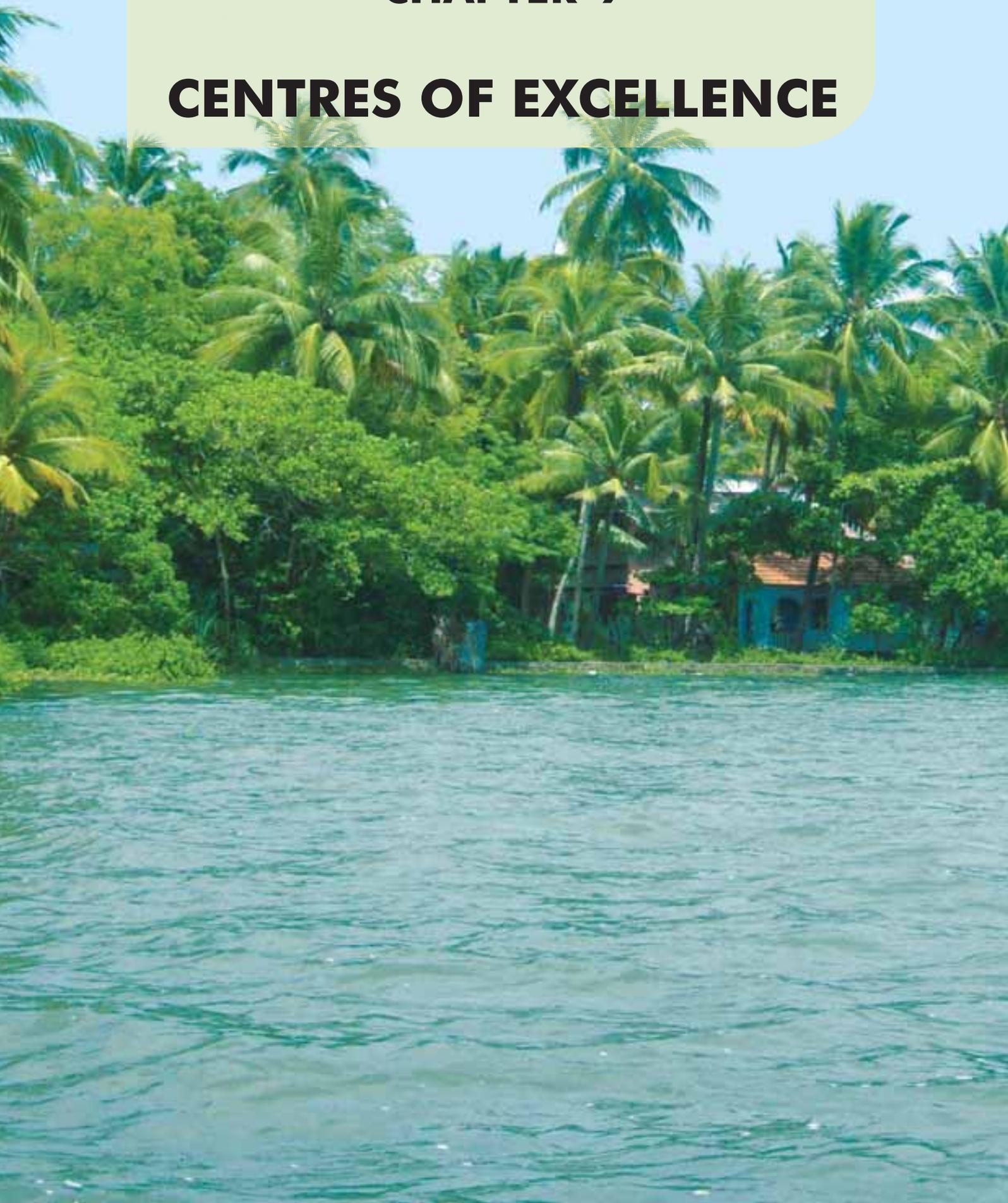
Wildlife Week celebration

The Wildlife Week was celebrated at the Institute during 2-8 October, 2010. The main aim of the Wildlife Week was to make the younger generation aware about the importance of wildlife for the entire world. It was aimed to motivate them to know how they can help in protecting the animals and birds.

The following activities were organized by the Institute during the Wildlife Week: (i) Drawing competition was organized on 4th October, 2010 in which 80 students from five schools participated, (ii) A talk was delivered on 'Health Ecosystem, Healthy World' where more than 100 students and teachers were present, (iii) nature trail visit, followed by a quiz competition at the Porta Cabin for the students, (iv) an Environment and Wildlife Quiz was also organized by the Institute in collaboration with the Friends of Doon, Dehradun for the school children of Dehradun.

CHAPTER-9

CENTRES OF EXCELLENCE



Centres of Excellence

Enhancement of people's awareness about environment requires capacity building at institutional and individual level for providing adequate support to the efforts in the fields of environment education, research and training. To serve this end, the Ministry launched the scheme 'Centres of Excellence' in 1983 to promote institutions in priority areas of Environmental Sciences and Management.

Ten Centres of Excellence have so far been set in different areas as listed below:

- (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
- (x) Centre for Animals and Environment, CARTMAN, Bengaluru.

Centre for Environment Education (CEE), Ahmedabad

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 and concern, leading to action, regarding the 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.

Paryavaran Mitra Programme

Paryavaran Mitra, one of the largest sustainability and climate change education programme in the world, was launched in CEE, on 24th July, 2010.

Paryavaran Mitra is a programme for students that envisions creating Paryavaran Mitra (Friends of the Environment) in schools across India. The goal of the programme is to create a network of young people across the nation who have the knowledge, awareness and commitment to meet the challenges of global citizenship and Climate Change.

The Paryavaran Mitra programme aims to guide, facilitate, capacity build students through curriculum-linked activities and co-curricular action projects to take positive environmental action at individual, community, national and global level.

The first phase of the programme is for a period of three years from 2010-2013, during which the aim is to reach students in classes from standards 6 – 9 (age group 11-15 years). 2,00,000 schools and two crore school students across the country will be reached in this phase. These students will be from schools in every state and every district

of India. It is envisaged that the programme is built on a variety of networks and partnerships. The goal is to create Paryavaran Mitra in all schools in India.

Paryavaran Mitra represents Hand print action. Hand print is a measure of ESD action; action that is directed to decrease the human footprint and make the world more sustainable.

CEE Central launched Paryavaran Mitra project in the region in presence of Dr. A.P.J Abdul Kalam with participation from Madhya Pradesh, Maharashtra, Chhattisgarh and Goa. An Environment Exhibition focussed on Biodiversity in the Sahyadri was also launched by Dr. Kalam.

The Paryavaran Mitra Programme is an initiative of CEE in partnership with the Ministry of Environment and Forests (MoEF) and is supported by ArcelorMittal.

National Green Corps (NGC)

CEE implements NGC programme in 15 states and two Union Territories as resource agency. CEE took up an initiative to develop a road map based on reflections of a decade of implementation and work out the way forward.

CEE facilitated a national conference of Nodal agencies and Resource agencies on 13th -14th July at Bengaluru. A case study book compiling 100 handprint actions by CEE for MoEF was released in the conference.

A publication containing 100 case studies of the work of various National Green Corps (NGC) Eco-clubs was compiled by CEE South and released on 13 July, 2010 commemorating the decade of green action by the young for a sustainable future. These case studies give a glimpse of the diverse actions of eco-clubs, across a wide range of geographical situations, climates and cultures. CEE also developed master trainers manual

for standardizing trainings in NGC programme.

Biodiversity Conservation

CEE with the support from the Ministry has initiated a two-year project on Ganges River Dolphin Conservation Education Programme in the north and north eastern region of India, where 20 locations are being identified. An educational package for various target groups is being developed.

CEE initiated a People's Biodiversity Registration process at thirty villages in the Guru Ghasidas National Park, and seven villages in Bastar and Rajnandgaon districts of Chhattisgarh in 2010.

Public Consultations

CEE helped to facilitate consultations on Bt brinjal on behalf of the Ministry. Six consultations were organized in different parts of the country. The Minister, Mr Jairam Ramesh, chaired all the consultations and listened to opinions and concerns of various stakeholder groups, including farmers, scientists, agriculture experts, farmer organizations, consumer groups, NGOs, government officials, lawyers, doctors, nutrition experts, ayurveda experts, and concerned citizens.

CEE conducted a series of seven Public Consultations on the National Mission for a Green India (Green India Mission or GIM). Organized on behalf of the Ministry of Environment & Forests, these consultations were aimed at gathering comments and feedback from the general public, civil society groups, researchers, activists, institutions, and other stakeholders on the Ministry's draft version of the Mission document. CEE prepared and distributed 11 language versions of the draft mission document. The GIM is one of the eight Missions under the National Action Plan on Climate Change announced by the Prime Minister

CEE Goa facilitated public consultations to discuss the Coastal Regulatory Zone Draft Notification and Final Frontier released by the Union Ministry of Environment and Forests.

Popularizing Low carbon lifestyles

Creating Green Citizens: Promotion of Low Carbon Practices at the XIX Commonwealth Games 2010. CEE and its NGO and SGP partners for the GEF UNDP SGP Project for sensitizing people on 'low carbon practices' and planting saplings. CEE developed a Low Carbon Lifestyles Toolkit which is really a barometer on our attitudes and practices, and focuses on the efficient use of electricity, transportation, LPG, water, organic waste and paper. The purpose of toolkit is to spread awareness and sensitivity among people regarding adopting low carbon practices for a sustainable lifestyle.

International Conference

The International Conference "Ethical Framework for a Sustainable World" was held at the Centre for Environment Education (CEE) campus in Ahmedabad from 1st to 3rd November, 2010. The Conference was held in partnership with the Earth Charter International. The Ministry of Human Resource Development, Government of India was a co host at the Conference.

The Ministry, United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Environment Programme (UNEP) were partners in the Conference.

The objectives of the Conference were:

- Strengthen efforts at making ESD central to education practice and training
- Clarify the role the EC can play in education
- Share experiences on the use of EC in education
- Strengthen partnerships with the EC

- Capture the spirit of the events related to EC +10 and to use the ideas to discuss and launch the vision for the EC for the next decade (2011-2020)

The Conference looked at the effective translation of the Earth Charter from principles to practice. Specifically the Conference sought to review and strengthen ways by which these principles and values can find resonance in different areas of life and work across different sectors from international organizations and business enterprises to formal education. Seven plenary Sessions set the tone and pace for more focused the discussions and interactions in 10 workshop themes.

C.P.R. Environmental Education Centre (CPREEC)

Introduction

To create awareness among various stakeholders about current environmental issues and our responsibilities towards the preservation of our environment. The programmes are conducted in the states of Andhra Pradesh, Goa, Karnataka, Kerala, Orissa, Maharashtra and Tamilnadu and the Union Territories of Andaman and Nicobar Islands and Puducherry.

Progress /achievements made during the year

Green Schools of India

CPREEC's Green Schools of India (GSI) was launched in 2007 in Chennai, Bengaluru, Hyderabad, Ooty, Mysore and Puducherry, and was expanded to include more schools this year. This scheme involves students from urban schools in five areas of environmental management: reducing energy and water consumption, waste management, greening the campus and animal welfare. This programme has been developed in converting awareness and education to action. Annual Green School Awards were given to the best performing schools in all the places where the GSI is being carried out. NGC schools participated in the GSI campaign.

Biodiversity Conservation Education

The species approach to biodiversity conservation has been very popular with teachers and students in Andhra Pradesh, Karnataka and Tamilnadu. The focus was on Mangroves, Tropical Forests, Coastal Eco Systems and Wetlands. The participants visited reserved forests and planned campaigns about the importance of biodiversity conservation.

Sacred Groves

CPREEC has been conserving and restoring sacred groves since 1993-94. Eight groves were taken up for restoration and maintenance this year. Sacred groves are the hub for village meetings and school visits that are devoted to proactive conservation plans. All activities are implemented with the participation of local villagers. Saplings are distributed to local students. Orientation programmes for school students were organized at the sacred grove site to motivate them towards sacred grove conservation. Till date, CPREEC has restored 51 sacred groves, with another 22 taken up by local villagers.

Women and the Environment

CPREEC trained women of 30 villages in waste management, vermicomposting, organic gardening, health and nutrition. Saplings and seeds were distributed to the participants and seed banks of local varieties were established by the women self help groups. CPREEC also surveyed the growth rate of saplings distributed to them over the years. Over 85% have survived.

Nilgiri Biosphere Reserve Conservation Education

The importance of the Nilgiris Biosphere Reserve was conveyed to the Eco Development Committee Members, Village Forest Committees and Panchayats in the districts of Nilgiris, Coimbatore and Erode in Tamilnadu. The annual Anti Plastic Campaign of CPREEC was organized at Sim's Park in Coonoor,

Kotagiri and at the entry point to Doddabetta in the Nilgiris.

Exhibitions

Three exhibitions were designed and launched this year. They were:

- Wetlands
- Eco Friendly Architecture
- Biodiversity Conservation (NEAC Theme)

A pamphlet on each topic was distributed free to all visitors. Competitions were conducted to assess the student's comprehension.

Generation and Production of Resource Materials

CPREEC's publications are regularly updated and reprinted. Apart from reprints, a booklet on *A to Z Cruelty to Animals* (English), earlier booklets on *Wetland Conservation* (Tamil), *Pollution and Health* in Oriya, *Biodiversity* in English and Tamil and book on *Biodiversity* were printed. The proceedings of the Seminar on *Ecological Traditions and Sacred Sites of Punjab* were brought out.

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, Tamilnadu and the Union Territories of Andaman & Nicobar Islands and Puducherry.

Research and Surveys

CPREEC carried out a Survey on Water Usage Pattern in Alwarpet, Chennai and analysed 50 water samples for its potability. CPREEC collected and analysed 150 water samples along the east coast to compare the level of intrusion. Water was collected from 50 localities along the Karaikal coast to study and compare the previous data on salt water intrusion. At Cuddalore ambient air and noise level surveys were carried out. The water quality

of Tiruchirapalli, ambient air quality and noise level was carried out. All the above were carried out in response to requests made by local communities.

National Green Corps (NGC)

CPREEC is the Regional Resource Agency (RRA) for NGC in the states of Andhra Pradesh, Karnataka, Kerala, Goa, Orissa, Tamilnadu and Union Territories of Andaman & Nicobar Islands and Puducherry. Workshops were organised for NGC teacher-coordinators at District level in the states of Andhra Pradesh, Karnataka, Orissa, Tamilnadu and Union Territory of Puducherry. NGC schools participated in the GSI campaign.

Biomedical Waste Management

CPREEC conducted a series of workshops on Biomedical Waste Management for Medical Officers in the states of Andhra Pradesh, Orissa, Karnataka, Kerala and Tamilnadu. The workshops were executed in collaboration with the State Pollution Control Boards and the Indian Medical Association. The workshops were sponsored by the Ministry.

International Biodiversity Day Celebrations – 22nd May, 2010

CPREEC's state office at Andhra Pradesh organized a programme for farmers at Medak District stressing the importance of conserving native species. The programme in Karnataka was organized for teacher trainees at Maddur Taluk in Mandya District followed by a field visit to the Kokkre Bellur bird Sanctuary. Field Office at Ooty organized a programme for farmers of Vazhathottam in Nilgiris. The Field Office at Port Blair in the Andaman & Nicobar Islands organized a programme at GB Pant Hospital for the benefit of nursing trainees. A signature campaign on this day was a special attraction.

World Environment Day Celebrations – 5th June, 2010

As part of World Environment Day

celebrations, CPREEC organized WALKATHON in collaboration with Radio City 91.1 FM Channel at Marina Beach. Shri. S. Ve. Shekhar, film actor and MLA, Mylapore Constituency, flagged off the Walkathon. Several school students and general public participated, carrying placards with environmental messages.

C. P. R. Environmental Education Centre's Award for Environmental Education

Dr. M.S. Swaminathan, Chairman, CPREEC, gave away the annual C. P. R. Environmental Education Centre Award for Environmental Education - 2010 to Shri. Bency Joy, a teacher from Port Blair in Andaman and Nicobar Islands, in recognition of his contribution to environmental conservation through education.

GLOBE

CPREEC organized workshop for teachers of Chennai schools and a refresher course for the teachers of Puducherry in collaboration with the State Training Centre, Puducherry. The GPS readings of the schools in Chennai and Puducherry have been recorded and communicated to the GLOBE Country Coordinator for GLOBE unique IDs and passwords.

COP-10, NAGOYA, JAPAN

CPREEC designed, developed and supplied promotional / exhibition materials showcasing India's rich biodiversity for Convention of Parties (COP-10) held at Nagoya, Japan on behalf of National Biodiversity Authority, Ministry of Environment and Forests, Government of India. CPREEC's book on *Biodiversity*, fliers on *Ecological Heritage of India*, *Biodiversity Act and Rules* and *Biodiversity Management* were also prepared for COP-10.

National Environment Awareness Campaign (NEAC)

A pamphlet and stickers on Biodiversity Conservation were distributed to NGOs and educational institutions implementing NEAC in select districts in Tamilnadu, Andaman & Nicobar Islands and Puducherry.

Centre for Ecological Sciences (CES), Indian Institute of Science (IISc), Bengaluru

Introduction and Objective

The Ministry recognized the Center of Ecological Sciences, Indian Institute of Science, Bangalore as a Center of Excellence in the year 1983. The CES IISc conducts research with practical application in conservation and sustainable development of natural areas of Western Ghats and organizes extension and training programmes, particularly for field managers.

Activities undertaken so far

The Centre for Ecological Sciences carried out 28 research projects in the fields of ecology of tropical forests, climate change, community ecology, behavioural ecology and evolutionary biology. The centre 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 / achievements during the year Tropical forests and climate change

Tropical forest structure, dynamics and the influence of climate change factors involves long-term monitoring of permanent plots in tropical forest of Western Ghats, mainly the Nilgiris and Uttara Kannada districts. Natural vegetation, plantations and soils have been known as major carbon sinks. Analyses of a 10 year data set from a 50 hectare plot in

Mudumalai indicates that drought enhances tree mortality with a time lag of one to three years, but that tropical dry forests have better adaptive capacity compared to tropical moist forest and temperate forests. Rainfall and fire both play significant roles in the spread of Lantana an invasive plant. Initial findings from behavioural experiments show that both butterflies and thrips play important roles in lantana pollination and may aid its spread.

Community ecology and biogeography of select vertebrate taxa in the Western Ghats

The centre initiated field survey to create a distribution database on frogs, lizards and snakes. Work has also been initiated on the community ecology of birds, on mixed species foraging flocks, and on distribution of vertebrates.

Coastal and marine biology and its conservation

Five of the seven species of marine turtles are found in Indian coastal waters and at least four have significant nesting beaches and /or feeding area. The Centre is continuing molecular genetics, and studying other aspects such as multiple paternity. The Centre has recently attached satellite transmitters to three leatherback turtles.

Behavioural ecology of large mammals

The ecological basis of space use, foraging and social behaviour is being studied in a typical grassland landscape. Work on Asian elephant behaviour and ecology also continued with new research on reproductive behaviour and ecology of the species in Kaziranga National Park with special emphasis on female choice of tusked versus tuskless males.

Molecular ecology

The phylogeny retrieved four distinct

9

claded among Poecilotheria that arose due to a marine transgression event which separated Sri Lanka from peninsular India for the first time in the Early Miocene. In addition, DIVA analysis suggested two dispersal events from Sri Lanka into India during the Miocene-Pliocene and the Pleistocene times respectively.

Social Behaviour of insects

We studied the mating behaviour of the primitive social wasp *Ropalidia marginata* and the factors that may influence sperm transfer. The effect of nestmateship and body size on mate selection through a choice based assay in a primitively eusocial wasp *Ropalidia marginata* was also investigated.

Chemical Ecology of Species Interactions : plants, Insects and other Invertebrates

The interactions between figs (*Ficus* spp., Moraceae) and their associated fig wasps (Hymenoptera: Chalcidoidea : Agaonidae) have been a subject of much interest to evolutionary biology as being a model system for studying co-evolution. The Centre have extended its studies on *Ficus racemosa* in India to parasitic organisms living within the fig syconium and one such form was on nematodes.

Visual Ecology of Species Interaction

Community-wise floral colour patterns in a seasonal cloud forest in the Bhimashankar Wildlife Sanctuary in Maharashtra in relation to their pollinators was explored. Color patterns correspond well with the identity of pollinator. Floral resources available for nocturnal versus diurnal pollinators in the same site and also the floral resources that are actually utilized were determined. In addition, the Centre organized several major symposia and workshops during the year.

Budget Allocation

₹125 Lakhs, likely to be spent by end of financial year.

Implementing organizations

Centre is functioning under the administrative control of Indian Institute of Science, Bangalore.

Centre for Mining Environment (CME), Indian School of Mines, Dhanbad

The Ministry set up CME as a Centre of Excellence in Mining Environment in 1987 in the Indian School of Mines University, Dhanbad. Since inception, the Centre has been carrying out Academic and Advance Research Activities in Environmental Science and Engineering with special emphasis on Mining Environment.

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

Objectives

The Salim Ali Centre for Ornithology and Natural History (SACON) was established in 1990. The major objective of the Centre is to “design and conduct research in ornithology covering all aspects of biodiversity and Natural History, develop and conduct regular courses in ornithology and natural history, create a data bank on Indian ornithology and nature history, and disseminate knowledge relating to ornithology and natural history for the benefit of the community.”

Progress / Achievements made during the year

- In the year 2010-11 the Centre has undertaken 26 programmes that include studies, consultancy works, environmental impact assessments and activities related to nature education.
- During the year, SACON continued the work on single species and ecosystems. The study on Spot-billed Pelican was continued at Uppalapadu in Andhra Pradesh, where a large breeding colony of the species is present. The program to conserve the Edible-bird Swiftlet in the



Fig-81. Siberian Crane (*Grus leucogeranus*) at Keoladeo National Park

Andaman & Nicobar Islands, in collaboration with the Andaman & Nicobar Forest department since 1999, has shown increase in population of the species at the focal sites. SACON has continued pursuing ecological investigations of the island ecosystems. The study to monitor post-tsunami coastal ecosystem in the Nicobar islands reports notable plant regeneration in affected areas. Although, species such as Robber crabs have become less abundant, recovery of other species is apparent.

- Lion tailed Macaque is an endemic and endangered species. SACON has taken a study of the species on one of its largest known populations of the species in the forests of Sirsi-Honnavaara, a reserve forest with high human density and a mosaic of various plantations and agriculture, in Karnataka. BRT Wildlife Sanctuary, considered as a live bridge between the Western and Eastern Ghats, is part of the larger forest complexes of the region considered for the conservation of Asian elephant and tiger. A study on the mammalian species of BRT Wildlife Sanctuary reveals that it is one of the

high mammalian biomass areas in the country.

- SACON, in Collaboration with NRSC, Hyderabad, has undertaken a change detection study of the Land use land cover in the Yamuna river basin that will help comparing the past and present status and to predict the future scenario in the basin.

- The Centre has continued the study on insect and bird pollinators, and avian seed dispersers in various forest types in Tamil

Nadu. Honeybees, butterflies and sunbirds are the major pollinators in most of the forest types, while bulbuls, barbets, crows, Nilgiri Laughing Thrush from principal avian seed dispersers.

- As part of Centre's ongoing ecotoxicological investigations and residue analysis two projects were undertaken. (i) Impact of agricultural pesticides on the population status and breeding success of select species of fish-eating birds in Tamil Nadu. It was found that residue levels of pesticides are less than levels considered lethal. Nevertheless, this has to be viewed with concern, as these pesticides are capable of causing several abnormalities. (ii) to monitor and compare pesticide residues in agro ecosystem of a village practicing organic and chemical farming shows higher organochlorine pesticides residues in the samples collected from chemical farming than the organic farming.
- During the year 2009-10 SACON has undertaken a rapid environmental impact assessment of the proposed India Based Neutrino Observatory (INO) at Bodi Hills, Theni district, Tamil Nadu.



Fig-82. Blue Whistling-thrush (*Myophonus caeruleus*), generally found in hill forests

- SACON has undertaken nature education activities intensively. The Centre could reach out to several schools and the public with the message of conservation. SACON have continued the work of organizing the Department of Biotechnology's Natural resources Awareness Clubs for School Children (The DNA Clubs) in the Andaman & Nicobar Islands and several other programmes including one residential programme with students as a target group in the islands to spread awareness on natural resource conservation.
- SACON is pursuing, in earnest, development of human resources in conservation and biodiversity studies. As of now 20 PhD projects are in progress in the Centre. Several short term projects and summer training programmes for PG students of various institutions are also in progress.
- The Annual Research Seminar of SACON was held on 13th December, 2010 followed by the 22nd meeting of the Research, Monitoring and Advisory Committee of SACON on 14th December, 2010. The 61st Governing Council Meeting was held on 18th November, 2010 forenoon and the 20th Annual General Meeting was held on the same day afternoon at the MoEF, New Delhi.
- SACON has remained very active during this year in terms of publications, participation in seminars / symposia and workshops. More than 20 articles in national peer reviewed journals, about 25 in international reviewed journals, three chapters in books, seven technical reports and 20 papers in conferences/ seminar/ proceedings edited volumes are among our contribution for the year.

Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi, Delhi

- The Centre of Excellence Programme of MoEF at the Centre for Environmental Management of Degraded Ecosystems (CEMDE), University of Delhi, has been actively involved in (i) development of ecological restoration technologies for ecosystem redevelopment in degraded landscapes including mined out, desertified and degraded forest lands and (ii) in the management of invasive weeds that led to loss of biodiversity in forest ecosystems. The scientists have developed site specific restoration technologies which have been successfully implemented for the restoration of limestone mined out areas, Iron ore mined out areas, morrum mined out areas and degraded Aravalli hills to the original forest ecosystems, and these technologies are used by the stakeholders today. The restoration technologies involve appropriate assemblage of plant species and their



Fig-83. *Megalaima haemacephala* also known as Coppersmith Barbet

associated microbes and soil invertebrates, and inoculation procedures. The restoration technologies developed are simple, cost effective, does not require after care, and generate employment among rural women.

- The second major achievement of the Programme is the development of a New Management Strategy for eradication of Lantana – one of the top ten world’s worst weeds and an alien that invaded tropical and subtropical India and threatening native biodiversity. The New Management Strategy involves (i) removal of Lantana by cut rootstock method – a simple, innovative and cost effective method developed by the scientists of the programme; (ii) weeding out of saplings/ young plants from beneath the perching trees of generalist birds, which disperse the seeds, by using Search List of Perching Trees of Generalist Birds; and (iii) restoration of weed free landscape to the grassland/ forest communities.
- The new management strategy has been widely followed for eradication of Lantana by many states across the country. In

Corbett Tiger Reserve alone, Lantana was eradicated from 1700 hectares and restored weed free landscapes to the grasslands which are now used by herbivores, and the frequency of Tiger sighting has been increased several fold in weed free restored sites.

- The other activity of the Centre is to augment capacity building in action research through seminars/ workshops to stakeholders. The scientists have been

conducting a series of interface programmes to officials and field staff of the forest departments of different states and NGOs.

Madras School of Economics, Chennai

The Centre of Excellence in Environmental Economics has started functioning from 2002. Presently the Centre is in its second five year term based on MoU signed in 2007 between Madras School of Economics and Ministry of Environment and Forests, Government of India. The main objectives of the Centre are to carry out research on issues related to environmental economics in project mode, maintain a state-of-the-art website on environmental economics and provide policy assistance to the Ministry.

During the year 2010-11, the Centre initiated a new project on, ‘Economy-wide Impacts of Pollution in India : Meta Analysis’. The report on the project on ‘Eco-taxes and GST’ has been finalized and the project on Trade-Environment with reference to Textile Sector is ongoing. Two issues of the newsletter, ‘Green Thoughts’ have been published during the year.

- The new project on ‘Economy-wide Impacts of Pollution in India : Meta

Analysis' has been initiated in October 2010 with a project during is 18 months. The project aims to use meta-analysis of studies relating to air and water pollution to assess macro-level estimates of overall impacts of pollution in India.

- The Centre has finalized the report on the project, 'Coping with Pollution : Eco-taxes in a GST Regime - A Discussion Paper' after incorporating all the suggestions made at draft stage.
- The draft report on the project, 'India's Export of Textile and Textile Products and Environmental Requirements' is likely to be submitted to the Ministry soon.
- The Centre's website <http://coe.mse.ac.in> has been updated to make it more user friendly. Efforts have been made to augment the database on environmental economics literature substantially. Similarly a number of Indian studies have also been added to the database. The website is serving as one-stop destination for users interested in environmental economics related issues in India. Close to 7000 articles published in referred journals have been categorized under various sub-disciplines of environmental economics and resource economics. This searchable database enables the user to access publication information and the abstract and also provide scope for carrying out comprehensive literature review.
- The Centre has started publishing bi-annual newsletter, Green Thoughts, from March 2009. Two issues were brought out during 2010 - one in March and another in October. The newsletter summarizes the work done at the Centre on various ongoing projects.
- The Centre has organized several workshops / events / seminars during the year 2010-11. Two Round-Table

consultations were organized in February and March 2010 in Chennai and New Delhi, respectively to develop consensus opinion on the need to integrate environmental considerations into the GST regime. These consultations were attended by policy-makers, think-tanks and industrialists. Workshops were organized on (a) Economics of Climate Change Adaptation and Land Use Planning and Agriculture to identify research priorities, policy gaps and capacity building needs.

- The ENVIS Centre at MSE has brought out two Newsletters with themes 'Man-made Disasters' and 'Natural Disasters' during 2010.
- "National circumstances of India : Socio-Economic Profile of India", report prepared to serve as background material for India's second Communication to the UNFCCC, July 2010.

Foundation for Revitalization of Local Health Tradition (FRLHT), Bengaluru

The Centre of Excellence on Medicinal Plants and Traditional Knowledge at FRLHT, Bangalore has been supported by MoEF since 2002-03 to bring to the focus various issues related to Indian medicinal plants and their conservation. The Centre has set up a national Bio-cultural herbarium of Indian medicinal plants as well as an Ethno-medicinal garden. These have very rich collection of medicinal plants and are playing an important role in generating awareness among different stakeholders. Besides, the Centre has also undertaken the following activities: a) pharmacognostic studies on the controversial plant raw drug entities, b) building capacities of different stakeholder groups about various issues related to medicinal plants, through its capacity building courses, workshops and trainings, c) preparing a GIS based Atlas of distribution of Indian medicinal plants to guide

informed conservation action and d) bringing out well-referenced educational CD-ROMs on medicinal plants of different Indian medical systems namely Ayurveda, Siddha, Unani and Homoeopathy.

Following are the highlights of the progress achieved during the year under its different key areas.

- Bio-Cultural Herbarium: Development of a unique Bio-cultural Herbarium of Indian Medicinal plants has been one of the key tasks of the centre. Towards this end, the team of field botanists at the centre engaged in the floristic surveys in different locations which resulted in addition of about 1000 plant specimens to the existing collection. These efforts also resulted in addition of more than 100 plant species not available in the collection earlier.

Around 2000 images of plants depicting their habit and the specific parts/ products in medicinal use have been added to the image library. Training programs on herbarium techniques were conducted by the team. Besides, four posters were also prepared as educational and extension material. During the year, more than 200 authentic raw drug samples were obtained after careful identification of specific plant sources. Additionally, around 200 raw drug samples were also obtained from the markets and added to the repository. These collections have been arranged thematically.

- Ethno-Medicinal Garden: During the year, the collections at the ethno medicinal garden were further diversified by adding more themes. A manual titled, 'Secrets of Ethno –Medicinal Garden' was also printed.
- Pharmacognosy Studies: During the year, phyto-chemical screening, HPLC comparative profiling and HPLC finger

printing was carried out for *Aconitum heterophyllum* and *Cyperus rotundus*. A manuscript on SCAR markers for *Berberis* species has been prepared and a research paper highlighting the structure and properties of *Kiritiquinone* obtained from *Maesa indica* has been published.

- Distribution Mapping: During the year, geo-distribution maps for 250 species and eco-distribution maps for 25 species, using GIS techniques, have been prepared. The revised and upgraded version of digital atlas, incorporating geo-distribution and eco-distribution maps has been completed.
- Outreach (Training & Educational material on Plants of ISM): A National level workshop for finalization of draft "Strategy and Guidelines for Conservation of Medicinal Plants in India", and developing "operational guidelines" for the same, was organized. Two capacity building courses on "Medicinal Plants Conservation" for the frontline forest staff from Karnataka were conducted during the year. Thus a total of ten such courses have been conducted across five states over the last two years covering more than 450 field staff. A prototype CD-ROM on the "Plants in Ashtanga Samgraha" has been prepared for dissemination of traditional knowledge relating to Indian medicinal plants.

Centre for Animals and Environment, CARTMAN, Bengaluru

The Project on Centre of Excellence for Animals & Environment (CAE) awarded by the Ministry to CARTMAN, Bengaluru in 2000 and discontinued after two years for administrative reasons was resumed during 2009.

The main objective of the Project is to study the mutual dependence and inter-relationship between the Animals (LIVESTOCK)

and Environment (Plant Life) and initiate steps to preserve environment and to improve the health and welfare of animals by making them more productive. Another activity envisaged is to eliminate pollution of environment caused by City based Abattoirs by providing alternate locations where animals are born and reared. This would also result in development of rural areas by retaining the Value added in the process in villages and nearby towns.

Activities undertaken during the year

Compilation of data relating to the scope of the project, Consultations with experts, study on the utilization of the bullock carts in two locations each in Karnataka and Tamil Nadu and the need for their modernization, Study of two slaughter houses in two locations in the cities of Karnataka or Tamil Nadu, preparation of Web Site and Data Bank, Conducting Audio Visual Programme on Environment for school children in Bengaluru City, Conducting Questionnaire Survey on the subjects of land availability, classification of land, availability of pasture land, forest land, etc, population of livestock, their classification, trend in population, utilization of bullock carts in six States viz., Madhya Pradesh, Andhra Pradesh, Orissa, Maharashtra, Tamil Nadu and Karnataka.

The above studies indicate that there is scope for introducing Improved carts for improving the financial status of cart owners and farmers.

Study of Slaughter Houses in two locations in Karnata

Work has already been taken up to study the slaughter of small and big animals in the districts of Belgaum and also of slaughtering

animals for the City based abattoirs in Bengaluru. Preliminary studies indicate that the present arrangements give rise to the following problems:

- Cruelty to animals by transporting them for long distances.
- Unhygienic conditions existing in the City based Abattoirs
- Pollution of the City.
- Meat consumed is not very hygienic
- Considerable wastage on the total production of meat and utilization of by-products.
- Farmers/Animal Rearers located in rural areas do not get sufficient returns for their animals.

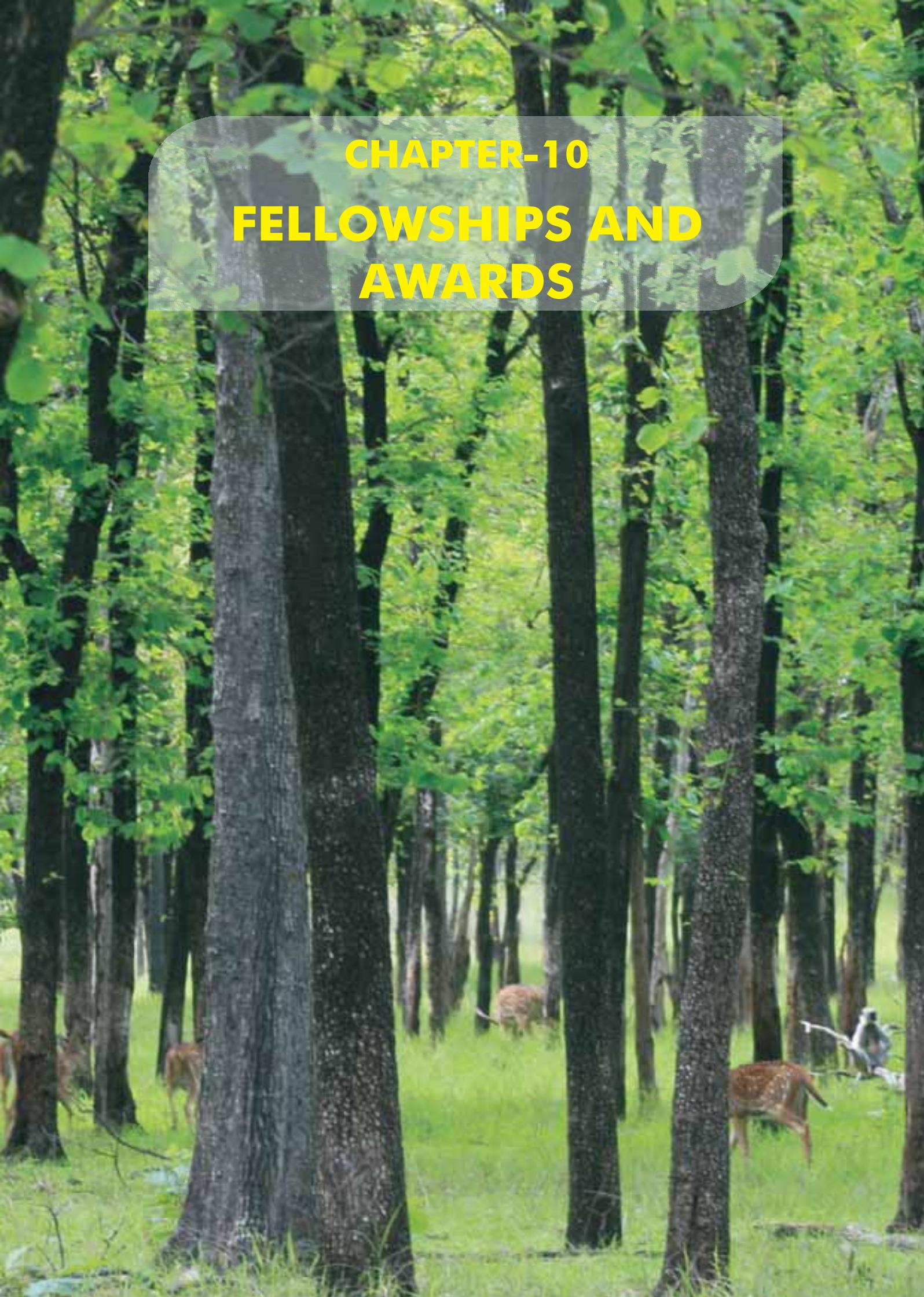
If this system is changed to establishment of mini abattoirs in rural areas, the above problems could be remedied to a great extent.

CARTMAN-BBMP ECO Park

This particular park having plants more than 300 variety of plants, located in Koramangala VI Block, has been developed by creating better ambience and environment for attracting visitors. The Building Plan have been approved by BBMP and MoEF has been requested to release funds for taking up construction of Building.

Audio Visual Shows

Audio Visual shows conducted were on Environment, Conservation of Ecology, Bio-Diversity, Conservation of Natural Resources and Pollution Control. It is part of the Awareness Programme planned for the first year.

A photograph of a dense forest with tall, slender trees and vibrant green foliage. In the foreground and midground, several deer are visible, some grazing on the grass. The scene is bright and natural, suggesting a healthy woodland environment.

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" 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 ₹1,00,000/- was awarded to deserving individual/organization of India. Since 1991, the prize of ₹1,00,000/- each were awarded separately to individual and organizational category. From the year 2002, the prize money has been enhanced to ₹5,00,000/- in each category. Subsequently, the "Regulations" governing the IGPP was revised from the year 2005 onwards. As per the revised regulations, one prize of ₹5,00,000/- under the Organisation category, and two prizes of ₹3,00,000/- and ₹2,00,000/- each to individuals in the Individual category shall be given annually. As per the revised regulations from the year 2009 onwards, two prizes of ₹5,00,000/- each under the Organisation category, and three prizes of ₹5,00,000/-, ₹3,00,000/- and ₹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. There is no age limit for the nomination for individual.

The regulations governing IGPP was again revised from the year 2010 onwards. As per the revised regulations, any citizen of India having at least 10 years work experience in the field of Environment (substantiated in support of his experience by published/ field work)/ NGO working in the field of environment with at least five years experience/ Environment

and Forests Departments of States/UTs/State Pollution Control Board/District Collector/Magistrate can propose a name of any citizen or organization of India who has at least five years working experience in the field of environment in the prescribed proforma. Self nominations and nominations proposed by relatives are not considered. The advertisement will be issued on 15th July every year. The last date for receipt of nominations shall be 15th September every year.

Short listing of the nomination is carried out by three Expert Members selected by the Prime Minister's Office. The environmental Prize Committee constituted under the Chairmanship of Hon'ble Vice President of India select the awardees.

While selecting the awardees the term "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.

For IGPP-2008, one awardee i.e. under organization category only was selected by the Prize committee under the Chairmanship of Hon'ble Vice President of India and no one was found suitable for award under individual category. The award was given away in the award ceremony held at Vigyan Bhawan, New

Delhi on 5th June, 2010 on the occasion of World Environment Day.

The nominations received for IGPP-2009 were processed. Short-listing of the nomination have been carried out by the three experts selected by PMO. The ground truth verification of the short-listed nominations will be carried out by the Regional Offices concerned of the Ministry.

Advertisements for inviting the nominations for IGPP, 2010 were issued in national dailies with regional coverage on 15th July 2010. The nominations for IGPP-2010 under both the individual and organization category have been received. Various activities as per the regulations applicable for IGPP-2010 are under process.

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 individuals and institutions in the field of afforestation/wasteland development every year.

Till the year 2005, these awards were given under twelve categories but from 2006 onwards the awards have been restructured to enhance the response and prestige and now awards under four categories are given as follows:

1. Individuals including Government Servants
2. Joint Forest Management Committees (JFMCs)
3. Government Institutions / Organizations
4. Non-Governmental Institutions/ Organizations

- Only one award is given in each category.
- Cash prize of ₹ 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 IPVM Awards for the year 2010 were conferred on 19th November, 2010 and the exercise for IPVM Awards for the calendar year 2011 is under process. Sh. A.T. Mishra, DFO Dhalbhum Forest Division, Jamshedpur (Jharkhand) was given award under category "Individual including Government Servant". Forestry extension Wing, Tamil Nadu Forest Department, Chennai under category "Institutions/organizations under Government" and Village Forest Protection & Management Committee, Dani Talai, Rajasthan under category "Joint Forest Management Committee" were also given award for the year 2010.

IPVM Awards for States and Union Territories

The IPVM Awards for States and Union Territories were instituted in the year 2008 for enhancing the percentage of Forest and Tree Cover in States/UTs. The awards are divided into three categories and only one award is to be given in each category (Table-29.)

10

Table-29. Categorization of IPVM Award

Sl.No.	Category	Award	Awards for 2010
a)	Big State having geographical area of 80,000 Sq. Km and above	₹8.00 lakhs (one)	J&K
b)	Small State having geographical area below 80,000 Sq.Km.	₹5.00 lakhs (one)	Mizoram
c)	Union Territories	₹5.00 lakhs (one)	UT of Chandigarh

The IPVM Awards for States/UTs were conferred upon on 19th November, 2010. Next IPVM Awards for States/UTs are due in the calendar year 2012.

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 Awards for the year 2007 and 2008 have been announced while for the year 2009 and 2010 nomination have been obtained and are under process.

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 Awards for the year 2007 and 2008 have been announced while for the year 2009 and 2010 nomination have been obtained and are under process.

National Awards for Prevention of Pollution and Rajiv Gandhi Environment Award for Clean Technology

The National Awards for Prevention of Pollution and the Rajiv Gandhi Environment Award for Clean Technology are given each year, in the following identified categories of highly polluting industries, of industries which have made a significant and measurable contribution towards development of use of clean technologies, products or practices that prevent pollution and find innovative solution to environmental problems:

Large Scale Industries

- i) Sugar, ii) Fertilizer, iii) Cement, iv) Fermentation and Distillery, v) Aluminium, vi) Petro-chemicals, vii) Thermal Power,

viii) Caustic Soda, ix) Oil Refineries, x) Sulphuric Acid, xi) Tanneries, xii) Copper Smelting, xiii) Zinc Smelting, xiv) Iron and Steel, xv) Pulp and Paper, xvi) Dye and Dye Intermediates, xvii) Pesticides, xviii) Pharmaceuticals.

Small Scale Industries

i) Tanneries, ii) Pulp and Paper, iii) Dye and Dye Intermediates, iv) Pesticides, v) Pharmaceuticals.

The National Awards for Prevention of Pollution are bestowed on 23 industries (18 scale and five small scale industries), one each for the above mentioned categories of industries based upon their performance during the Award financial year.

The Rajiv Gandhi Environment Award for Clean Technology is given to the one which is the best among these industries, particularly from the angle of adoption of the clean technology. The Awards comprise a Cash Award of Rupees one lakh in addition to a silver Trophy and a Citation.

The Rajiv Gandhi Environment Award for Clean Technology for the year 2008-2009 awarded to M/s Reliance Infrastructure Limited, Dahanu in recognition for its outstanding efforts towards conservation and protection of the environment through use of innovative practices and cleaner technologies.

National Award for Prevention of Pollution for the year 2008-2009 was awarded to M/s Indian Rayon, Veraval, Gujarat (under the Caustic Soda category), M/s Binani Cement Limited, Sirohi, Rajasthan (under the Cement category), M/s Indian Farmers Fertilizer Cooperative Ltd. (IFFCO), Phulpur Unit, Allahabad, Uttar Pradesh (Under Fertilizer category), M/s Reliance Industries Ltd., Dahej, Gujarat (under the Petrochemical category), M/s BILT Graphic Paper Products Ltd., Kerala (under the Zinc Smelting category) for their commendable efforts towards conservation of

energy and water, reduction in waste generation and commitment towards maintaining a safe, clean and healthy environment.

Nominations were invited for the National Awards for Prevention of Pollution and the Rajiv Gandhi Environment Award for Clean Technology for the year 2009-2010. Sixty five nominations have been received for the Awards for the year 2009-2010 and evaluation of the same are being processed for consideration of the Award Committee.

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 ₹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 Maozgendri 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 ₹One lakh each, along with medallions, and citations, are given to:

- Education and research institutions and organizations, and
- Forests and Wildlife Officers/research

10

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 Srivastava.

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.

Medini Puraskar

The Hon'ble Minister of State (Independent Charge) honoured five writers under Medini Puraskar Scheme with a view to encourage writing of original books in Hindi, on the subjects related to the environment for the year 2009.

CHAPTER-11

**ENVIRONMENTAL
INFORMATION**



Environmental Information System (ENVIS)

Introduction

Environmental information plays a paramount role not only in formulating environmental management policies but also in the decision making process aiming at environmental protection and improvement of environment aim at sustaining good quality of life for the living beings. Hence, management of Environment is key component and thus plays an important role in effecting a balance between the demands and resource available there by keeping the environmental quality at a satisfactory level. Realizing of such need 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 carry out 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/UT 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/UT 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

The long term and short term objectives of Environmental Information System (ENVIS) are as follows:

Long Term Objectives

- To build up a repository and dissemination centre in Environmental Science and Engineering;
- To gear up State of Art 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 meeting 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 / Achievements carried out by ENVIS Network during the year

The ENVIS network comprising both on the subject specific areas and status of environment and related issues established under ENVIS Scheme 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. This was done by updating and maintaining an information base that includes both descriptive information as well as numerical data. Descriptive information in the form of publications, reports, reprints and abstracts on related subjects is stored for dissemination. Numerical data on the same subject are collected, compiled, processed and analyzed for the purpose of dissemination. Documentation in the form of publications and reports are brought out. All the information thus compiled are made available on the website of the respective Centres.

- The Meeting of the Scientific Advisory Committee of Environmental Information System (ENVIS) was held on 25th June, 2010 under the chairmanship of Shri R.H. Khwaja, Special Secretary of the Ministry to review the functioning of the scheme, provide guidelines for the implementation and other necessary mid-course corrective directions, if any, towards meeting the stated objectives of the scheme. During this meeting it was recommended *inter-alia* that a Sub-Committee should be constituted to look into the various issues pertaining to ENVIS Scheme. Accordingly, a Sub-Committee was constituted and its Terms of Reference finalized to look into the various issues pertaining to ENVIS Scheme. The first meeting of the sub-committee was held on 26th October, 2010. The second meeting of the Sub-

Committee for ENVIS Scheme was held on 23rd November, 2010. As some ENVIS Centres were called for discussion/presentation before the Committee. The Report of the Committee drafted and under finalization and will be submitted to Ministry for consideration.

- A National Evaluation Workshop for all ENVIS Centres was held on 5-6th April, 2010 at Gangtok, Sikkim. The evaluation was done by an independent Expert Committee constituted by the Ministry. The Committee after carefully going through the presentation of each ENVIS Centre graded their performance and provided suitable guidelines and suggestions for further improvement in the functioning of the ENVIS Centres. Necessary follow up action have been or are being taken on the recommendation of the Evaluation Committee.
- ENVIS Focal Point in the Ministry is responsible for maintenance and updation of the website of the Ministry (URL: <http://www.moef.gov.in>) and disseminating information through the website to all concerned. Information in the Ministry's website was continuously updated by ENVIS focal point throughout the year. The website (Fig.-84) 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. The website recorded a huge number of hits per month reflecting the usage of website by various national and international users. Ministry's website has been revamped with better look, content and design adopting latest technologies

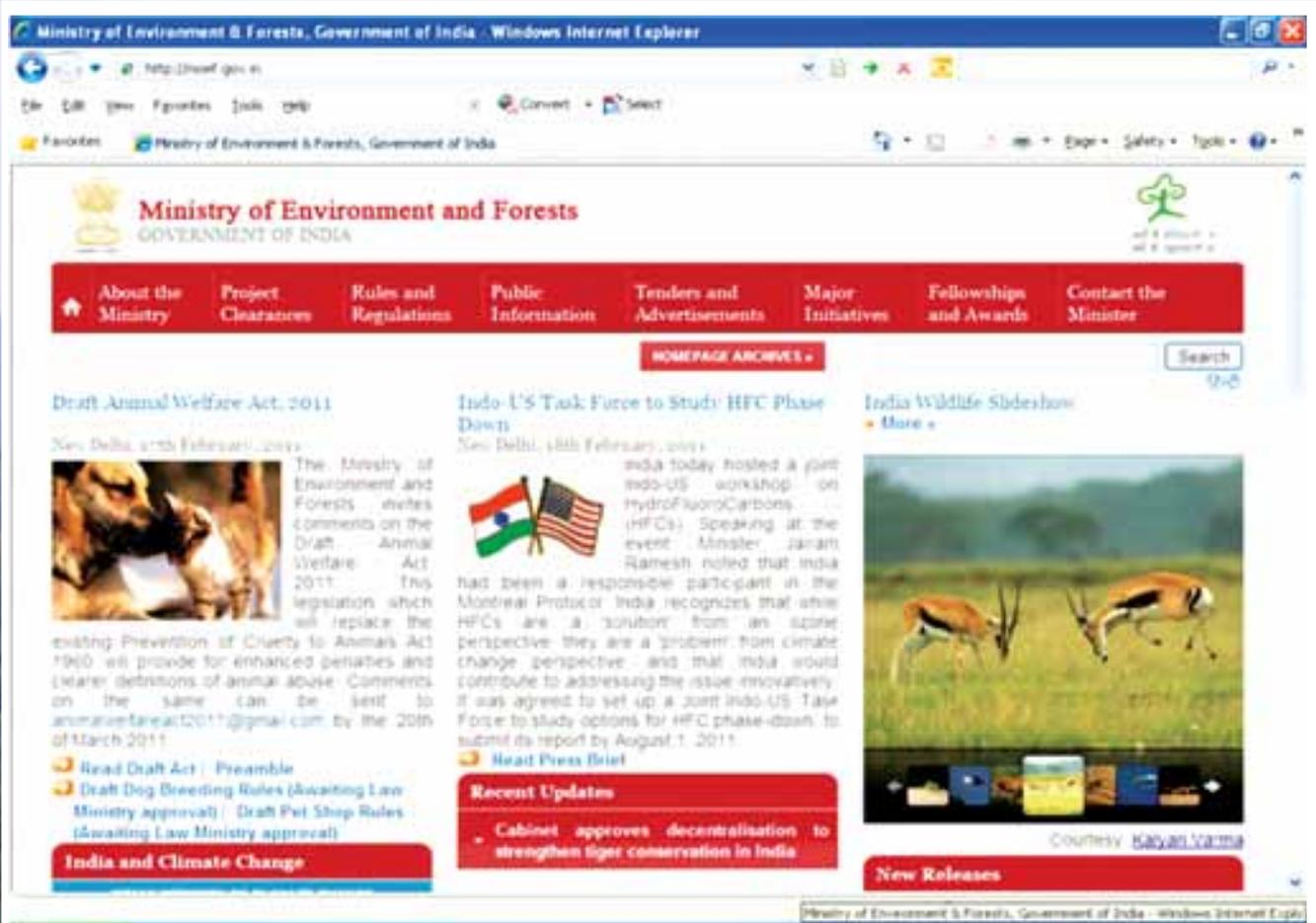


Fig-84. Ministry's website (<http://moef.gov.in>)

and keeping in view of the guidelines for development and management of government website to make it more transparent and user friendly. Efforts are also continuously made to make Ministry's website up to date and user friendly.

- A portal of ENVIS at URL: <http://www.envis.nic.in> connecting all the ENVIS network partners are updated regularly by the focal point. 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 established. The websites of all the ENVIS network partners could be directly accessed from the homepage of the portal giving information on major events, activities and

current updates of the entire network. An effort is being made to redesign and to have better look and user friendly by revamping to the portal.

- The Ministry has initiated the process for cyber security audit of 36 ENVIS websites which are hosted on the NIC Server in the first phase in collaboration with NICS/ NIC as per Govt. of India's Guidelines for Govt. websites. The websites will be audited and complied with respect to Web Security Guidelines issued by Indian Computer Emergency Response Team (CERT-In). Apart from auditing, removal of vulnerable pages, redesigning, restructuring of the website, uniformity of the navigational pages/links/hyperlinks, etc, will also be taken care of during this exercise.

- Query-Answer Service is one of the major responsibilities of ENVIS Network. The ENVIS focal point and all its partners responded a large number of queries during the year and provided substantive information as far as possible. Wherever, information is not readily available, the network provided 'Referral Service' to the concerned users. The major subject-areas on which the queries were responded to pertain to climate change, ozone layer, environmental conservation, environmental standards, environmental education and awareness, water and air pollution, waste management and environmental laws etc.
- ENVIS focal point coordinated and published the Annual Report 2010-11 of the Ministry and got it distributed to various Central and State Government Departments, professional institutions, universities, research organizations, embassies/High Commissions of various countries in India, etc. The electronic version of current and achieved Annual Reports are also available on the website of the Ministry.
- A one-day Seminar on "Methodology and Procedures for popularizing ENVIS network among the stake holders: A study of Delhi ENVIS Centres" which was organized by the Ministry in collaboration with The Energy and Research Institute (TERI), New Delhi on 26th November, 2010 at New Delhi. The main theme of the Seminar was to find a suitable feasible strategy to be adopted by the ENVIS Centres in order to popularize the ENVIS Scheme among the stakeholders in view of the changed scenario. Forty six participants including representatives from ten ENVIS Centres in Delhi along with the user community and Ministry officials were present. The recommendations of the seminar are being considered by the Ministry.
- The ENVIS World Wildlife Fund (WWF), Delhi organized a seminar to celebrate the 25 years of the ENVIS Scheme. Head, EI Division gave the key note address. Officers/officials of EI Division was also present. All the Centres established during the initial stage participated and presented their achievements throughout the years and suggested for strengthening and streamlining of the ENVIS scheme for its better performance in the coming days. The Centre has also compiled the compendium "Environment in the Indian Parliament, and Analysis 2010, and extensive database of Parliamentary matters related to the Environment in the Lok Sabha and Rajya Sabha and is under printing.
- As a follow up to the Hon'ble President of India's address to the Joint Session of the Parliament on 4th June, 2009, the Ministry published the 'Report to the People on Environment and Forests 2009-10". The purpose of the Report is to generate a national debate on environmental issues, which will form the basis for suitable revision in the policy frame-work, wherever required, and ultimately result in improved performance in Environment and Forests Sector. The Report has been hosted in the Ministry's website and widely distributed to all the stakeholders concerned with the development of the environment and forestry sector of the country.

Indian State Level Basic Environmental Information Database (ISBEID)

In order to develop the relevant databases on several environment and its related parameters and to make it online to the Ministry for to and fro information flow, a web enabled software, namely, Indian State Level

Basic Environmental Information Database (ISBEID) was developed by ENVIS focal point in collaboration with National Informatics Centre (NIC). The objective for development of this software is to cover the gap in environmental data dissemination with regard to vast parameters such as air pollution, water pollution, forestry, land resources, flora and fauna. The software developed in-house consisted of 17 modules to help the state government centres to collect, compile and disseminate information at state level on the selected modules and fill in the data online in a centralised server.

A software module for spatial interface with GIS application in the ISBEID software was developed by NIC through NICS. The major objective of the software was to (i) Develop an internet based GIS application, (ii) Provide one stop information to the users, (iii) Interactive maps capable of handling operations like zoom in/out, pan, print, measure etc. and (iv) Querying the database interactively.

Initially the database consisting of 23 modules in various environmental fields was tested on pilot basis by eight states with 12 modules in two phases. During the two phase of the programme it was observed that there were some practical problems in collecting the data and filling the database software. After deliberations it was decided that the existing 23 modules will be revisited and revised in consultation with all the State/UT ENVIS Centres and to extend the ISBEID project for all the States/UTs. Accordingly, the database module was revised in consultation with the state ENVIS Centres in a workshop organized for this purpose at Hyderabad during 7th - 8th June, 2010 and finally the number of modules has been reduced to 17. Simultaneously, the ISBEID programme is being extended to all the State/UT ENVIS Centres throughout the country in collaboration with

NICS/NIC. The database software for the revised 17 modules is complete and has been given to the State/UT ENVIS Centres for entering data in the MIS software. The development of the GIS interface software is in progress.

State of Environment Reporting (SoER) Scheme

- During the 10th Plan period, Ministry launched SoER scheme which 100% central assistance was provided to the States/UTs to prepare their State of Environment Report. The scheme for preparation of State of 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 each State/UTs continued during the 11th Five Year Plan. During the year 2010-11, the SoE Reports for the states of Andhra Pradesh, Uttar Pradesh and Union Territory of Lakshadweep and Hyderabad city have been completed and are under printing. The SoE Report for the states of Arunachal Pradesh, Karnataka, Tripura, Jammu & Kashmir and for the metro cities of Chennai and Delhi are in progress.
- The Ministry developed an "Interactive State of Environment Atlas – 2008" in collaboration with Development Alternatives, New Delhi. The dossier and the website on SoE Atlas were released by the then Hon'ble MoS (E&F) and then Secretary (E&F) on the Earth Day i.e. 22nd April, 2008. The Atlas is a compilation of categorized thematic maps on green (forests and biodiversity), blue (water resources) and brown (pollution) environmental issues and provides flexibility and versatility for users to visualize environmental spatial data using simple GIS functionalities. Development

Alternatives was entrusted with the job of updation of the Atlas for the period up to 31.03.2010. A stakeholder workshop was held on 02.12.2010 for finalization of the Atlas. The updated "Interactive State of Environment Atlas" will be hosted on the Ministry's website shortly.

Statistical Cell

- The role of Statistical Cell in the Ministry *inter alia* includes assistance to 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. During the year the Cell provided inputs for various publications of Central Statistical Organizations on environment and forests.
- ENVIS has been representing the Ministry and providing inputs in various Committees of the Government, especially those constituted by Ministry of Statistics and Programme Implementation such as 'Development of Database on Climate Change', 'Issues in the Estimation of GDP of Forestry Sector' etc. It also provided necessary information for publication of Compendium of Environmental Statistics, Statistical Abstracts, etc., periodically as per the recommendation of the National Statistical Commission.
- A two-day workshop on Capacity Building of limited ENVIS Centres and Central and Statistical Officers (COCSSO) was held in New Delhi on 22nd & 23rd September, 2010. The two-day workshop was organized jointly by ENVIS in the Ministry and CSO, Ministry of Statistics and Programme Implementation. This joint workshop was held as a follow up to a recommendation of the 16th Workshop of COCSSO attended by Statistical Advisor, EI Division. The joint workshop was

attended by 13 ENVIS Centres, eight representatives from State Directorate of Economic Statistics and representatives from Central Government Ministries, officials of MoEF and CSO.

- The Ministry participated in the 15th Commonwealth Statisticians Conference organized by the Ministry of Statistics in New Delhi during 7th -10th, February, 2011. This is one of the most important global Conference of Official Statisticians and is considered prestigious in the arena of statistics. The objective of the conference is for commitment to sharing experience and information, continuous dialogue, collaborative networking, bridging gaps between people, infrastructure and processes for the strengthening and improvement of the statistical systems among the Commonwealth countries.
- Statistical Advisor attended the meeting on Environment Statistics in Delhi organized by the Directorate of Economics and Statistics (DES), Govt. of National Capital Territory of Delhi (GNCTD) on 04-02-2011. The focus of the meeting was on environment statistics in Delhi and related Millennium indicators and to strengthen the ENVIS Centre located in GNCTD.
- Statistical Advisor as a representative from the Ministry, attended the UNEP Global Environment Outlook 5 Consultation Meeting held at Nairobi during 29th - 31st March, 2010.
- Statistical Advisor has been nominated by the Ministry to act as Nodal Officer for the Development Information System (DevInfo), a database system for monitoring human development. It is a tool for organizing, storing and presenting data in a uniform way to facilitate data sharing at the country, regional and global

levels across government departments, UN organizations, civil society organizations and development partners. It is funded by eight UN organizations.

Information and Facilitation Centre (IFC)

- The Information & Facilitation Counter at Paryavaran Bhavan has been functioning for over four years with the assistance of Centre for Environment Education, a Centre of Excellence supported under this Ministry. The IFC is equipped with a helpdesk, touch screen computer and open display area to guide the visitors.
- 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. The priced publications of the Ministry are available from the IFC.

- 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 different Ministries/ Departments and other Government agencies on various issues including creating a database relating to NGOs working in the field of environment and its associated areas.

Attending parliament questions/matters/ RTI applications on NGOs.

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 implementation of the National Environment Policy 2006, National Green Tribunal Act, 2010, Ecomark Scheme and work relating to establishment of National Environment Assessment and Monitoring Authority (NEAMA).

The National Green Tribunal Act, 2010

The National Green Tribunal (NGT) Act, 2010 has been brought into force on 18th October, 2010. The Notifications relating to establishment of NGT and appointment of Justice Shri L.S. Panta as Chairperson, NGT have also been published in the Gazette of India on 18th October, 2010.

The NGT has been established for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The Tribunal

shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.

The Tribunal’s dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal is mandated to make an endeavor for disposal of applications or appeals finally within six months of filing of the same. Initially, the NGT is proposed to be set up at five places of sittings and will follow circuit procedure for making itself more accessible. New Delhi is the Principal Place of Sitting of the Tribunal.

National Environment Assessment and Monitoring Authority (NEAMA)

The Ministry has initiated a proposal to establish a National Environment Assessment and Monitoring Authority (NEAMA) to strengthen the regulatory framework and to improve the environmental governance in the country particularly in the fields of environment impact assessment and coastal zone management. The earlier National Environment Protection Authority (NEPA) has been rechristened as NEAMA in line with its proposed mandate. A concept note on NEPA was uploaded in the Ministry’s website on 25th May, 2010 for suggestions and as part of the consultation process, a meeting was held in May, 2010 in New Delhi in which representatives of State Governments, State

Pollution Control Boards/Pollution Control Committees, Central Pollution Control Board and line Ministries participated. A project titled 'Scope, Structure and Process of NEAMA was awarded by MoEF to Indian Institute of Technology (IIT), Delhi and the draft study report has been uploaded on the Ministry's website on 26th November, 2010 for comments. NEAMA is a part of the larger environmental regulatory reform agenda of the Ministry.

Trade and Environment

Trade and Environment Cell

Trade and Environment Cell of the Ministry undertakes the following items of work :

- Provide technical inputs to the preparatory process in the area of Trade and Environment, in particular, items under negotiations in the World Trade Organization (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 Project on Trade and Environment.

Activities undertaken during the year

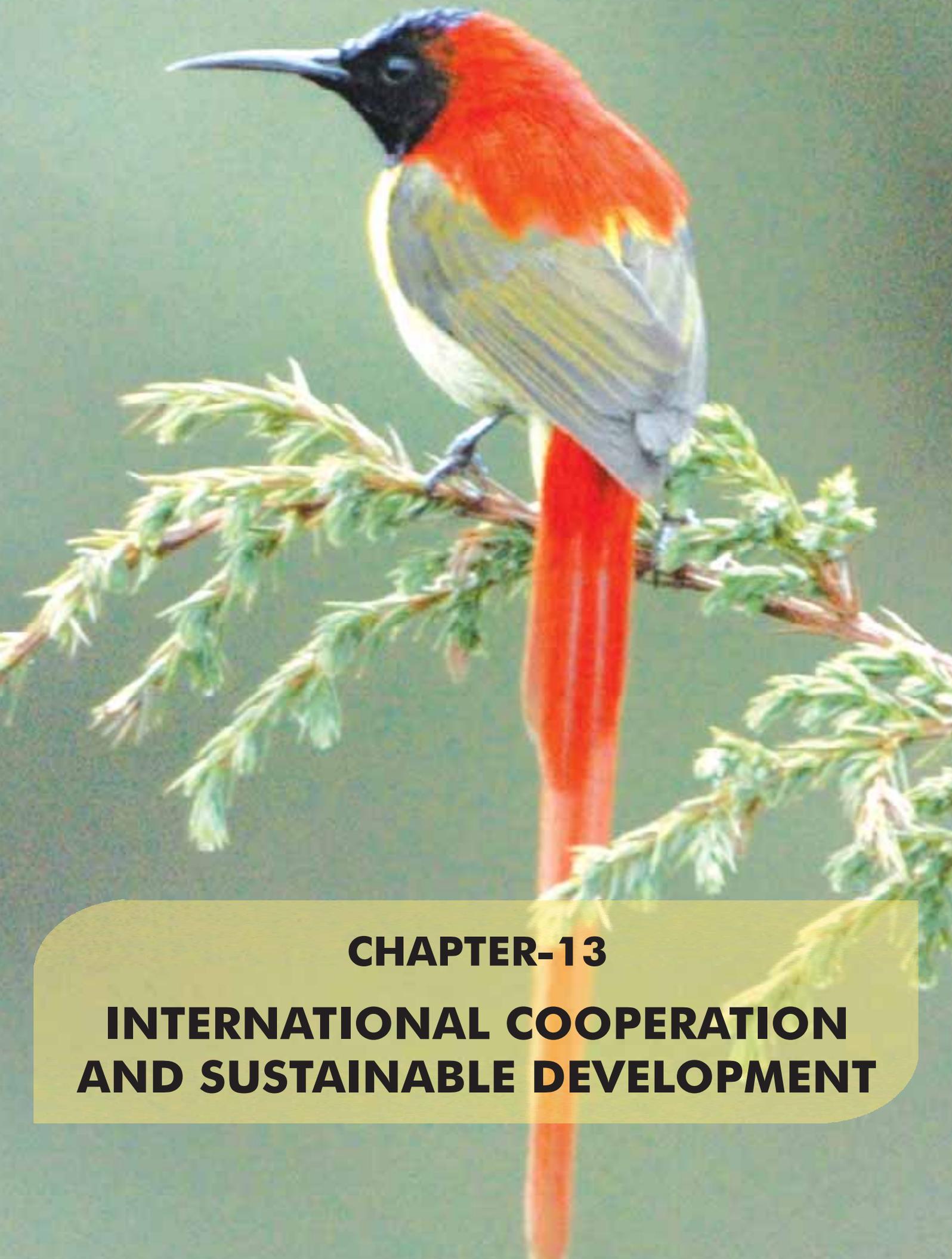
During the year 2010-11, the Trade and Environment Cell of the Ministry examined and furnished inputs from environment and forestry point of view to the Department of Commerce facilitating participation in the on going

negotiations under the Doha Round under the aegis of the World Trade Organization (WTO). Inputs regarding both in the area of Environmental Goods and Services were provided as and when required. In addition to this Trade and Environment Cell examined a number of Regional Trade Agreements (RTA), Bilateral Investment Protection Agreements or Investment Treaties, Comprehensive Economic Cooperation Agreements (CCEA) from the environment and forestry point of view. Agreements from Singapore, New Zealand, Burkina Faso, Indonesia etc. were examined and comments furnished. In addition to this inputs to the Department of Commerce (DoC) were provided on REACH as a Non-Tariff Barrier on chemicals by European Union (EU) and China, Genetically Modified Organisms, and further firming up the list approach in case of Environmental Goods. Inputs to the Committee of Secretaries on the issue of opening up of Wild Life exit points at Bangalore airport to regulate trade in protected Wild Life species were also furnished. Inputs to the Department of Industrial Policy and Promotion were provided on issues related to Transfer of Technology (ToT), IPRs, environmentally sound technology etc. Proposals for opening up of liaisoning offices in India by developed countries were processed too.

The consultancy project, 'Programme on Trade and Environment' continued during the year. The dedicated website - <http://www.mse.ac.in/Trade/index.asp> - functions as

one-stop resource for Trade and Environment related issues in India with comprehensive coverage of Doha development agenda, General Agreement on Trade in Services, Regional Trade Agreements, TRIPS, and Trade

& Environment in the context of WTO. As part of the project activities, a two-day National Seminar was organized at MSE during 26-27 October 2010 in collaboration with the Ministry of Environment and Forests, New Delhi.



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 Bilateral and Multilateral Environmental Agreements. These include Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that deplete the Ozone Layer, 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), UN Commission for Sustainable Development (CSD), United Nations Development Programme (UNDP), the World Bank, UNIDO, 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), India Brazil South Africa (IBSA) Summit on Environment, etc. The Division also handles bilateral country to country co-operation in the areas of environment protection and sustainable development. This Division also deputes officers for participation in conventional meetings organized by UNEP, UNDESA, GEF and other UN Agencies and international organizations.

Progress/Achievements during the year

Commission on Sustainable Development (CSD)

- The United Nations Conference on Environment and Development (UNCED), also known as Earth Summit or Rio Summit, was held at Rio-de-Janeiro, Brazil in 1992, had adopted the 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. The Commission meets annually in New York, USA.
- 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 the Agenda 21. The 18th Session (being the Policy Session) of the Commission on Sustainable Development (CSD), was held from 3-14 May, 2010 in New York as Review Session, which had considered the thematic areas of transport, chemicals, waste (Hazardous and Solid waste), mining, sustainable consumption and production. A delegation from India comprising senior officers from this Ministry had attended the above Session under the leadership of the Secretary, Ministry of Environment and Forests. The final report of the meeting is available at the UN Website at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N10/381/00/PDF/N1038100.pdf>.

- The participating countries in the CSD meetings are required to submit their National Reports on thematic issues of the meeting once in two years cycle. India had already submitted its National Report "Towards Sustainable Growth: Transport/ Chemicals/Waste Management/Mining/ SCP" to the Commission in its 18th Session during 2010.
- The CSD will organize its 19th Session as Policy Session in New York, USA from 2-13 May, 2011. Being a Policy Session, the CSD will focus to arrive at policy options and possible actions to expedite implementation of actions of the Agenda 21 with respect to the pre-decided thematic areas of transport, chemicals, waste (Hazardous and Solid waste), mining, sustainable consumption and production.
- Before the 19th Session, the Commission will hold an Intergovernmental Preparatory Meeting in New York from 28 February, 2011 to 4 March, 2011 which will serve as a funnel by way of broad-based discussions with respect to above thematic areas and to identify policy options and possible actions in the form of negotiable text for consideration and adoption in the 19th Session.

United Nations Environment Programme (UNEP)

- The United Nations Environment Programme (UNEP) established in 1972, after the Rio Earth Summit held in Brazil in 1992, 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

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.

- One of the main responsibilities of the UNEP is to keep under review the world environmental situation and ensure that emerging environmental problems of wide international significance are prioritized and receive appropriate and adequate consideration by the Governments.
- The Governing Council/Global Ministerial Environment Forum of the UNEP is the high level environment policy forum which brings the world's environment ministers together to review important and emerging policy issues in the field of the environment. The Council/Forum meets annually at Nairobi, Kenya in general sessions and outside Kenya in special sessions in alternate years.
- The UNEP Council/Forum had organized its 11th Special Session at Bali, Indonesia from 24-26 February, 2010. 'Environment in the multilateral system' was the theme of the session under which various issues of international environment governance, green economy, biodiversity and ecosystem services, international law etc. were covered. The Indian Delegation was led by Secretary, Ministry of Environment and Forests. In the above Session, Nusa Dua Declaration was adopted with the objective to keep the nations committed to strengthening the role of the United Nations Environment Programme as the leading global environmental authority that sets the global environmental agenda, that promotes the coherent implementation of the environmental dimension of sustainable development

within the United Nations system, and that serves as an authoritative advocate for the global environment. The proceedings of the meeting as well as Nusa Dua Declaration may be seen at UNEP website at http://unep.org/gc/GCSS-XI/proceeding_docs.asp .

- The 26th Session of the UNEP Governing Council/Global Ministerial Environment Forum (Council/Forum) will be held in UNEP's Headquarter at Nairobi, Kenya from 21-24 February, 2011. It is a major international event which is attended by developed, developing and least developed countries and small island developing states. In an effort to make the session as climate neutral and environment friendly with the concept of 'Greening the Governing Council', the UNEP will conduct a paperless conferencing system for the 26th Session, which will be first time in the Governing Council/Global Ministerial Environment Forum.
- Under the policy issues, the Council/Forum will discuss the issues of international environmental governance, world environment situation, chemicals management, including mercury, intergovernmental science-policy platform on biodiversity and ecosystem services, sustainable consumption and production, waste management, protection of marine environment from land based activities, financing options for chemicals and wastes. Apart from these, the Council/Forum will also consider following two topics under the emerging policy issues in the ministerial consultations :
 - (i) Green economy: benefits, challenges and risks associated with a transition to a green economy;
 - (ii) International environmental governance.

(ii) International environmental governance.

The Ministry is in the process of participating in the meeting.

- Government of India provides contribution to the UNEP Environment Fund annually at the rate of US \$ 100,000. Contributions upto the calendar year 2010 has been transmitted to the UNEP Secretariat.

Rio+20 Process

- The United Nations Conference on Environment and Development (UNCED), also known as the Rio Summit, Rio Conference, Earth Summit was organized by the United Nations as a major United Nations conference in Rio de Janeiro, Brazil from 3 June to 14 June 1992 to find ways to halt the destruction of irreplaceable natural resources and pollution of the planet. Hundreds of thousands of people from all walks of life were drawn into the Rio process. The Summit brought out 'Agenda 21'- an unprecedented and comprehensive programme of action for global action in all areas of sustainable development.
- The Rio Summit will complete 20 years in 2012. With a view to commemorate the 20th anniversary of the Rio Summit, the United Nations is going to hold the United Nations Conference on Sustainable Development (UNCSD) known as Rio+20 Process at Rio-de-Janeiro, Brazil during May, 2012. The Rio+20 will mainly comprise two themes viz: (a) Green Economy in the context of Sustainable Development and Poverty Eradication and (b) The Institutional Framework for Sustainable Development.

- The Ministry will participate in the Rio+20 events and is planning to put in place several synopsis studies on green economy, institutional framework and progress of implementation of the Agenda 21 in India.

Global Environment Facility (GEF)

- India is a founder member of GEF (www.gefweb.org), the largest multilateral funding mechanism providing incremental project grant to the developing countries on global environmental issues with local benefits. Set up in 1991, 182 governments are its members. India is both a donor and recipient of GEF grant. We chair and represent the GEF South Asia Constituency (comprising of Bangladesh, Bhutan, Nepal, Maldives and Sri Lanka) in the GEF Council meetings twice a year. The 3rd GEF South Asia Constituency meeting was hosted by the Government of Bangladesh in Dhaka focusing on GEF 5 operational and programming issues.
- The Ministry of Environment and Forests (MoEF) is the GEF Operational Focal Point for India for coordination and operational matters. Department of Economic Affairs (DEA) in Ministry of Finance is the GEF Political Focal Point for India dealing with policy and governance issues. The GEF Empowered Committee chaired by Secretary (E&F) guides, approves and overlooks GEF operations in the country.
- Since 1991, India has accessed USD 326 million as GEF grant and of this USD 154 million was accessed during the GEF 4 cycle (July 2006 – June 2010). The projects developed during GEF 4 cycle are on Sustainable Transport, Energy Efficiency initiatives in Commercial

Building, SME, Railways, Chillers, Tea processing and Brick manufacturing sectors, bio-safety issues, access and benefit issues under the Biological Diversity Act, Programmatic Approach on Marine Conservation, Programmatic Approach on Sustainable Land and Ecosystem Management amongst others. Since inception, about USD 2 billion has been leveraged as project co-financing. India has contributed USD 51 million to the GEF Trust Fund (1991 - June 2014).

- The Ministry has actively participated in the GEF 5 replenishment negotiations of the GEF Trust Fund at the global level and was able to initiate several operational reforms to the GEF. We have received an indicative allocation of USD 129 million under GEF 5 cycle (July 2010 – June 2014) and in consultation with the concerned stakeholders, the Ministry has initiated the process of identification, prioritization and preparation of GEF 5 (July 2010 – June 2014) programming plan for submission to the GEF Secretariat.

Small Grant Programme (SGP)

- 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 grassroot organizations. SGP is a country wide, focus on the tribal, remote, inaccessible areas and with Indigenous tribal people. SGP India has funded more than 300 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. During, GEF-5 cycle, SGP-India will be a full scale project involving US\$ 5 million as GEF grant.

- The SGP in India is being hosted and coordinated by the Centre for Environment Education (CEE), Ahmedabad. The National Steering Committee chaired by the Joint Secretary, IC and GEF Operational Focal Point, 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.

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 Ministry provides Government of India's annual contribution to the SACEP. The Ministry has sanctioned an amount of Rs. 16,99,755/- and released an amount of Rs. 14,00,000/- as first installment of the contribution for the calendar year 2010.

- SACEP Governing Council met on November 1-3, 2010 at Colombo, Sri Lanka during which the chair of the Governing Council got passed on from India to Sri Lanka.

South Asian Association for Regional Cooperation (SAARC)

- The South Asian Association for Regional Cooperation (SAARC), which is an intergovernmental body, was established in 1985 with the aim to provide a platform for the peoples of South Asia to work together in a spirit of friendship, trust and understanding so that the process of economic and social development in Member States could be accelerated. The SAARC has eight countries as its members, viz., Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka.
- With a view to provide directives and mandate for regional co-operation under the SAARC, the SAARC Secretariat organizes meeting of the Heads of State or Government once a year or more often as and when considered necessary by the Member States known as SAARC Summit. So far sixteen Summits had been held.
- The Sixteenth Summit of the South Asian Association for Regional Cooperation was held in Thimphu, Bhutan from 28-29 April, 2010 as Silver Jubilee Year of SAARC with the theme of "Towards a Green and Happy South Asia". The Heads of States emphasized the need to develop a 'Vision Statement'. They agreed to form a 'South Asia Forum' for the generation of debate, discussion and the exchange of ideas on South Asia and its future development. Dr. Manmohan Singh, the Prime Minister of India had led a full fledged delegation

to attend the above meeting. In the Summit, the SAARC Convention on Cooperation on Environment was signed by the Member States and called for its early ratification and implementation by the member states. The draft of SAARC Convention was formulated by the Ministry in 2009. The Ministry has ratified the SAARC Convention on Cooperation on Environment thus legally binding for the implementation of the Convention.

- So far, eight Environment Ministers Conferences of SAARC countries 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.
- During the 8th meeting of the SAARC Environment Ministers held in New Delhi, India from 19-20 October, 2009, Shri Jairam Ramesh, Minister for Environment and Forests had announced a one time grant of one million US dollar each for capacity building and strengthening of SAARC Forestry Center in Bhutan and SAARC Coastal Management Center in Maldives equivalent to ₹10.00 crore. The first installment of ₹3.84 crore, being 40% of the total grant were released during 2009-10 to SAARC Secretariat. The second installment of ₹3.74 crore being remaining 40% of the grant was released during 2010-11.
- The Ministry had been entrusted with the responsibility to organize training, including specialized training of government officials on different issues of mutual interest in the area of environment for the officials of the SAARC countries.

Delhi Sustainable Development Summit

- Sustainable Development being a thrust area of the Ministry, it has been supporting the Energy and Resources Institute (TERI), New Delhi in organizing Delhi Sustainable Development Summit (DSDS) since 2001. So far 10 such summits have been organized.
- The 10th Delhi Sustainable Development Summit was organized by TERI on 5-7 February, 2010. The theme of the summit was 'Beyond Copenhagen: New Pathways to Sustainable Development' with a view to think over the growing global warming and climate change concerns being faced by developing world.
- The 11th Delhi Sustainable Development Summit was organized on 3-5 February, 2011 with the theme focusing on "Tapping local initiatives and tackling global inertia". The event was attended by around 700 participants ranging from governments, policy makers, UN officials, NGOs etc. from India and abroad. The event was inaugurated by Prime Minister of India.

The World Bank

- IC&SD Division is the 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.

SEED Initiative

- The SEED Initiative, founded by UNEP, UNDP and IUCN at the 2002 World Summit on Sustainable Development in Johannesburg, is a global partnership for

action on sustainable development and the green economy. SEED supports innovative small-scale and locally driven entrepreneurs around the globe which integrate social and environmental benefits into their business model. SEED offers two main types of support to social and environmental entrepreneurs: (i) Resources and (ii) Tools.

- Government of India had announced a one time contribution of US \$ 100,000 to the SEED Initiative to support development of projects pertaining to sustainable development. The Ministry has released ₹48.00 lakh to the SEED Secretariat for the purpose.

Bilateral Cooperation

Ministry of Environment and Forests has about 20 bilateral cooperation agreements with a number of countries such as the U.K., France, Germany, Denmark, Sweden, Norway, the E.U. etc. Most of these agreements are operated through the mechanism of Joint Working Groups. These agreements provide mechanism for international interactions and consultations in the field of environment.

Some of the important Joint Working Group Meetings which have been held during the period are as under –

- The second meeting of India-Canada Forum for Environmental Cooperation was held in New Delhi on 13-14 September, 2010. Bilateral cooperation issues relating to pollution control, climate change, hazardous waste management, bio-diversity and forest management were discussed in the meeting. Capacity building of Indian scientists/officers in air quality monitoring was decided as one of the important areas of future cooperation.

- The fourth meeting of EU-India Environment Forum was held on 21st October, 2010 in New Delhi on “Ship Dismantling – Towards a Safe and Environmentally Sound Recycling of Ships”.
- The fifth meeting of the India-Norway Joint Working Group was held on 9th November, 2010 in New Delhi. The issues relating to bio-diversity and bio- safety, chemicals and environmental hazards, climate change, glaciology and sustainable development were discussed as areas of future cooperation between the two countries. A proposal of CPCB on “Recovery of alternative fuels and raw materials and treatment of organic hazardous wastes through co-processing in resource and energy intensive industries in India” is under consideration for Norwegian funding.
- The first meeting of Indo-Swedish Joint Working Group on Environment was held on 1st December, 2010. Potential areas of cooperation identified with the Central Pollution Control Board include clean technology and zero- discharge in polluting industries, air quality management. Besides issues of climate change, bio-diversity and hazardous waste management were also discussed. Paper & Pulp and Pharmaceuticals were inter-alia identified as two major areas of cooperation with Sweden.
- A Memorandum of Understanding (MoU) for Cooperation in the field of environment protection with Egypt was finalised with the approval of the Government. Waste management, air quality and water quality, use of bio-fuels, protection of wetlands and water conservation, etc. are the identified areas of cooperation under this MOU.

United Nations Convention to Combat Desertification

The United Nations Convention to Combat Desertification (UNCCD) is one of the Rio Conventions that focuses on desertification, land degradation and drought (DLDD). 'Desertification' as defined in the UNCCD refers to land degradation in the drylands (arid, semi arid and dry sub humid regions) resulting from various factors and does not connote spread or expansion of deserts.

UNCCD, with 194 Parties recognizes land degradation as an important factor affecting some of the most vulnerable people and ecosystems in the world. The convention aims at adaptation and can, on implementation, significantly contribute to achieving the Millennium Development Goals (MDGs), as well as sustainable development and poverty reduction by means of arresting and reversing land degradation.

The convention promotes sustainable land management (SLM) as solution to global challenges. Land degradation is long-term loss of ecosystem function and productivity caused by disturbances from which the land cannot recover unaided. While Sustainable Land Management is focused on changes in land cover/land use in order to maintain and enhance ecosystems functions and services.

As the Convention enters its second decade, the Parties unanimously adopted the 10-year strategic plan and framework to enhance the implementation of the Convention for 2008-2018 (The Strategy) at COP8, held in Madrid in September 2007. The Strategy provides a unique opportunity to address some of the Convention's key challenges, to capitalize on its strengths, to seize opportunities provided by the new policy and financing environment, and to create a new, revitalized common

ground for all UNCCD stakeholders. The Strategy contains the "strategic objectives" to be achieved over the 10 years, and the "operational objectives" that guide the actions of short and medium-term effects. The strategy can be downloaded at http://www.unccd.int/knowledge/docs/The_Strategy_leaflet-english.pdf.

India became a signatory to the United Nations Convention to Combat Desertification on 14th October 1994 and ratified it on 17th December 1996. With about 32% of its land being affected by land degradation, India has high stakes and stands strongly committed to implementing the UNCCD. The Ministry of Environment and Forests is the nodal Ministry in the Government of India for the UNCCD, and Desertification cell is the nodal point within the Ministry to co-ordinate all issues pertaining to the convention. Additionally, India is also the Chair of the Regional Implementation Annexe for Asia – a group of 55 country parties to the UNCCD.

Though India does not have a specific policy or legislative framework for combating desertification as such, the concern for arresting and reversing land degradation and desertification gets reflected in many of our national policies which have enabling provisions for addressing these problems. It is also implicit in the goals of sustainable forest management (SFM), sustainable agriculture, sustainable land management (SLM) and the overarching goal of sustainable development which the country has been pursuing. The subject has in fact been engaging the attention of our planners and policy makers since the inception of planning. The first five year plan (1951-1956) had 'land rehabilitation' as one of the thrust areas. In the subsequent plans too, high priority has been consistently attached to development of the drylands.

As per the Desertification and Land Degradation Atlas of India published by the Space Application Centre in 2007 about 32.07% of the land is undergoing various forms of degradation and 25% of the geographical area is affected by desertification. About 69% of the country's lands are drylands and degradation of these lands has severe implications for the livelihood and food security of millions.

India occupies only 2.4% of the world's geographical area, yet supports about 16.7% of the world's human population; it has only 0.5% of the world's grazing land but supports 18% of the world's cattle population. Thus there is tremendous pressure on the land-based natural resources and sustainable land management is crucial for sustainable development and also our progress towards attaining the MDG goals including poverty alleviation.

India formulated and submitted in 2001 a National Action Programme (NAP) to combat desertification, in accordance with the Convention (UNCCD). A broad roadmap to combating desertification, NAP recognizes the multi-sectoral nature of the task, in view of the fact that many of the drivers of desertification have cross cutting dimensions, for instance, poverty of the masses has long been known to be a key driver of desertification and land degradation, which needs to be addressed.

To address the issues of Desertification, Land Degradation and Drought (DLDD) and build synergy with other RIO conventions (UNFCCC & CBD), the Sustainable Land and Ecosystem Management Country Partnership Program (SLEM CPP) was developed. The SLEM Programme is a joint initiative between the Government of India (GOI) and the Global Environmental Facility (GEF), under the latter's

Country Partnership Programme (CPP). The objective of SLEM Programmatic Approach is to "promote sustainable land management and use of biodiversity as well as maintain the capacity of ecosystems to deliver goods and services". Under this SLEM Programmatic Approach, seven projects have been formulated, and are under various stages of implementation.

Significant achievements

- The 4th National Report was submitted to the UNCCD secretariat on-line in October 2010, using the Performance Review and Assessment of Implementation System (PRAIS) established by decision 12/COP 9. This report, unlike the previous three report already submitted, was aligned with the five (5) Operational objectives and Performance Indicators of 'the Strategy', and information was provided on Performance indicators for the five operational objectives of the Strategy; Financial flows (through the Standardized Financial Annex (SFA) and Programme and Project Sheet (PPS); Best practices on sustainable land management (SLM) technologies, including adaptation; Feedback on indicators and methodologies applied in this reporting and review process, as well as other pertinent information that reporting entities may wish to provide to the COP. A National Consultative meeting with concerned ministries was organized on 17 Aug 2010 and with the Civil Society organizations on 14 Sept 2010 to invite inputs into the national report. A validation meeting was held on 01 Oct 2010 to finalise the report for submission. The final submitted report is available on the ministry website and can be downloaded at <http://moef.nic.in/modules/divisions/desertification-cell/report2010>.

- A delegation comprising of the National Focal Point for UNCCD and Science and Technology Correspondent, will be participating in the meeting of the UNCCD's subsidiary bodies –Ninth session of the Committee for the Review of the Implementation of the Convention (CRIC 9) and the Second special session of Committee on Science & Technology (CST-S2), Bonn, Germany from 16-25 February 2011. Major discussions focused on the analysis of the national reports submitted and on development of Impact indicators for reporting in the next cycle.
- The National Steering Committee for the Sustainable Land and Ecosystem Management (SLEM) programme was constituted on 31 March 2010 with the mandate to endorse the work plans of the SLEM projects and review progress. Accordingly, the first NSC meeting was held on 26 May 2010 and the second meeting is scheduled for 03 March 2011.

Externally Aided Projects (EAPs)

The Externally Aided Projects (EAP) Division deals with the appraisals, approvals and monitoring of Forestry Projects being implemented in the States with assistance from external donors. These projects are implemented in the States with assistance from external funding agencies viz. Japan International Cooperation Agency (JICA), AFD (French Development Agency), World Bank (WB), etc.

The funds are utilized for promoting afforestation, rehabilitation of degraded forest areas, water and soil conservation measures, farm forestry, agro forestry with the aim to increase forest and tree cover as well as to augment availability of fuel wood and fodder, improve the livelihood opportunities and quality of life of the villagers adjoining forests,

strengthening joint forest management institutions to ensure people's participation, besides encouraging tree growing on private land as well as 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 the project. These projects are reimbursed their actual expenditure as per the loan agreements.

At present, nine State Sector Forestry Projects with an investment of about Rs. 4,615 Crores are being implemented in nine States and another project under Central Sector titled "Capacity Building for Frontline Staff in Forestry Sector" with an outlay of Rs. 225 crores is being implemented in 10 States. Details of projects under implementation, their components, project cost, project period, etc. are given in (Table-30).

Projects under consideration for external assistance

The following forestry projects have been included for consideration under the Rolling Plan for FY 2010-12 for external funding:

Under consideration by Japan International Cooperation Agency (JICA)

- Tamil Nadu Natural Resource Management Project-
- Rajasthan Forestry and Bio-diversity Project Phase-II
- Integrated Forestry Development and Bio-diversity Conservation through People's Participation in West Bengal
- Integrated Forest Resources Management Project in Jammu & Kashmir

Table-30. Details of ongoing projects under financial assistance from various funding agencies.

S. No.	Name of the Project	Implementing Agency/ State	Cost (in ₹ crores)	Funding Agency	Components	Project Period
1.	Integrated Natural Resources Management and Poverty Reduction Project in Haryana	Haryana	286	JICA	(i) Soil and Water Conservation (ii) Plantation model and nursery development (iii) Poverty reduction and institution building (iv) Technical assistance (v) Supporting activities (vi) Administration Staff.	2004-05 to 2010-11
2.	Tamil Nadu Afforestation project phase-II	Tamil Nadu	567	JICA	(i) Integrated Watershed Development (ii) Integrated Tribal Development (iii) Forestry Extension (iv) Urban Forestry (v) Capacity Building Research Support (vi) Human Resources Development (vii) Establishment of Modern Nurseries (viii) Improving the infrastructural facilities (ix) Administration (x) Monitoring and Evaluation	2005-06 to 2012-13
3.	Karnataka Sustainable Forests Management & Bio-diversity Conservation	Karnataka	745	JICA	(i) Afforestation (ii) Income Generation Activities for Poverty Alleviation (iii) Biodiversity Conservation (iv) Provision of Basic Infrastructure Support for Field work. (v) Supporting Activities for Forest Management (Research and Training, Consultancy, and Enhancement of Geographic Information System (GIS) and Management Information System (MIS)	2005-06 to 2012-13
4.	Orissa Forestry Sector Development Project	Orissa	660	JICA	(i) Protection and Conservation of Biodiversity of forests (ii) Improving productivity of natural forests. (iii) Providing livelihood options for the people (Support to VSS) (iv) Eco-development and ecotourism activities (v) Catering to commercial and industrial demands. (vi) Capacity building of the Forest Department.	2006-07 To 2012-13

S. No.	Name of the Project	Implementing Agency/ State	Cost (in ₹ crores)	Funding Agency	Components	Project Period
5.	Swan River Integrated Watershed Management Project	Himachal Pradesh	162	JICA	(i) Afforestation (ii) Civil Work for Soil & River Management (iii) Soil Protection & Land Reclamation (iv) Livelihood Improvement (v) Institutional Development	2006-07 To 2013-14
6.	Tripura Forest Environmental and Poverty Alleviation Project	Tripura	460	JICA	(i) Rehabilitation of degraded land. (ii) Rehabilitation of degraded and available non forest land. (iii) Farm forestry in Private holding. (iv) Eco-Development. (v) Service Support. (vi) Rehabilitation of families engaged in shifting cultivation. (vii) Interface forestry Development. (viii) Supporting Works	2007-08 To 2014-15
7.	Gujarat Forestry Development Project - Phase II	Gujarat	830	JICA	(i) (i) Preparatory works (ii) Departmental Forest Development and Management (iii) JFM Forest Development and Management (iv) Social Forestry Development and Management (v) Forest Research (vi) Communication and Publication (vii) Wildlife Conservation and Management (viii) Monitoring and Evaluation (ix) Phase-out works (x) Consulting Services (including price and physical cont.)	2007-08 To 2015-16
8.	Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project	Uttar Pradesh	575	JICA	(i) Plantations, regeneration of forests, etc. (ii) Institutional Strengthening of PMU/DMUs/FMUs (iii) Rehabilitation of Forest Training Institute at Lucknow. (iv) Communication and Publication. (v) Monitoring and Evaluation. (vi) Physical Contingency (vii) Consulting Services	2008-09 To 2015-16

S. No.	Name of the Project	Implementing Agency/ State	Cost (in ₹ crores)	Funding Agency	Components	Project Period
9.	Capacity Development for Forest Management and Training of Personnel	Central Sector Project	225	JICA	(i) To improve training environment for frontline staff through the rehabilitation of States (ii) Forests Training Institutes and through capacity building of frontline forestry staff putting emphasis on Joint Forests Management (JFM), thereby strengthening human resource (iii) Development for sustainable forest management.	2008-09 to 2013-14 (5 years and 3 months)
10.	Sikkim Biodiversity Conservation and Forest Management Project	Sikkim	330	JICA	(i) Forest and biodiversity conservation (ii) Eco -tourism (iii) Joint Forests Management (iv) Supporting Activities (v) Consulting Services	2010-11 to 2019-20
		Total	4840			

- Nagaland Afforestation and Eco-development project

Under consideration by AFD (French Development Agency)

- Assam Project on Forest and Bio-diversity Conservation

Projects under appraisal/ clearance stage for external assistance

The following projects are proposed to be forwarded to external agencies for consideration in 2010-11 :

- Simultaneous Treatment of Fringe Forest and Adjoining Non- forestlands for Conservation of Water, Bio-diversity, Sustainability of JFM and Poverty Alleviation (Central Sector Project).
- Non Timber Forests Produce – Livelihood Possibilities in Uttarakhand.

- Non Timber Forests Produce (NTFP)

- Livelihood possibilities for local rural communities in the State of Madhya Pradesh.

EAP Division also acts as a nodal point, being the North-East Cell, in respect of North Eastern States for forestry related matters and following activities:

- Forest based industrial estates
- Transportation of forest produce
- Court cases in Apex Court, etc.

Climate Change

Introduction

Climate Change, as a global environmental phenomenon, has received heightened political attention in recent years. Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change

(2007) has stressed the unequivocal nature of human-induced climate change. AR4 projects that climate change, if not addressed, may result in rising temperatures, changed rainfall patterns, and increased severity and frequency of floods, droughts and cyclones, which can severely impact livelihoods, especially of the poor in developing countries.

Expert level studies conducted in India indicate that climate change may exacerbate the problem of existing climate variability in India. It is projected that, by the end of 21st century, rainfall in India may increase by 15-40% with high regional variability. Warming may be more pronounced over land areas with northern India experiencing maximum increase. The warming could be relatively greater in winter and post-monsoon seasons. The annual mean temperature could increase by 3°C to 6°C over the century.

International regime for climate change

Recognising the global nature of climate change, a consensus-based international regime for addressing climate change was agreed in 1992 in form of the United Nations Framework Convention on Climate Change (UNFCCC). The Convention is premised on the principle of “common but differentiated responsibilities and respective capabilities” of the member Parties. It recognizes that the developed countries who have the largest share in historical and current global emissions of greenhouse gases will address the problem by reducing their emissions and providing financial and technology support to developing countries to enable them to take mitigation and adaptation actions. The implementation of the Convention is reviewed by the Conference of Parties (CoP) at its annual meetings. The Kyoto Protocol of the Convention sets legally binding targets for GHG reductions by industrialized countries (5.2% below their aggregate 1990 emissions) during the “first commitment period”, 2008-2012.

Currently, the international community is engaged in negotiating and implementing enhanced actions for achieving the objectives of the Convention and its Kyoto Protocol. The mandate given to the parties to decide on the enhanced actions (including the actions of the largest non-Kyoto party emitter i.e. the US) and the emissions reduction targets of the developed countries for the 2nd commitment period under the Kyoto protocol for the post-2012 period is known as the Bali Road Map and is the basis of the current negotiations. Following this mandate, the parties took certain decisions at the Cancun Conference held in December 2010, to make progress, though partially on these issues.

Cancun Agreements at CoP 16

The sixteenth Conference of Parties (COP-16) to UNFCCC held at Cancun from November 29-December 10, 2010 took important decisions on the global issues under negotiations. The Indian delegation to the Conference led by Shri Jairam Ramesh, Minister of State (Independent Charge), Environment & Forests played an important role in facilitating the discussions and reaching agreements.

The Cancun outcomes, termed as Cancun Agreements, are in form of a set of decisions that seek to advance, though only partially, the implementation of the Bali Action Plan and the mandate under the Kyoto Protocol, together known as the Bali Road Map. The decisions establish a work programme to implement the agreements reached on specific issues in the two tracks of negotiations, namely the Long-term Cooperative Action (LCA) under the UNFCCC and its Kyoto Protocol (KP).

The Cancun Agreements are significant in the contrast which they provide to the negotiations held at Copenhagen in 2009 where no decisions could be reached despite intensive discussions. The Cancun Agreements seek to create a delicate balance in the

obligations of all parties by seeking to build a globally cooperative set of actions, particularly through anchoring/compilation of the mitigation pledges and actions of developed and developing countries. As a part of these actions, the Parties have also agreed, at Cancun, to establish a regime of measurement, report and verification (MRV) of their commitments and actions in accordance with internationally agreed guidelines. However, one of the key objectives, namely, the determination of emission reduction targets of developing countries in the second commitment period of the Kyoto Protocol (KP) is yet to be achieved.

The Cancun decisions also set up a Climate Fund, a Technology Mechanism, an Adaptation Framework and a framework of actions on forestry. While, these decisions represent a forward movement, there are several issues of importance that need to be addressed from both, a global as well as a developing country perspective. Substantial work remains to be done on strengthening of weak mitigation pledges by developed countries, preventing unilateral trade actions in the name of climate change, ensuring equity in burden sharing in the movement towards long term goal of climate stabilization, provision and mobilization of adequate resources for financing climate change related actions through multilateral channels, and sustaining a dialogue on Intellectual Property Rights as part of technology development and transfer efforts. The discussions on the work programme agreed at Cancun and related issues will continue to take place in two tracks of the Kyoto protocol and the Convention in the run up to Durban, South Africa (December 2011) where outcomes are expected to be reached.

Climate Change and India's actions

Although India's contribution to global climate change is minimal and its total CO₂

emissions are about 4% only of total global CO₂ emissions, India has been conscious of the global challenge of climate change. India's strategy for addressing climate change is reflected in many of its social and economic development programmes. Current Government expenditure in India on adaptation to climate variability exceeds 2.6 per cent of the GDP, with agriculture, water resources, health and sanitation, forests, coastal zone infrastructure and extreme events, being specific areas of concern.

In fulfillment of the international obligations under the UNFCCC, India prepares a National Communication (NATCOM) which gives an inventory of the greenhouse gases (GHG) emissions in India, and assesses the vulnerability and impacts. The NATCOM also makes appropriate recommendations regarding social, economic and technological measures for addressing climate change. First NATCOM was presented in 2004. The Government is engaged in preparing NATCOM II, which will be presented to the UNFCCC in 2011. Preparation of NATCOM II is an exercise based on an extensive network of research and scientific institutions in India and draws upon expertise and assistance from different institutions.

The National Action Plan on Climate Change (NAPCC) coordinated by the Ministry and implemented through the Nodal Ministries is aimed at advancing relevant actions in specific sectors/areas. Eight national missions in the area of solar energy, enhanced energy efficiency, sustainable agriculture, sustainable habitat, water, Himalayan eco-system, increasing the forest cover, and strategic knowledge for climate change form the core of National Action Plan. The National Missions on Solar, Energy Efficiency, Water, Agriculture and Sustainable Habitat have been approved by the Prime Minister's Council on Climate Change. State Governments are also

preparing, under advice of the Central Government, State Action Plans aimed at creating institutional and programme oriented capacities to address climate change. These, together with the National Missions will enhance the climate change related actions in the public and private domain.

An indicative target of increasing energy efficiency by 20% by 2016-17 is already included in the 11th Five Year Plan. Perform, Achieve and Trade (PAT) scheme will now be implemented under the National Mission on Enhanced Energy Efficiency, by the Bureau of Energy Efficiency (BEE) in order to achieve this goal. The scheme will cover over 700 energy intensive industrial units and will help them reduce their energy consumption.

Government has announced a domestic mitigation goal of reducing emissions intensity of GDP by 20-25% by 2020 in comparison with 2005 level. This is in line with the projections of the energy intensity of India's output that has shown a declining trend owing to improvements in energy efficiency, autonomous technological changes and economical use of energy. India's climate modeling studies show that, even with 8-9% GDP growth every year for the next decade or two, its per capita emissions will be around 3-3.5 tonnes of carbon dioxide equivalent by 2030, as compared with 1-1.2 tonnes, at present. These will be well below developed country averages by any estimation.

Achieving the domestic goal of lower energy intensity requires significant resources to be deployed in different sectors of economy. An Expert Panel appointed by the Planning Commission is examining the possible ways in which a low carbon strategy for development can be implemented while ensuring inclusive growth. The levy of a cess on coal to generate resources for a National Clean Energy Fund set up by the Government during 2010, recommendations made by the 13th Finance

Commission for award of grants to States linked with environmental protection including conservation of forest cover, and funds for afforestation earmarked to the States by Compensatory Afforestation Management and Planning Authority (CAMPA) represent important steps taken by the Government in this direction.

Steps have also been taken to increase capacity at the institutional level for conducting research into climate change science and making necessary assessments. The Ministry has set up a network, namely the Indian Network for Climate Change Assessment (INCCA) comprising of 127 research institutions tasked with undertaking research on the science of climate change and its impacts on different sectors of economy across various regions of India. The Ministry released, in May 2010, India's Green House Gas (GHG) Emissions Inventory for 2007 prepared by INCCA. The 2007 inventory was brought out in order to increase transparency of estimates of the GHG emissions in India. With this publication, India became the first 'non Annex I' (i.e., developing) country to publish such updated numbers. This constitutes a major step forward to improving the frequency of the preparation of NATCOMs and emissions inventory in India.

The Ministry carried out, in 2010, a major assessment of the impacts of climate change on four sectors – water resources, agriculture, forests and human health – in four critical regions of India – the Himalayan region, North-East, Western Ghats and coastal prepared by INCCA. The Report was released by the Ministry in November 2010. The Ministry has also launched an ambitious project on assessment of 'black carbon' and its impact on environment in consultation with other agencies of the Government.

India's participation in CDM projects continued to see an upward trend during the year. By the end of 2010, the total number of approved projects in India had risen to

1887 out of which 590 had been registered by the CDM Executive Board (EB) of the UNFCCC. The total investment potential of the approved projects is ₹306,260 Crores. The Certified Emission Reduction certificates (CERs) for the projects approved by the EB are 81.28 million. At a nominal value of US \$ 10 per CER, this represents a likely flow of around US \$ 810 million. India continues to occupy the second position globally in terms of projects approved by the EB as also in terms of the value of CERs earned by the approved projects.

Initiatives taken in 2010-11

Besides following a pro-active policy of domestic actions, India took several other initiatives during the year to advance domestic and international actions on climate change. The Ministry organised, in collaboration with the United Nations Department of Economic and Social Affairs (UNDESA), a Ministerial Dialogue on 'Climate Change: Technology Mechanism' on 9-10 November, 2010 in Delhi. High level representatives from 37 countries and international organizations participated in the Conference to discuss and agree on the approach to the structure, function and mechanism of the proposed Technology Mechanism under the Convention for supporting global efforts on technology. The views piloted by India and emerging from the Conference on formation of Technology Executive Committee (TEC) and Climate Technology Centers and Network (CTCN) are part of the Cancun agreements on technology and broadly reflect our concerns.

During the visit of Chinese Premier in December 2010, India and China signed on December, 16, a Memorandum of Agreement for 'Cooperation on Green technologies'. This MoU was a sequel to the MoU signed in 2009 on "Cooperation on Addressing Climate Change", reflecting the growing cooperation and synergy between India and China on the

issues relating to climate change. As a follow up to the India-China MoU on climate change cooperation (2009), a joint India-China workshop on 'Mountain Eco-systems and Climate Change' was also organized in Beijing on September 29, 2010. A team of Indian experts led by M/o. Environment and Forests and consisting of representatives of Ministry of Earth Sciences, M/o. External Affairs and the G.B. Pant Institute of Himalayan Environment and Development (GBPIHED) participated in the workshop.

Efforts were made during the year to promote bilateral cooperation in climate change with SAARC, ASEAN and AoSIS countries. At the SAARC Summit held in March, 2010 in Bhutan, the Prime Minister announced setting up of a Climate Endowment for SAARC countries. The India-ASEAN Green Fund set up during 2008, following the Prime Minister's announcement made during East-Asia Summit in 2007, was operationalised in ASEAN Secretariat with the release of initial installment of funds by India. Rules for operation of the fund were also finalized in consultation with the ASEAN Secretariat. Mutual understanding with the Association of Small Island States (AoSIS) was sought to be enhanced by making an offer of a scholarship programme to each member country of the Small Island Developing States (SIDS). The offer is intended to provide technical assistance and capacity building on climate science and climate change studies to the officials and scholars from small island developing states. The offer is proposed to be implemented through the Indian Technical and Economic Cooperation (ITEC) administered by the MEA.

During 2010, the UN Secretary General set up two high level panels, one on the issues relating to long term climate change finance, and the other on issues relating to global sustainability to advance actions on climate change. India has followed the developments closely and has also remained

engaged in the meetings of several international fora such as Major Economies Forum organized by the US, the Ministerial Dialogues convened by the Mexico as the President of COP 16, as also several other multilateral, regional and bilateral initiatives with a view to advance global actions on climate change.

India's National Communication to United Nations Framework Convention on Climate Change (UNFCCC)

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. The Convention enjoins Parties to communicate information about the implementation of the Convention, taking into account the common but differentiated responsibilities and respective capabilities and their specific regional and national development priorities, objectives and circumstances. Article 12 of the Convention relates to the communication of information pertaining to implementation in accordance with Article 4 (1) of the Convention, whereby each Party is required to communicate to the Conference of the Parties. The elements of information in the communication are provided in the context of national circumstances and include:

- A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of Parties;
- 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 that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

Towards fulfilment of obligation under the UNFCCC, India submitted its Initial National Communication 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 to the UNFCCC. The Ministry of Environment & 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 the National Communication.

Indian Network of Climate Change Assessment (INCCA)

The Indian Network Climate Change Assessment (INCCA) is a network based programme of the Ministry to undertake more ambitious programme of climate change assessment. The mechanism consists of a network of Institutions and Scientists from across the country. Studies are undertaken to enhance understanding of the phenomenon of climate change and its impact on various sectors of the Indian economy and society. This programme envisages to cover significant aspect related to climate change, including, for example, the study of black carbon and

the impact of climate change on glaciers and on rainfall patterns. The major elements of the envisaged programmes on Assessment include:

- Climate Change scenarios for 2030
- Impact assessment at national level on water resources, agriculture, forests, energy, coastal zone and human health.
- Integrated impacts and vulnerability assessment
- Developing adaptation frameworks

Greenhouse Gas Emissions

Under the aegis of Indian Network for Climate Change Assessment a Report on 'India's Greenhouse Gas Emission – 2007' was published in May 2010. This Report contains updated information on India's Greenhouse Gas Emission for the year 2007. India has become the first developing country to publish such updated numbers. The Assessment has been prepared by 83 Experts belonging to 19 Institutions country wide.

This assessment provides information on India's emissions of Greenhouse gases (carbon Dioxide, Methane and Nitrous Oxide) emitted from anthropogenic activities at national level from Energy; Industry; Agriculture; Waste and Land Use land Use change & Forestry (LULUCF)

The key results given in the Report are as follows

The net Greenhouse Gas (GHG) emissions from India in 2007, that is emissions with Land Use Land Use Change & Forestry were 1727.71 million tons of CO₂ equivalent (eq) of which CO₂ emissions were 1221.76 million tons; CH₄ emissions were 20.56 million tons; and N₂O emissions were 0.24 million tons GHG emissions from Energy, Industry, Agriculture, and Waste sectors constituted 58%, 22%, 17% and 3% of the net CO₂ eq emissions respectively. The GHG emission from Energy

sector emitted 1100.06 million tons of CO₂ eq, of which 719.31 million tons of CO₂ eq were emitted from electricity generation and 142.04 million tons of CO₂ eq from the transport sector. Industry sector emitted 412.55 million tons of CO₂ eq. LULUCF sector was a net sink. It sequestered 177.03 million tons of CO₂. India's per capita CO₂ eq emissions including LULUCF were 1.5 tons/capita in 2007.

Climate Change & India: A 4x4 Assessment – A Sectoral and Regional Assessment of Impact of Climate Change in 2030s

The studies were undertaken in four climate sensitive climate sensitive regions of the country, viz., Himalayan Region, Western Ghats, North Eastern Region Coastal areas in the four sectors such as agriculture, water, forests and health have been analysed and a Report titled 'Climate Change and India: A 4x4 Assessment – A Sectoral and Regional Analysis for 2030s' have been prepared and was released in November 2010. This report brings together a review of what is known about the impacts of climate variability in the four regions and sectors aforesaid.

The 4x4 Assessment for 2030 provide implications of climate change on aspects such as temperature, precipitation, extreme temperature, extreme precipitation, cyclones, storm surges, sea-level rise, impact on agriculture, natural eco-system and bio-diversity and impact on human health, water, frequency of droughts and floods. The Report also indicates the way forward addressing data gaps, systematic observations. Regional climate modelling with higher resolution, capacity building and plan for regional assessment.

National Carbon Aerosol Programme

Under the aegis of INCCA, a National Carbon Aerosol Programme (NCAP) is

envisaged with a view to enhance our understanding of the sources and estimation of quantities including nature of Aerosols, including Black Carbon (BC), monitoring and finally the impact of Black Carbon. The programme thus attempts to address science questions such as – The study is contemplator as a multi-institutional network.

- The contribution of aerosols, especially black carbon aerosols, to regional warming.
- Role of Black Carbon on atmospheric stability and the consequent effect on cloud formation and monsoon.
- Role of Black Carbon in altering the ability of hygroscopic aerosols to act as cloud condensation nuclei.
- Role of BC-induced low-level temperature inversions and their role in formation of fog especially over northern India.
- The response of tropical oceans to large decrease in surface solar heating and the consequent effect on the hydrological cycle.
- Role of Black Carbon both as a result of BC deposition on snow as well as warming

by elevated BC aerosols, if any, on Himalayan glacier retreat.

Two Consultative Meetings have been organized with Scientists for devising the science programme of the study.

Indo-UK Collaborative Research Programme on Climate Change – Impact and Adaptation - Phase II

This is a joint collaborative research programme between the Government of United Kingdom, Department of Energy and Climate Change and the Ministry of Environment and Forests, Government of India.

The Phase-II of the project was launched on 11th and 12th May 2009. The institutions responsible for undertaking research activities on various components 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 at Table 31.

As per the annual action plan of the project, a Review Meeting was held in May, 2010 by the Joint Working Group Co-chaired by the representative of Ministry and the

13

Table-31. Institutions and Research areas of the Project on Climate Change

Name of the Institutions	Area of research
Indian Institute of Technology, Delhi.	Linking water and agriculture in river basins: Impact of climate change.
Indian Institute of Tropical Meteorology, Pune	Development and dissemination of high resolution climate change scenario
Winrock International India, Delhi	Assessment of state level vulnerability and adaptation – a case study in Orissa
Development Alternative, New Delhi	State level vulnerability and adaptation assessment – a study in Madhya Pradesh.
Indian Institute of Management, Ahmedabad	Socio-economics

Representative of Department of Energy and Climate Change.

Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental panel on Climate Change (IPCC) 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 it undertakes and facilitates implementation of various activities of the IPCC at both international and national level.

The IPCC selected a list of 831 climate change experts worldwide to serve as Coordinating Lead Authors, Lead Authors and Review Editors for preparation of the Fifth Assessment report out of which 34 Experts/Scientists are from Research Institutions/Universities/Government Agencies from India.

These Experts will contribute towards preparation of IPCC 5th Assessment Report to be published between 2013 and 2014. These Experts will also provide contributions to the Synthesis Report to be published in 2014. The 32nd Session of IPCC was held in October 2010 at Busan, Korea, at which the IPCC accepted the list of authors selected for preparation of AR 5 Report.

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 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. In India, provisions of the Montreal Protocol and its London Amendment came into effect from 17th September, 1992. India also ratified the Copenhagen Amendment (1992), the Montreal Amendment (1997) and the Beijing Amendment (1999) on 3rd March, 2003.
- India was self sufficient in production of Chlorofluorocarbons (CFCs). India was mainly producing and using nine of the 96 substances controlled under the Montreal Protocol. These are CFC-11, CFC-12, CFC-113, Carbontetrachloride (CTC), Hydrochlorofluorocarbons-22 (HCFC-22), Halon-1211, Halon-1301, Methyl Chloroform and Methyl Bromide. These Ozone Depleting Substances (ODS) are used in Refrigeration and Air Conditioning (RAC), foams, fire fighting, aerosol, fumigation and cleaning applications etc.

- The Government of India has entrusted the work relating 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 also established an Empowered Steering Committee (ESC) Chaired by the Secretary (E&F) which is supported by two Standing Committees, Technology and Finance Standing Committee (TFSC) and Standing Committee on Monitoring. These Committees are responsible for the implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approval and monitoring etc.

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 19th July, 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 1st January, 2003 except in MDI and other medical purposes. Other ODS such as CTC, halon, methyl chloroform will be used upto 1st January, 2010. Further, the use of methyl bromide has been allowed upto 1st January, 2015. Since HCFCs are used as interim substitute to replace CFCs, these would be allowed upto 1st January, 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 2010-2011.

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, the 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. 2010-11 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 brought under the ambit of licensing

- for purpose of both imports and exports. Import of CFCs in India has been banned.
- 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.
 - 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 technical options evolved and used in various sectors all over the globe.
 - Participation in the meeting of the Ex-Com, Open Ended Working Group (OEWG), South Asia Network meeting and joint meeting of Regional Ozone Networks, Multilateral Environmental Agreement Regional Enforcement Network Meeting (MEA-REN), Meeting of the Parties (MOP) and other Montreal Protocol related meetings.
 - Data on production, consumption, export, import of ODSs is being submitted to the Ozone Secretariat by end of September every year.
 - Organization of Technology and Finance Standing Committee (TFSC) meetings for recommending ODSs phaseout projects for submission to the MLF Secretariat and recommending projects for fiscal incentives. In year 2010, two meetings of TFSC were held and duty exemption certificate were issued to ten enterprises.
 - No Objection certificate for 122 enterprises were issued to DGFT for import and export of ODSs and ODSs based equipments.
 - Project Management Unit (PMU) was set up in 2002 to implement the CFC and CTC National Phase-out Plans.
 - The phase-out of HCFCs was accelerated by ten years with certain reduction schedule vide decision XIX/6 of the 19th MOP in 2007. The implementation of accelerated phase-out of HCFCs is a challenging task as HCFCs are widely used in various applications like RAC, foam manufacturing, solvents, fire extinguishing etc. and use is growing because of industrial and Gross Domestic Production (GDP) growth in the country. India has made a number of innovative efforts to meet the challenges of accelerated phase-out of HCFCs.
 - A Roadmap to Phase-out HCFCs was developed describing the long term vision and action plan including the policy instruments for phasing out of production and consumption of HCFCs in India.
 - A detailed Action Plan with clearly identified activities, responsible implementing agency(s)/ organization(s) and time line for implementation of the Roadmap for Phasing out of HCFC’s in India has also been prepared.

Awards & Appreciations received so far

Awards & Appreciations received so far

- The United Nations Environment Programme (UNEP), on the occasion of 20th Anniversary of the Montreal Protocol, Conferred "The Montreal Protocol Implementers Award, 2007" to the 'Ozone Cell of India' in recognition of extraordinary contributions in the effective implementation of the Montreal Protocol and the global effort to protect the Ozone Layer.
- The United Nations Environment Programme, on the occasion of 20th Anniversary of the Montreal Protocol, Conferred "The Montreal Protocol Exemplary Project Recognition" to the 'Ozone Cell of India' for its contribution to the Exemplary Project "Foam Sector Umbrella Project for Conservation to CFC-Free Technology". In addition to this, 'Ecological Refrigeration (ECOFRIG)', 'Human and Institutional Development in Ecology Refrigeration (HIDECOR)' and 'National CFC Consumption Phase-out Plan (NCCoPP)' and two Industries viz. 'M/s. Kirloskar Copeland Ltd.' And 'M/s. Satya Deeptha Pharmaceuticals' also got the Montreal Protocol Exemplary Project Recognition Award.
- "The Stratospheric Ozone Protection Award, 2008" was conferred to Dr.A. Duraisamy, Director, Ozone Cell in recognition of his exceptional contribution to global environmental protection and for leadership in Ozone Layer protection by United States Environmental Protection Agency, Washington, DC.

Achievements

- India has met the following compliance targets as per the control schedule of the Montreal Protocol:-

- Phase out of production of CFCs with effect from 1st January, 2008, 17 months prior to the Montreal Protocol schedule.
- Complete phase-out of production and consumption of CFCs, CTC and halons with effect from 1st January, 2010, except use of pharma grade CFC's under Essential Use Nomination (EUN) in manufacturing of Metered Dose Inhalers (MDIs) for the year 2010 for Asthma, Chronic Obstructive Pulmonary Disease (COPD) patients and other respiratory ailments.
- The Ex-Com of the MLF had approved a total of 301 projects involving MLF funding of US \$257,427,713 for phase-out of production and consumption of 58,638 ODP tonne.
- The Sixteenth International Day for the Preservation of the Ozone Layer was celebrated in Delhi on 16th September, 2010. The theme of this year's International Ozone Day was "Ozone layer protection: governance and compliance at their best". Shri Jairam Ramesh, Hon'ble Minister of State for Environment & Forests (Independent Charge) was the Chief Guest. Around 650 school children, policy makers, technocrats and Government officials attended the function.
- On this occasion poster, painting, model making, slogan writing, quiz, 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.
- In 2010, the Ex-Com of the MLF during 60th to 62nd meeting had approved US\$ 406,576 for Institutional Strengthening Project (ISP) for the years 2010 and 2011

and the preparation of a project for demonstration of a sustainable technological, financial and management model for disposal of ODS. The 61st Ex-Com also approved the 2010 work programme for the CTC phase-out Plan for the consumption and production sectors.

- 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 National CFC Consumption Phase-out Plan (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 units have been provided at a number of places and organizations including Indian Railways to recover, reclaim and reuse the CFCs.
- The 61st Ex-Com discussed in detail the Consolidated Business Plan of the MLF for the implementation of the Montreal Protocol for the period 2010-2014. This is very crucial period as 2013 freeze and 10% reduction of the baseline in 2015 of the accelerated phase-out of HCFCs is to be catered in this period. There were extensive discussions during the plenary as well as in the Contact Group formed for this purpose.
- In 30th Meeting of the OEWG was held in Geneva, Switzerland from 15th to 18th June, 2010. The Indian delegation was represented by Dr.B.P. Nilaratna, Joint Secretary, MoEF and Dr. A. Duraisamy, Director, Ozone Cell, MoEF. An Amendment was proposed by a number



Fig-85. Hon'ble Minister of State (I/C) for Environment and Forests, Shri Jairam Ramesh addressing at the 'International Ozone Day-2010' celebrations at New Delhi

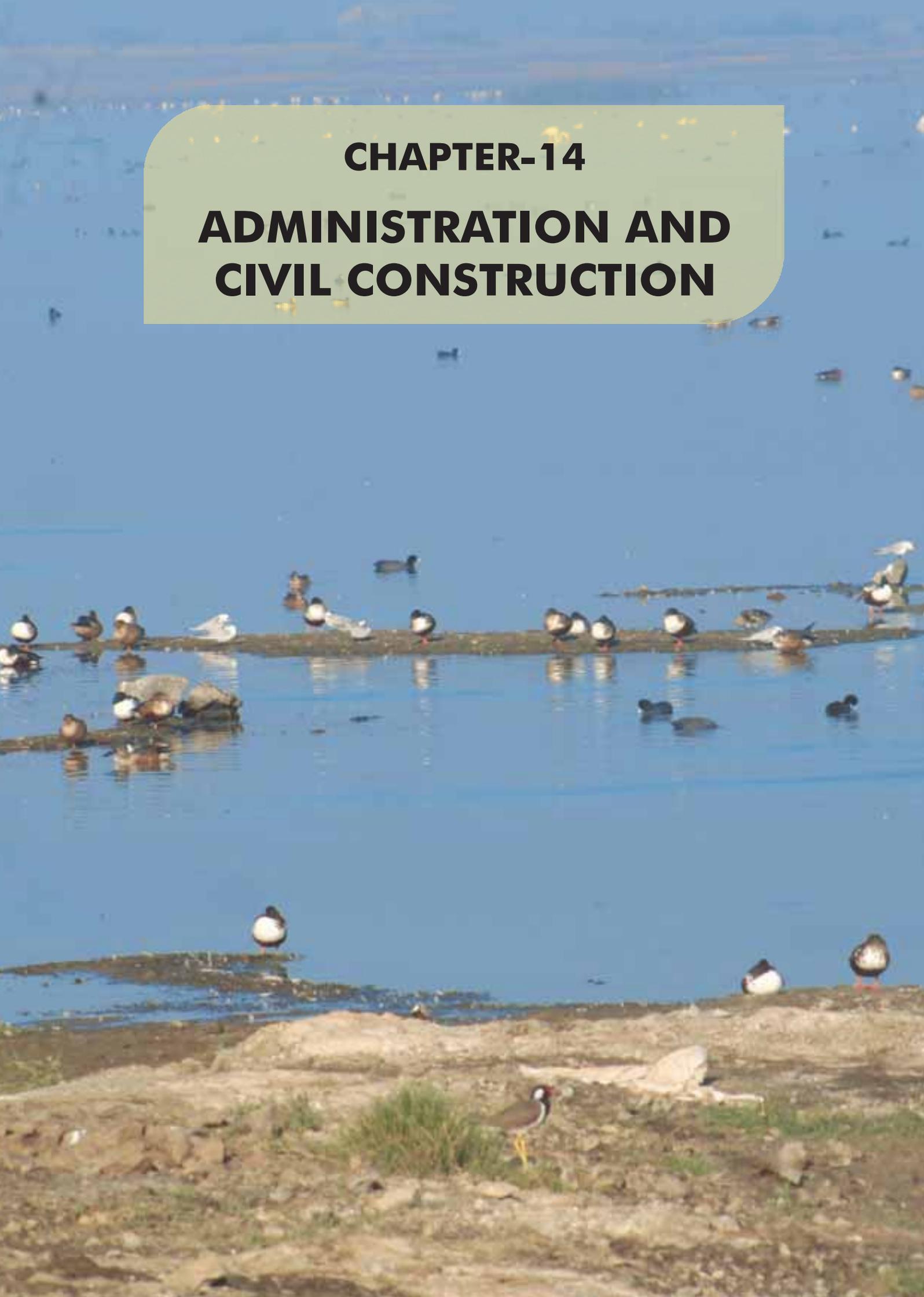
of member countries including USA and Canada, to bring Phase-down of HFCs under the ambit of the Montreal Protocol. China, Brazil, India and other member Article 5 countries were not in favour of this Amendment. India played key role during the discussion and finally the amendment was not agreed at the 22nd MOP and it may again come-up at the 31st OEWS scheduled to be held during July, 2011. India made efforts highlighting the legal, policy and technical aspects against the proposed amendments to the Montreal Protocol as per the guidance provided by the High-Level Task Force on Multilateral Environmental Agreement (Montreal Protocol) and the brief-cum-approach approved by the Hon'ble Minister of State (I/C) for Environment and Forests.

- The 22nd MOP to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at the United Nations Conference Centre, Bangkok, Thailand from 8th to 12th November, 2010. The Indian delegation was represented by Dr.B.P. Nilaratna, Joint Secretary, MoEF and Dr. A. Duraisamy, Director, Ozone Cell, MoEF. An Amendment was proposed by a number of Member Countries including USA and Canada to bring Phase-down of HFCs under the ambit of a Montreal Protocol. China, Brazil, India and other member Article 5 countries were not in favour of this Amendment. India played key role during the discussion and finally the amendment was not agreed at the 22nd MOP and it may again come-up at the 31st OEWS scheduled to be held during July, 2011.
- India raised the issue of HCFCs in pre-blended polyols at the 30th OEWS as the legal status of the HCFCs in pre-blended polyols is important as it is needed for

establishing the baseline in Article 5 Parties. The 22nd MOP acknowledged with appreciation the efforts of India to bring this important issue to attention of the Parties. The Parties decided to take a note with appreciation the cooperative manner in which the 61st Meeting of the Ex-Com of the MLF addressed this issue and agreeing on a framework on eligible incremental costs for Article 5 Parties in their transition from the use of HCFCs in pre-blended polyols.

- The National Strategy for Transition to Non-CFC MDIs and Plan for Phase-out of CFCs in the Manufacture of Pharmaceutical MDIs has been implemented with an accelerated pace. The Indian MDIs manufacturers have made an excellent progress in phase-out of CFCs in manufacturing of MDIs. In view of this, India in consultation with MDI manufacturers has withdrawn the EUN for 2011. The 22nd MOP congratulated India for its efforts in successful implementation of the National Strategy for Phase-out of CFCs in the Manufacture of Pharmaceutical MDIs.
- The 62nd Ex-Com held from 29th November to 3rd December, 2010 discussed in detail the policy issues related to implementation of accelerated phase-out of HCFCs like funding for 2013 freeze, incremental costs related to retooling for manufacturing of heat exchangers, phase-out of production of HCFCs etc. There were extensive discussions during the plenary as well as contact groups formed for these purposes. India played a key role in the discussions. Some of the issues will further be discussed during the 63rd Ex-Com.
- India has been elected as the Co-opted Member of the Ex-Com for the year 2011 with China. India was a Member of the Ex-Com for the year 2010.

- The following workshops were conducted during this year:
 - Seven workshops on Good Servicing Practices and Retrofitting of Ice Candy Plants with Open Type Compressor (OTC) from CFC-12 to HCFC-22 were organized by the Ozone Cell.
 - Six Awareness Workshops for HCFC Phase-out Management Plan (HPMP), three each in RAC Manufacturing and Foam Manufacturing sectors were organized by Refrigeration and Air-conditioning Manufacturers Association (RAMA) and Indian Polyurethane Association (IPUA).
- 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.
- In addition to these, workshops and seminars are also being organized on a regular basis for interaction with industry, Government bodies etc.



CHAPTER-14
**ADMINISTRATION AND
CIVIL CONSTRUCTION**

Personnel Administration

Staff Position

The staff strength of the Ministry including NAEB, NRCD is given in Table-32.

Recruitment and Promotion of Scientists

Following the re-organisation of the Scientific Departments/Ministries during 1986 and the consequent de-linking of the Group 'A' Scientific posts for the purview of the UPSC and introduction of Flexible Complementing Scheme (FCS), P-III Section was specifically conceived and created in the Ministry to function as a separate, distinct, centralized and confidential unit for the purpose of

recruitment (through Direct Recruitment/Deputation) as well as promotion under FCS (Flexible Complementing Scheme) 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.

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 are given Table-33.

Table-32. Number of employees in various groups and with reservation positions

Group of Post	Sanctioned Strength	Number in position	Scheduled Castes	Scheduled Tribes	OBCs	Physically Handicapped
A	170	157	16	03	08	02
B	276	225	32	09	09	04
C	429	291	89	14	17	05
Total	875	673	137	26	34	11

The Ministry has outsourced some clerical jobs to tide over the shortage of the staff during the year.

Table-33. Review and assessment of scientists for promotion

Organisation	Scientists Considered for Screening	No. of Scientists screened in for interview	No. of Scientists successful in the interview
Ministry Proper including Regional Offices	11	07	07
Botanical Survey of India	09	03	03
National Museum of Natural History	04	01	01
National River Conservation Directorate	07	05	05
Zoological Survey of India	29	25	24

Recruitment

During the year the following posts of Scientists (Table 34) were filled by way of Direct Recruitment/Deputation.

In addition to the above, the process to fill up one post of Scientist 'F', one post of Scientist 'E', six posts of Scientists 'C' in Ministry (Proper) including Regional offices, one post of Scientist 'G' (Director) in Botanical Survey of India, six posts of Scientist 'C' in BSI, one post of Scientist 'E' plus six posts of Scientist 'B' in NRCD, one post of Scientist 'C' in NMNH and one post of Scientist 'B' in Directorate of Forest Education is underway.

General Administration

The General Administration (GA) Division of the Ministry is entrusted with the responsibility of procurement of stationery, stores and equipment for functioning of the Ministry and providing essential services to the personnel of the Ministry including transport, communication, general upkeep etc. Some of the major initiative/activities of the Division during the year are (i) renovation of the 5th floor B2 wing of Paryavaran Bhavan, which was devastated in a fire in April, 2009. The office space measuring about 4000 sq.ft. has since been renovated through the CPWD as an open office system with modern facilities; (ii) the Ministry has acquired about 9565 sq.

mtr. of land at Aliganj, Jorbagh Road, New Delhi for construction of its own office building. The GA Division is working in tandem with various agencies involved in the project to complete the building by middle of 2012. Construction work for the building has since started after completion of various procedural formalities and obtaining statutory clearances from various authorities; (iii) the Division has hired 9754.78 sq.ft. office space from NDMC at Palika Bhavan to decongest the office space at paryavaran Bhavan. Some of Divisions/Sections are expected to be relocated shortly after renovation of the premises is completed by NDMC in February, 2011.

Indian Forest Service (IFS) Cadre Management Division

Mandate

- The Indian Forest Service (IFS) Cadre Management Division is enjoined upon to handle the business of the Ministry as the Cadre Controlling Authority for the Indian Forest Service (one of the three All India Services).
- The total authorized cadre strength of the Indian Forest Service as on 1st January, 2010 is three thousand thirty four which includes 2115 Direct Recruit and 919 Promotion posts. The Total Senior Duty Posts (SDP) in the Indian Forest Service

Table-34. Filling of Scientist posts by Direct recruitment/Deputation

Zoological Survey of India	one post of Scientist 'G' (Director)
Botanical Survey of India basis	11 posts of Scientist 'C' on Direct Recruitment
Ministry Proper including Regional Offices	10 posts of Scientist 'C' on Direct Recruitment basis, one post of Scientist 'D' on Deputation
National Museum of Natural History basis	one post of Scientist 'D' on Direct Recruitment
National River Conservation Directorate basis	one post of Scientist 'C' on Direct Recruitment

are one thousand eight hundred thirty four and the remaining under various reserves. Besides serving the thirty one Forest Departments in the States and Union Territories managing the country's natural resources, a good number of them work in various Ministries and institutions both in the State and Central Government.

Main activities of the IFS Cadre Management are :

- Determination of vacancies and framing of rules for Direct Recruitment and allocation of cadres to IFS probationers.
- Determination of vacancies for induction of State Forest Service Officers by promotion into Indian Forest Service, coordination of Selection Committee Meeting, Promotion and Determination of Seniority.
- Cadre Review for revision of composition and strength of IFS in various cadres.
- Selection/appointment of IFS officers to various posts under the Central Staffing Scheme of the Ministry and to various autonomous bodies including Indian Council of Forestry Research & Education, Dehradun; Indian Institute of Forest Management, Bhopal and Wildlife Institute of India, Dehradun.
- Facilitation of Selection/Appointment of IFS officers against the Central Staffing Scheme of the Department of Personnel & Training (DoPT).
- Finalisation of various service matters like inter-cadre transfers, inter-cadre deputations, cadre clearance for placements/trainings and post retirement benefits to the officers.
- Management of AGMUT cadre including promotions, transfers, postings and other service matters.

Progress/Achievements during the year

- The IFS Cadre Management Division of the Ministry deals with the broad items of work relating to the Indian Forest Service.
- Direct Recruitment to the Indian Forest Service.
- Allocation of IFS Probationers to various State cadres.
- Up-to-date Civil List of IFS officers is available on the website of this Ministry at www.ifs.nic.in besides, vacancy circulars, training programme circulars, Rules and Regulations concerning IFS, ACR availability status of IFS officers are also hosted on this site for the benefit of the members of the Service. Each and every member of Service has been provided facility to have his unique e-mail account through NIC on this site and members of Service have been provided facility to update the date relating to their posting details online for periodical upgradation.
- Eighty four Direct Recruit officer on the basis of IFS Examination, two thousand eight were inducted into the Service.
- Thirty six State Forest Service officers were inducted into the Indian Forest Service under IFS (Appointment by Promotion) Regulations, during the year 2008-09.
- About thirty seven IFS officers joined at various levels under the Central Staffing Scheme of the Ministry and about ten IFS officers joined under the Central Staffing Scheme of the Department of Personnel & Training
- Meeting of the Cadre Review Committee were held to review the strength and composition of 11 cadres, namely AGMUT, Manipur-Tripura, Rajasthan, Nagaland, Uttarakhand, Gujarat, Andhra Pradesh, Tamil Nadu, Sikkim, Uttar Pradesh and Maharashtra.

- Thirty-seven Court Cases pending in various Courts across the Country were liquidated. Around two hundred fifty Court cases relating to the issues of IFS Cadre are pending in various Tribunals/Courts all over the Country.
- For the first time, on line system for filling up of the deputational posts under CSS introduced.
- Scanning of the ACRs of almost one thousand eight hundred (out of two thousand eight hundred twenty six) officers was completed and maintained in electronic form along with hard copies.

Vigilance

The Vigilance Division is responsible for all vigilance/disciplinary matters relating to the Indian Forest Service officers both in the Ministry including its attached and subordinate offices, autonomous organizations/PSUs & IFS officers posted in the State Governments. The Vigilance Division functions under the direct control of Joint Secretary & Central Vigilance Officer (CVO) and overall supervision of Secretary, Environment & 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 & 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 Bureau of Investigation, Central Vigilance Commission, Union Public

Service Commission (UPSC) and Department of Personnel and Training (DOPT) as per rules and procedures laid down on the matter.

During the year, 24 Disciplinary Proceedings cases, 12 Appeal cases and 16 Prosecution cases were processed in the Vigilance Division. Of these, eight Disciplinary cases, seven Appeal cases and five Prosecution cases were finally disposed off. Court cases were pursued in the respective court/CAT Bench. Counter Reply was filed in about 10 cases. Four contempt Petitions were finally dropped by the Hon'ble Tribunal. Out of 25 complaints received through CVC, five complaints were finally disposed off after obtaining and considering the investigation reports. Other complaints are at various stages of investigation/examination. Ten complaints received from other sources were also closed during the year. Thirty four numbers of application received under RTI Act were also processed and replies sent to the applicants. The progress on the disposal of DP, Appeal, Prosecution, Court cases and RTI cases as well as complaints is reviewed by JS&CVO from time to time.

About 262 Annual Property Returns as on 1st January, 2010 were received from Group 'A' & 'B' officers of the Ministry as well as organisations under it, of which 145 APRs were scrutinised till the end of December, 2010.

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 organisations and rotational transfer from sensitive posts are effected in these organisations as and when required.

Vigilance Awareness Week was observed in the Ministry during the period from 25th October, 2010 to 1st November, 2010 and a pledge was administered by Secretary (E&F)

to the officers & 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.

Parliament

Introduction

The Parliament Division in the Ministry is responsible for co-ordination of all parliament matters related to the Ministry.

During the year 2010-11, a total number of 1197 Parliament Questions pertaining to various aspects of environment were answered by the Ministry (617 questions in the Lok Sabha, out of which 59 were starred and 558 were un-starred. A total of 580 questions were asked in the Rajya Sabha, out of which 76 were starred and 504 were un-starred). The questions covered a wide range of issues with which the Ministry is concerned, prominent among them being questions related to Wildlife Management, Forest Conservation, EIA, Pollution, Freshwater and Marine Conservation, Climate Change, Environmental Conservation, Environment and Forest Trade Issue, Water Management etc.

The ENVIS Centre at WWF-India, under ENVIS scheme of the Ministry compiles the above mentioned Parliament Questions as replied by MoEF and other Ministries pertaining to various environmental issues.

Graphical representation of the Parliament Questions replied by the Ministry during 2010-11 both in Lok Sabha and Rajya Sabha in various sessions are given in Fig-86 and Fig.-87.

Every Question/Answer is classified under various sub heads of environment as per the subject list available with the ENVIS Centre, WWF-India. This year subject-wise classified questions in Lok Sabha and Rajya Sabha sums up at 759 and 808 respectively. After classification, the total no. of questions in both Lok Sabha and Rajya Sabha rises in comparison to the unclassified data, because of the fact that a single question can attribute to more than one subject sub-head.

Statistical representation depicting the subject-wise coverage of total no. of questions asked in both the houses of Parliament (Lok Sabha and Rajya Sabha) during the year 2010-11 is given in Fig.-88 and Fig.-89.

The centre is currently working on the compendium of Environment in the Indian Parliament: An Analysis 2010 with the joint consensus of Parliament Section, MoEF. The preparation of the Trends & Analysis of the above-mentioned Parliamentary questions replied by the Ministry of Environment & Forests and other Ministries related to Environment is available with the ENVIS Centre at WWF-India. Online accessibility is also there with the Centre’s website: <http://www.wwfenvis.nic.in>.

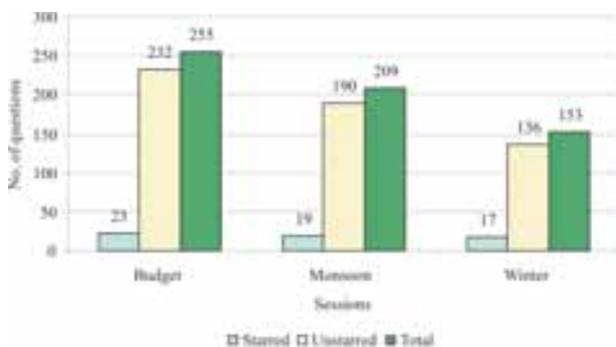


Fig-86. Number of questions replied by the Ministry in all sessions of Lok Sabha during 2010-2011

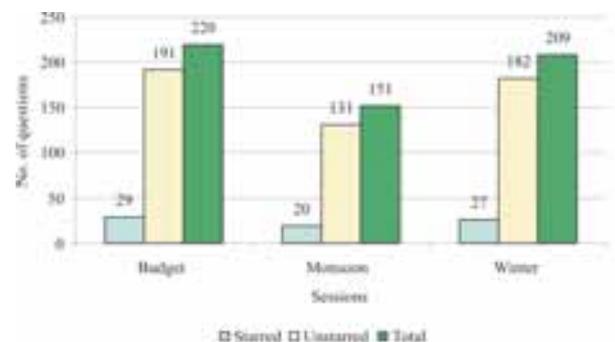


Fig-87. Number of questions replied by the Ministry in all sessions of Rajya Sabha during 2010-11

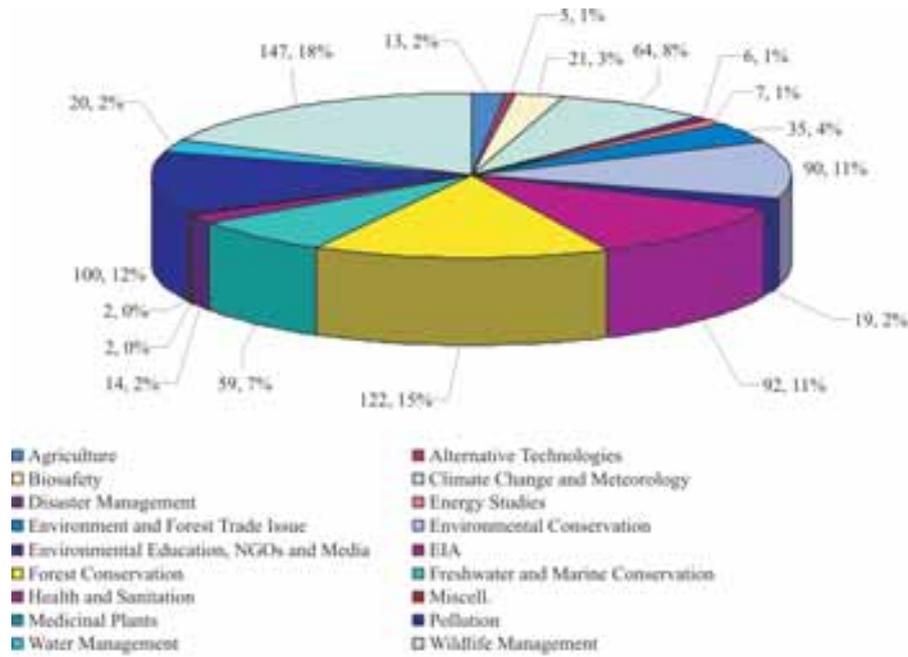


Fig-88. Subject-wise depiction of questions replied by the Ministry in Lok Sabha during 2010-2011

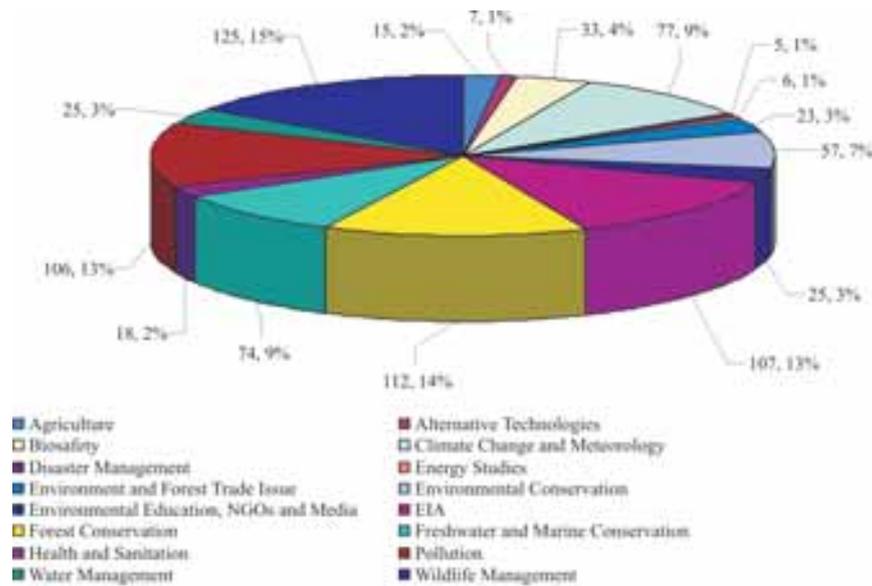


Fig-89. Subject-wise depiction of questions replied by the Ministry in Rajya Sabha during 2010-2011

During the year 2010-11, the Consultative Committee of Members of Parliament attached to the Ministry held two meeting related to Copenhagen Accord & Convention on Biodiversity. The meetings of the Department related Parliamentary Standing Committee of Science and Technology, Environment and Forests of the Members of the Parliament were

held thrice and deliberated over the demand for grants of 2010-11. Senior officers of the Ministry also held the meeting and discussed matters with regard to Lok Sabha and Rajya Sabha. Assurances and Matters raised under rule 377 in the Lok Sabha and by way of special mention in the Rajya Sabha.

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 Records 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 as 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 man power requirements for various Divisions/ Sections of the Ministry has been completed. Most of the recommendations in this regard have been implemented.

Work Management Study of scientific and non-scientific posts in the Ministry including NAEB and NRCD, by the work management 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 a continue process. O&M Inspection Reports of six subordinate/ autonomous Institution under the Ministry have been received during the year 2010-11.

Review of "Induction Material" of the Ministry has been completed and is available on the Ministry's website.

Information Technology and e-Governance

The Government has recognized Information Technology (IT) as a major 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.
- It seeks to render services to its various stakeholders with accurate, timely and reliable information and develop a more friendly and hospitable interface with public.
- Projects to be implemented in 3 Stages:
Stage 1 (Conceptualization): It includes development of vision, objectives, 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 Consultant 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 PricewaterhouseCoopers Pvt. Ltd. (PwC) was engaged as Stage 2 consultants which 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 easy access to information through a website ensuring paperless office.

Stage 3 (System Integration & Project Implementation): The Ministry invited Expression of Interest (EOI) from the System Integrators to implement and maintain ENVISION Solution. The Request for Proposal for Stage 3 consultant was circulated to the short-listed firms. After the receipt of Technical and Financial Bids, evaluation of techno-commercial bids was held. The System Integrator will be in place by March 2011.

Progress/Achievements made during the year)

- The Financial Bids received against the circulation of Request for Proposal for Stage 3 consultant was evaluated.
- The IT infrastructure of the Ministry was strengthened.
- IT training was provided to about 1400 officers and staff of the Ministry and the attached offices.
- Scanning Digitisation of 60,000 Old Archival Documents at Botanical Survey of India, Kolkata were completed.
- Photographic digitization of 1437 Nos. of Textile Designs, 3555 Nos. of Natural Dyes and 3000 Nos. Of Illustrations in the Old Archival Documents at Botanical Survey of India, Kolkata were completed.
- Strengthened the website of the Ministry.

RTI Cell

The Ministry received seven hundred ninety four applications and seventy two appeals under RTI Act, 2005 during the year 2009-

10. During the year 2010-11 one thousand five hundred eighty two applications and one hundred eighty nine appeals have been received.

Central Public Information Officers (CPIOs) and Appellate Authority (AAs) have been designated for effective implementation of RTI Act, 2005. The notification designating CPIOs/AAs is revised periodically as and when there is change in allocation of work among CPIOs/AAs. All the subordinate offices/Institutions/Autonomous bodies have been requested to periodically revise the Notification for CPIOs/AAs.

The Transparency Officer has been designated for the Ministry and the other subordinate/autonomous organizations/institutions have also been requested to nominate the transparency officer for their respective organization/institutions.

Directions from the Central Information Commission (CIC) and DoPT, relevant to this Ministry are being circulated to the CPIO/AAs for better understanding and implementation of RTI Act.

Periodicals reports being sent regularly to DoPT and Central Information Commission.

Protocol Unit

- Providing comprehensive protocol arrangements for the Minister/Minister of State of Environment and Forests and senior officers of this Ministry. This includes working out the itinerary, booking of passage, baggage handling, customs/immigration/ security checks both at the time of Departure/ Arrival of VIPs as well as Security Passes for Airport and Reserved/ Ceremonial Lounge for MEF.
- To receive and see off foreign delegations VIPs who visits Paryavaran Bhavan to meet Minister/Minister of State/Secretary.
- To handle issue/revalidation of Diplomatic/Official Passports and getting

note verbal and arranging visas from Embassies.

- To arrange passes for Independence Day/ Republic Day for under Secretary and above officers of this Ministry.
- To arrange Domestic/ International ticketing of Minister/ Secretary (E&F)/ Spl. Secretary/ DGF and various officers of the Ministry and payment of Bills thereof.
- Handling of work relating to Receptions at Rashtrapati Bhawan for VIPs upto Addl. Secretary levels.
- Examining/ Passing of canteen bills on hospitality of US & above officers, ITDC, Ashoka at IGI Airport, Parliament House (N.Rly Catering), Tea Board/Coffee Board and VIP Guests of Hon'ble Minister/ Minister of State/Secretary.
- Protocol division provided 603 Air tickets for domestic & International Sectors and arranged visas & visa notes for around 152 of different countries during the period.

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.417, (4th Floor),
Paryavaran Bhawan, CGO Complex,
Lodi Road, New Delhi – 110 003
Tel.: 011-24361712.
e-mail: jsbpn_mef@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, fifty eight 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.

The staff of various divisions/sections have been trained by holding one-day video conferencing at Paryavaran Bhawan with the assistance of Directorate of Administrative Reform & Public Grievances (DARPG) officials to dispose off the complaints online through Centralised Public Grievance Redress And Monitoring System (CPGRAMS). To run the Centralised Public Grievances portal, the IDs have been provided to the concerned sections/ Divisions in the Ministry for quick disposal of grievances/monitoring and issuing reminders online.

Recently, User IDs and Passwords of the concerned sections in the Ministry dealing with pensions were also created for operation of the CPENGRAMS Portal launched by the Department of Pensions for dealing with public grievance petitions in respect of pensions and pensionary matters.

Implementation of Official Language Policy

Introduction

Sustained efforts were made to ensure proper compliance of the Official Language Policy of the Union, as envisaged in Constitution of India, the Official Languages Act, the Official Languages Rules, the Annual Programme and orders issued from time to time.

All documents coming under the purview of Sec. 3(3) of the Official Languages Act were issued in Hindi and English bilingual form. The letters received in Hindi and representations/ appeals signed in Hindi were replied to in Hindi ensuring 100% compliance of the Rule 5 and Rule 7(2) of the O.L. Rules.

Progress of Activities undertaken

Hindi Salahkar Samiti

Meeting of Hindi Salahkar Samiti was organised under the Chairmanship of Hon'ble Minister of State (Independent Charge).

Official Language Implementation Committee

Under the Chairmanship of Joint Secretary (OL) meetings of Official Language Implementation Committee was organised in every quarter, wherein position of implementation of Official Language Policy in the Divisions/Sections of the Ministry was reviewed.

Hindi Workshop

In every quarter Hindi workshops was organised for the officers and staff to enable them to carry out their day to day transaction in Hindi.

Incentive Schemes

Aimed at encouraging and motivating the employees to increase the use of Hindi,

incentive schemes were implemented in the Ministry.

Publication of Hindi Magazine "Paryavaran"

Two special issues of "Paryavaran" magazine on Climate Change and Ozone were brought out.

Inspections

High Power Committee of Parliament on Official Language apart from Ministry of Environment and Forests inspected Forest Survey of India, Shimla; Botanical Survey of India, Coimbatore; and Botanical Survey of India (HQ), Kolkata. In addition to these inspections, seven Attached/Subordinate Offices were also inspected by Joint Secretary/Director (OL) to review the position of implementing Official Language Policy of the Union.

Hindi Fortnight

Hindi Fortnight was organized commencing from Hindi Divas 14th September, 2010 during which various Hindi competitions aimed at increasing progressive use of Official Language were organized. Employees of the Ministry, NAEB, NRCD and CCU participated in these competitions.

Civil Construction Unit (CCU)

The Civil Construction Unit (CCU) was established in March, 1987 for execution of civil works in the Ministry. This unit undertakes construction works for all the attached and subordinate offices of the Ministry such as BSI, ZSI, FSI, NMNH, IGNFA and autonomous bodies like IIFM, IPIRTI, WII, ICFRE and GBPIHED. The CCU has constructed a number of office building, laboratories, museums and residential accommodation at various places such as Almora, Dehradun, Bhopal, Delhi, Bangalore, Jabalpur, Coimbatore, Hyderabad and Kozhikode.

There are three divisions looking after construction activities throughout India. Two divisions are located at Delhi for works in Northern Region and the third division is located at Bengaluru for works under Southern Region.

Civil Construction Works of the Ministry are executed by CPWD where CCU does not have its own unit. CCU provides necessary inputs for planning and coordinate works being executed by CPWD. The management of budget also rests with CCU.

Some of the important works in progress by CCU during the year 2010-2011 are:

Works Completed

- Building for North Eastern Regional office of Ministry of Environment & Forests at Shillong. The estimated cost of the project is ₹984.32 lakhs.
- Two lecture theatre and training officers suits for FRI, Shimla. The estimated cost of the project is ₹139.25 lakhs.
- Auditorium building for RFRI, Jorhat. The estimated cost of the project is ₹199.78 lakhs.
- Six type V quarters for IWST at Bengaluru were completed in October 2010 at a cost of ₹167.17 lakhs.
- Residential quarters, scientist hostel, tissue culture lab, garage with dormitory and development works at RFRI, Jorhat. The total revised estimated cost of the project is ₹549.02 lakhs.
- Providing vitrified floor tiles in south hostel (ground floor) of state forest service college, Dehradun with an estimated cost of ₹76.16 lakhs.
- Providing vitrified floor tiles in north hostel (ground floor) of state forest service college, Dehradun with an estimated cost of ₹82.92 lakhs.

Works in progress

- Construction of Indira Paryavaran Bhawan for the Ministry of Environment & Forests at Aliganj, New Delhi has been taken up during the financial year. The sanctioned

cost is ₹13162 lakhs. A Plot of 9565 sqm. was allotted to the Ministry in September 2009. The land use has been changed from residential to office building. The building would be energy efficient and it is aimed to obtain platinum rating of LEEDS and five star rating of GRIHA. The construction of building has started in January 2011 and is targeted to completed by the middle of 2012.

- Rajiv Gandhi Regional Museum of Natural History at Sawai Madhopur, Rajasthan. SH: Museum, Auditorium block and Hostel block. The sanctioned cost of the project is ₹4100/- lakhs.
- The work of girls hostel, reception centre and garage for GBPIHED at Kosi Katarmal, Almora with an estimated cost of ₹239.90 lakh. The work is in progress and shall be completed by 31st June, 2011.
- The development work of BGIR at NOIDA consisting of entrance gate, security cabin and parking etc. with an estimated cost of ₹153.05 lakhs. It shall be completed by 31st March, 2011.
- Reconstruction of damaged retaining walls, CC road and boundary wall etc. at different location of GBPIHED at Kosi Katarmal, Almora. There was substantial damage to infrastructure at GBPIHED, Almora due to incessant rain in the area in September, 2010. Reconstruction of infrastructure wherever damaged and protection of structure have been taken up in the campus at a cost of ₹83.03 lakhs and shall be completed by December, 2011.
- Improvement of infrastructure (roads, water supply, drainage system and electrical services) in National Zoological Park, New Delhi has been taken up with an estimated cost of ₹424.36 lakhs and shall be completed during 2011-12.

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 (Point XV item No.52 & 53).

Eleventh Five Year Plan (2007-2012)

Against an approved outlay of Rs.5945 crore, the total expenditure of the Ministry during the 10th Five Year Plan (2002-07) amounted to ₹5115 crores. For the 11th Five Year Plan, the Ministry has been provided with an outlay of ₹10000 crores. The Annual Plan 2007-08, first year of the 11th Plan had an approved outlay of ₹1351 crores against

which the actual utilization amounted to ₹1349.73 crores. The Annual Plan 2008-09, second year of the 11th Plan had an approved outlay of ₹1500.00 crores against which the actual utilization amounted to ₹1483.64 crores. The Annual Plan 2009-10, third year of the 11th Plan had an approved outlay of ₹1880.00 crores, which had been reduced to ₹1650.00 crores in RE stage, against which the actual utilization amounted to ₹1630.69 crores. In the current financial year 2010-11, the Ministry has been allocated an outlay of ₹2200.00 crores which an amount of ₹1558.17 crores has been utilized till January, 2011. Sector wise details are given in Table-35.

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

Table-35. Xth Plan Expenditure, XIth Plan Outlays / Expenditure

(₹ in crores)

Sl. No.	Sector	Tenth Plan		XI Plan		2007-08		2008-09		2009-10		2010-11	
		Outlay	Exp.	Outlay	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.*	
1.	Environment	1200.00	918.83	1246.01	259.16	224.22	261.38	240.91	291.42	253.03	480.17	365.57	
2.	National River Conservation Directorate	1670.00	1543.69	2540.00	340.00	320.94	340.00	326.23	577.33	426.69	751.71	430.68	
3.	Forestry & Wildlife	1600.00	1283.55	2943.99	371.61	361.73	475.00	520.66	599.63	572.00	592.12	495.42	
4.	National Afforestation and Eco-development Board	1300.00	1293.40	3150.00	359.23	422.05	398.62	370.95	386.62	354.97	352.00	243.38	
5.	Animal Welfare	1475.00	75.11	120.00	21.00	20.79	25.00	24.89	25.00	24.00	24.00	23.12	
	Total	5945.00	5114.58	10000.00	1351.00	1349.73	1500.00	1483.64	1880.00	1630.69	2200.00	1558.17	

* Utilised till January 2011

Sector, for the programmatic variegated Centrally Sponsored and Central Sector Schemes.

Annual Plan 2011-12

As against an outlay of ₹2200.00 crores

in 2010-11, the Annual Plan proposals of the Ministry for 2011-12, the terminal year of the 11th Five Year Plan has been approved at ₹2300.00 crores. The sectoral summary of 2011-12 plan proposals is given in Table-36.

Table-36. Plan Outlay for 2011-12

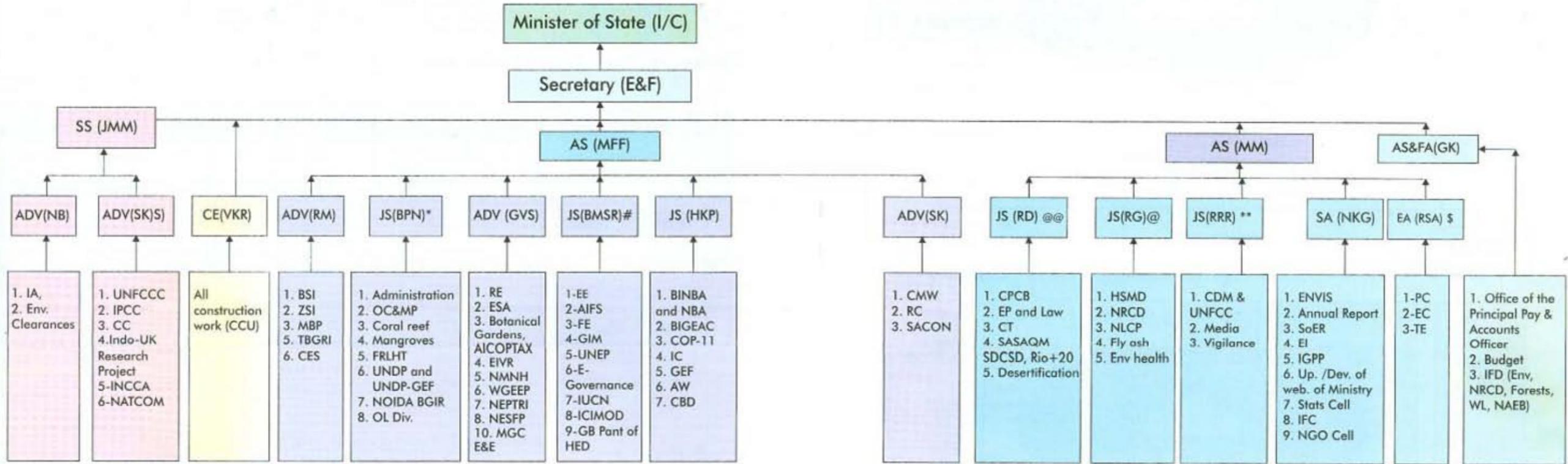
(₹ in crores)

	Sector	2010-11BE	2010-11RE	2011-12BE
1.	Environment	480.17	474.45	621.21
2.	NRCD	751.71	755.78	751.71
3.	Forests & Wildlife	592.12	588.77	573.08
4.	NAEB	352.00	357.00	330.00
5.	Animal Welfare	24.00	24.00	24.00
	Total (1-5)	2200.00	2200.00	2300.00

15

**ORGANISATIONAL STRUCTURE OF
(Divisions Under**

**MINISTRY OF ENVIRONMENT & FORESTS
Environment Sector)**



* JS (BPN) reports to SS (JMM) for Ozone Cell and Montreal Protocol and AS (MFF) for other works.
 **JS (RRR) reports to SS (JMM) for CDM & UNFCCC and AS (MFF) for Vigilance and AS (MM) for other works
 @ JS (RG) reports to AS (MFF) for Fly Ash, Environmental Health to AS&FA(GK) and AS (MM) for other works.
 @@ JS (RD) reports to AS&FA (GK) for Clean Technology and Environment Policy & Law and AS (MM) for other works.
 # JS (BMSR) reports to AS (MM) for Environmental Education, DG (F) for AIFS, FE & GIM and AS (MFF) for other works.
 \$ EA (RSA) reports to AS&FA(GK) for TE works.

AICOPTAX: All India Coordinated Project on Capacity Building in Taxonomy
 AIFS: Administration of Indian Forest Service
 AW: Animal welfare
 BGIR: Botanical Garden of the Indian Republic
 BG: Botanic Garden
 BSI: Botanical Survey of India
 BCS: Bio-Diversity Conservation Scheme.
 CC: Climate Change
 CDM: Clean Development Mechanism
 CES: Centre For Ecological Science
 CMW: Conservation and management of Wetlands
 CP: Control of Pollution
 CRZ: Coastal regulation Zone
 CPCB: Central Pollution Control Board
 CBP: Capacity Building Project

CBD: Convention on Biological Diversity
 CCU: Civil Construction Unit
 EE: Environment Education
 EIVR: Entities of Incomparable Value Regulations
 ENVIS: Environmental Information System
 ESA: Ecologically Sensitive Areas
 FE: Forest Establishment
 FRLHT: Foundation for Revitalization of Local Health Traditions
 GA: General Administration
 GBPIHED: G.B. Pant Himalayan Institute of Environment - Development
 GC: General Co-ordination
 GEAC: Genetic Engineering Approval Committee
 GEF: Global Environment Facility
 GIM: Greening India Mission
 UNFCCC: United Nations Framework Convention on Climate Change

UNCCD: United Nations Convention to Combat Desertification
 HSMD: Hazardous Substances Management Division.
 IGPP: Indira Gandhi Paryavaran Puraskar
 IA: Impact Assessment
 IC: International Co-operation
 ICIMOD: International Centre for Integrated Mountain -Development
 IFC: Information Facilitation Counter
 INCCA-Indian Network for Climate Change Assessment
 IPCC: International Panel on Climate Change
 IWSU: Internal Work Study Unit
 OC & MP: Ozone Cell & Montreal Protocol
 MBP: Man and Biosphere Programme
 NBAP: National Biodiversity Action Plan
 NBA: National Biodiversity Authority

NATCOM: National Communication to UNFCCC
 NESPF: National Environmental Sciences Fellows Programme
 NGO: Non Governmental Organisation
 NRCDD: National River Conservation Division
 NLCP: National Lake Conservation Plan
 NMNH: National Museum for Natural History
 OL: Official Language
 PG: Public Grievances
 PC: Plan Co-ordination
 P&L: Policy and Law
 RC: Rotterdam Convention
 RE: Research in Environment
 SACON: Salim Ali Centre for Ornithology & Natural History
 SD: Sustainable Development
 SoER: State of Environment Report
 TBGRI-Tropical Botanical Garden and Research Institute

ORGANISATIONAL STRUCTURE OF MINISTRY OF ENVIRONMENT

& FORESTS (DIVs. UNDER FORESTRY & WILDLIFE SECTOR)

